2020 42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC 2020)

Montreal, Quebec, Canada
20 – 24 July 2020

Pages 1-454

IEEE Catalog Number: CFP20EMB-POD
ISBN: 978-1-7281-1991-5

Copyright © 2020 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP20EMB-POD
ISBN (Print-On-Demand):	978-1-7281-1991-5
ISBN (Online):	978-1-7281-1990-8
ISSN:	1557-170X

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

Program in Chronological Order
(Copyrighted Papers)

* Author Name – Corresponding Author • * Following Paper Title – Paper not Available

Theme 01. Adaptive and Parametric Filtering (Oral Session)

Estimating the Shape of the Fetal Pulse Curve for Transabdominal Pulse Oximetry using Synchronous Averaging 1-4
Böttrich, Marcel* *(Technische Universität Ilmenau)*; Laqua, Daniel *(Ilmenau University of Technology)*; Husar, Peter *(Ilmenau University of Technology)*

Automating the Correction of Flow Integration Drift during Whole-Body Plethysmography 5-8
Stucky, Frédéric* *(University of Lausanne)*; Cazzaniga, Giacomo *(Politecnico di Milano)*; Aliverti, Andrea *(Politecnico di Milano)*; Kayser, Bengt *(University of Lausanne)*; Uva, Barbara *(University of Lausanne)*

Hilbert Huang Transformation with Filtering as a Pre-Treatment Method for the Quantitative Study of Glucose in Near Infrared Spectra 9-12
Patchava, Krishna Chaitanya* *(Qingdao University)*; Benaissa, Mohammed *(The University of Sheffield)*; Shuzhi, Sam Ge *(National University of Singapore)*

Regularized Estimation of Effective Scatterer Size and Acoustic Concentration Quantitative Ultrasound Parameters using Dynamic Programming 13-16
Jafarpisheh, Noushin* *(Concordia Univ.)*; Rosado-Mendez, Ivan Miguel *(Instituto de Fisica, Universidad Nacional Autonoma de Mexico)*; Hall, Timothy J. *(Univ. of Wisconsin)*; Rivaz, Hassan *(Concordia Univ.)*

Identification of the Vibrations Corresponding with Heart Sounds using Vibrational Cardiography 17-20
D'Mello, Yannick* *(McGill University)*; Skoric, James *(McGill University)*; Hakim, Siddiqui *(McGill University)*; Aboulezz, Ezz *(McGill University)*; Clairmonte, Nathan *(McGill University)*; Lortie, Michel *(MacDonald, Dettwiler and Associates Corporation)*; Plant, David *(McGill University)*

Theme 01. Connectivity and Causality (Oral Session)

Analysis of Electrohysterographic Signal Propagation Direction during Uterine Contraction: The Application of Directed Information 21-25
Xu, Yuhang* *(Coventry University)*; Hao, Dongmei *(Beijing University of Technology)*; Zheng, Dingchang *(Coventry University)*

Information Dynamics Analysis: A New Approach based on Sparse Identification of Linear Parametric Models 26-29
Antonacci, Yuri* *(University of Rome Sapienza)*; Faes, Luca *(University of Palermo)*; Astolfi, Laura *(University of Rome Sapienza)*

Volume Conduction Effects on Connectivity Metrics: Application of Network Parameters to Characterize Alzheimer's Disease Continuum 30-33
Ruiz-Gómez, Saúl J. *(Biomedical Engineering Group, University of Valladolid)*; Gomez, Carlos *(University of Valladolid, CIF: Q4718001C)*; Poza, Jesus *(University of Valladolid)*; Revilla-Vallejo, Marcos *(Biomedical Engineering Group)*; Gutiérrez-de-Pablo, Víctor *(Biomedical Engineering Group)*; Rodríguez-González, Víctor *(Biomedical Engineering Group, University of Valladolid)*; Maturana-Candelas, Aarón *(University of Valladolid)*; Hornero, Roberto* *(University of Valladolid)*

Emotional Networked Maps from EEG Signals 34-37
Gomez Montoya, Alejandro* *(Universidad EAFIT)*; Quintero Montoya, Olga Lucia *(Universidad EAFIT)*; López, Natalia M *(Universidad Nacional de San Juan)*; Villa Montoya, Luisa Fernanda *(Universidad de Medellín)*

Decoding Pigeon Behavior Outcomes during Goal-Directed Decision Task by WSR Functional Network Analysis 38-41
Cheng, Shuguan *(Zhengzhou University)*; Li, Mengmeng *(Zhengzhou University)*; Yu, Haifei *(Zhengzhou University)*; Zhao, Kun *(Zhengzhou University)*; Liu, Shuo *(Henan Provincial People's Hospital)*; Wan, Hong* *(Zhengzhou University)*

The Effect of Longitudinal Training on Working Memory Capacities: An Exploratory EEG Study 42-45
Pei, Zian *(Wuyi University)*; Xu, Tao *(Wuyi University)*; Bezerianos, Anastasios *(National University of Singapore)*; Li, Junhua *(Wuyi University)*; Sun, Yu *(Zhejiang University)*; Wang, Hongtao* *(Wuyi University)*

Theme 01. Data Mining for Biosignals – I (Oral Session)

Response to Vagal Stimulation by Heart-Rate Features in Drug-Resistant Epileptic Patients 46-49
Plesinger, Filip* *(Institute of Scientific Instruments of the CAS, v.v.i.)*; Halamek, Josef *(Institute of Scientific Instruments)*; Chladek, Jan *(Institute of Scientific Instruments, ASCR, v.v.i.)*; Jurak, Pavel *(Inst of Scientific Instruments Academy)*; Irena, Dolezalova *(Brno Epilepsy Center, Dept. of Neurology, St Anne's Univers)*; Chrastina, Jan *(St. Anne´s University Hospital, Brno)*; Brazdil, Milan *(Masaryk University Brno)*

A Spectral Clustering Approach for the Classification of Waveform Anomalies in High-Dimensional Brain Signals 50-53
Stamoulis, Catherine* *(Harvard Medical School)*

Gaussian Processes with Physiologically-Inspired Priors for Physical Arousal Recognition 54-57
Ghiasi, Shadi *(University of Pisa)*; Patane, Andrea* *(Dept. of Computer Science, University of Oxford)*; Greco, Alberto *(University of Pisa)*; Laurenti, Luca *(Dept. of Computer Science, University of Oxford)*; Scilingo, Enzo Pasquale *(University of Pisa)*; Kwiatkowska, Marta *(University of Oxford)*

Random Forest-Based Algorithm for Sleep Spindle Detection in Infant EEG 58-61
Wei, Lan* *(University College Dublin)*; Mooney, Catherine *(University College Dublin)*; Lowery, Madeleine *(University College Dublin)*; Soraia, Ventura *(University College Cork)*; Mathieson, Sean *(University College Cork)*; Boylan, Geraldine *(University College Cork)*; Ryan, Mary Anne *(University College Cork)*

Detecting Personality Traits using Inter-Hemispheric Asynchrony of the Brainwaves 62-65
Sharan, Roneel V.* *(Macquarie University)*; Berkovsky, Shlomo *(Macquarie University)*; Taib, Ronnie *(CSIRO)*; Koprinska, Irena *(University of Sydney)*; Li, Jingjie *(University of Wisconsin-Madison)*

Analysis of Selective Attention Processing on Experienced Simultaneous Interpreters using EEG Phase Synchronization 66-69
Yagura, Haruko* *(Nara Institute of Science and Technology)*; Tanaka, Hiroki *(Nara Institute of Science and Technology)*; Kinoshita, Taiki *(Nara Institute of Science and Technology)*; Watanabe, Hiroki *(Nara Institute of Science and Technology)*; Motomura, Shunnosuke *(Nara Institute of Science and Technology)*; Sudoh, Katsuhito *(Nara Institute of Science and Technology)*; Satoshi, Nakamura *(Nara Institute of Science and Technology)*

Theme 01. Data Mining for Biosignals – II (Oral Session)

Bi-Directional Gated Recurrent Unit based Ensemble Model for the Early Detection of Sepsis 70-73
Mahmud, Mdshaad* *(University of New Hampshire)*; Wickramaratne, Sajila *(University of New Hampshire)*

Audio for Audio is Better? An Investigation on Transfer Learning Models for Heart Sound Classification 74-77
Koike, Tomoya* *(University of Tokyo)*; Qian, Kun *(The University of Tokyo)*; Kong, Qiuqiang *(University of Surrey)*; Plumbley, Mark *(University of Surrey)*; Schuller, Bjoern *(University of Augsburg / Imperial College London)*; Yamamoto, Yoshiharu *(The University of Tokyo)*

Soft Tissue Characterization with Temporal Enhanced Ultrasound through Periodic Manipulation of Point Spread Function: A Feasibility Study 78-81
Gerolami, Justin* *(Queen's University)*; Jamzad, Amoon *(Queen's University)*; Li, Si Jia *(University of Washington)*; Bayat, Sharareh *(University of British Columbia)*; Abolmaesumi, Purang *(UBC)*; Mousavi, Parvin *(Queen's University)*

Locating Patterns in Nanopore Currents using Time-Warped Signal Representation of Consensus Nucleotides for Demultiplexing and Motif Detection 82-86
Kang, Albert S W* *(University of Cambridge)*; Enright, Anton James *(University of Cambridge)*

Enabling Context Aware Data Analysis for Long-Duration Repetitive Stooped Work through Human Activity Recognition in Sheep Shearing 87-90
Robinson, Mark Charles* *(The University of Melbourne)*; Lu, Lei *(Harbin Institute of Technology)*; Tan, Ying *(The University of Melbourne)*; Goonewardena, Kusal *(Elite Akademy Sports Medicine)*; Oetomo, Denny *(The University of Melbourne)*; Manzie, Chris *(The University of Melbourne)*

Exploration of the Physiological Response to an Online Gambling Task by Frequency Domain Analysis of the Electrodermal Activity 91-94
Rocco, Giulia* *(Université côte d'Azur)*; Reali, Pierluigi *(Politecnico di Milano)*; Lolatto, Riccardo *(Politecnico di Milano)*; Tacchino, Giulia *(Politecnico di Milano)*; Mandolfo, Marco *(Politecnico di Milano)*; Mazzola, Alessandra *(Politecnico di Milano)*; Bianchi, Anna Maria *(Politecnico di Milano)*

Theme 01. Deep Learning Methods for Electrophysiological Signals (Oral Session)

Automatic Identification of Brain Independent Components in Electroencephalography Data Collected while Standing in a Virtually Immersive Environment – A Deep Learning-Based Approach 95-98
Kaur, Rachneet *(University of Illinois at Urbana Champaign)*; Korolkov, Maxim *(UIUC ECE)*; Hernandez, Manuel* *(University of Illinois)*; Sowers, Richard *(University of Illinois at Urbana-Champaign)*

Deep Transfer Learning for Improving Single-EEG Arousal Detection 99-103
Olesen, Alexander N* *(Technical University of Denmark)*; Jennum, Poul *(University of Copenhagen, Demnar)*; Mignot, Emmanuel *(Stanford University)*; Sorensen, Helge B D *(Technical University of Denmark)*

Deep Learning for Estimation of Functional Brain Maturation from EEG of Premature Neonates 104-107
Gschwandtner, Laura* *(AIT Austrian Institute of Technology GmbH)*; Hartmann, Manfred *(AIT Austrian Institute of Technology GmbH)*; Oberdorfer, Lisa *(Dept. of Pediatrics and Adolescent Medicine, Division of Ne)*; Fürbaß, Franz *(AIT Austrian Institute of Technology GmbH)*; Klebermaß-Schrehof, Katrin *(Dept. of Pediatrics and Adolescent Medicine, Division of Ne)*; Werther, Tobias *(Dept. of Pediatrics and Adolescent Medicine, Division of Ne)*; Stevenson, Nathan *(QIMR Berghofer)*; Gritsch, Gerhard *(AIT Austrian Institute of Technology GmbH)*; Perko, Hannes *(Austrian Institute of Technology)*; Berger, Angelika *(Dept. of Pediatrics and Adolescent Medicine, Division of Ne)*; Kluge, Tilmann *(Austrian Institute of Technology)*; Giordano, Vito *(Dept. of Pediatrics and Adolescent Medicine, Division of Ne)*

Emotion Recognition with Refined Labels for Deep Learning 108-111
Zhang, Su *(Nanyang Technological University)*; Guan, Cuntai* *(Nanyang Technological University)*

Machine Learning with Imbalanced EEG Datasets using Outlier-Based Sampling 112-115
Islah, Nizar* *(University of Toronto)*; Koerner, Jamie *(University of Toronto)*; Genov, Roman *(University of Toronto)*; Valiante, Taufik A. *(University of Toronto)*; O Leary, Gerard *(University of Toronto)*

EEG-Based Emotion Recognition using Spatial-Temporal Representation via Bi-GRU 116-119
Lew, Wai Cheong Lincoln* *(Nanyang Technological University; Institute for Infocomm Research)*; Wang, Di *(Nanyang Technological University)*; Shylouskaya, Katsiaryna *(Institute for Infocomm Research)*; Zhang, Zhuo *(A*STAR)*; Ang, Kai Keng *(Institute for Infocomm Research)*; Lim, Joo-Hwee *(Institute for Infocomm Research)*; Tan, Ah-Hwee *(Nanyang Technological University)*

Theme 01. Deep Learning Methods for Neuroimaging Signals (Oral Session)

Depression Scale Prediction with Cross-Sample Entropy and Deep Learning 120-123
Chen, Guan-Yen *(National Tsing Hua University)*; Huang, Chih-Mao *(National Chiao Tung University)*; Liu, Ho-Ling *(University of Texas, MD Anderson Cancer Center)*; Lee, Shwu-Hua *(Linkou Chang Gung Memorial Hospital)*; Lee, Tatia Mei-Chun *(The University of Hong Kong)*; Lin, Chemin *(Keelung Chang Gung Memorial Hospital)*; Wu, Shun-Chi* *(National Tsing Hua University)*

Spatio-Temporal Deep Learning for EEG-fNIRS Brain Computer Interface 124-127
Ghonchi, Hamidreza *(Shahrood University of Technology)*; Fateh, Mansoor *(Shahrood University of Technology)*; Abolghasemi, Vahid* *(University of Essex)*; Ferdowsi, Saideh *(University of Essex)*; Rezvani, Mohsen *(Shahrood University of Technology)*

EEG-Based Depression Detection using Convolutional Neural Network with Demographic Attention Mechanism 128-133
Zhang, Xiaowei *(Lanzhou University)*; Li, Junlei *(Lanzhou University)*; Hou, KeChen *(Lanzhou University)*; Hu, Bin *(Lanzhou University)*; Shen, Jian *(Lanzhou University)*; Pan, Jing *(Lanzhou University)*; Hu, Bin* *(Lanzhou University)*

Generalized Prediction of Unconsciousness during Propofol Anesthesia using 3D Convolutional Neural Networks 134-137
Patlatzoglou, Konstantinos* *(University of Kent)*; Chennu, Srivas *(University of Kent)*; Gosseries, Olivia *(University and University Hospital of Liege)*; Bonhomme, Vincent *(CHU University Hospital of Liege)*; Wolff, Audrey *(University and University Hospital of Liege)*; Laureys, Steven *(Cyclotron Research Center, University of Liege in Belgium)*

Automatic Detection of Artifacts in EEG by Combining Deep Learning and Histogram Contour Processing 138-141
Bahador, Nooshin* *(University of Oulu)*; Erikson, Kristo *(University of Oulu)*; Laurila, Jouko *(University of Oulu and Oulu University Hospital)*; Koskenkari, Juha *(University of Oulu and Oulu University Hospital)*; Ala-Kokko, Tero *(University of Helsinki and Helsinki University Hospital)*; Kortelainen, Jukka *(University of Oulu)*

Deep Learning Techniques to Improve Intraoperative Awareness Detection from Electroencephalographic Signals 142-145
Avilov, Oleksii* *(National Technical University of Ukraine "Igor Sikorsky Kyiv Pol)*; Rimbert, Sébastien *(Université de Lorraine, LORIA, INRIA)*; Popov, Anton *(National Technical University of Ukraine "Kyiv Polytechnic Institute)*; Bougrain, Laurent *(University of Lorraine)*

Theme 01. Deep Learning Methods in Biosignal Analysis – I (Oral Session)

Predicting Age with Deep Neural Networks from Polysomnograms 146-149
Brink-Kjær, Andreas* *(Technical University of Denmark)*; Mignot, Emmanuel *(Stanford University)*; Sorensen, Helge B D *(Technical University of Denmark)*; Jennum, Poul *(University of Copenhagen, Demnar)*

A Machine Learning Method for Automatic Detection and Classification of Patient-Ventilator Asynchrony 150-153
Bakkes, Tom Hendricus Gerardus Franciscus* *(Eindhoven University of Technology)*; Montree, Roel *(Eindhoven University of Technology)*; Mischi, Massimo *(Eindhoven University of Technology)*; Mojoli, Francesco *(Fondazione I.R.C.C.S. Policlinico San Matteo)*; Turco, Simona *(Eindhoven University of Technology)*

Automatic Detection of Respiratory Effort Related Arousals with Deep Neural Networks from Polysomnographic Recordings 154-157
Mahmud, Mdshaad* *(University of New Hampshire)*; Wickramaratne, Sajila *(University of New Hampshire)*

Emergency Clinical Procedure Detection with Deep Learning 158-163
Li, Lingfeng *(Vanderbilt University)*; Paris, Richard *(Vanderbilt University)*; Pinson, Conner *(Vanderbilt University)*; Wang, Yan *(Vanderbilt University)*; Coco, Joseph *(Vanderbilt University Medical Center)*; Heard, Jamison *(Rochester Institute of Technology)*; Adams, Julie A. *(Oregon State University)*; Fabbri, Daniel *(Vanderbilt University Medical Center)*; Bodenheimer, Bobby* *(Vanderbilt University)*

Robust Deep Learning Framework for Predicting Respiratory Anomalies and Diseases 164-167
Pham, Lam* *(University of Kent)*; McLoughlin, Ian Vince *(The University of Science and Technology of China)*; Phan, Huy *(Queen Mary University of London)*; Tran, Minh *(University of Oxford)*; Nguyen, Truc *(Graz University of Technology)*; Ramaswamy, Palaniappan *(University of Kent)*

Rheumatic Heart Disease Detection using Deep Learning from Spectro-Temporal Representation of Heart Sounds 168-171
Asmare, Melkamu Hunegnaw* *(KU Leuven)*; Woldehanna, Frehiwot *(Addis Ababa Institute of Technology)*; Janssens, Luc *(KU Leuven)*; Vanrumste, Bart *(Katholieke Universiteit Leuven)*

Theme 01. Deep Learning Methods in Biosignal Analysis – II (Oral Session)

An Attention-Based Deep Learning Method for Schizophrenia Patients Classification using DNA Methylation Data 172-175
Zhang, Minmin *(Shanghai Key Laboratory of Navigation and Location Based Service)*; Pan, Changchun *(Shanghai Key Laboratory of Navigation and Location Based Service)*; Liu, Haichun *(Shanghai Key Laboratory of Navigation and Location Based Service)*; Zhang, Qinting* *(Shanghai Key Laboratory of Forensic Medicine, Shanghai Forensic)*; Li, Haozhe *(Shanghai Key Laboratory of Forensic Medicine, Shanghai Forensic)*

Hybrid Encoder-Decoder Deep Networks for Decoding Neural Drive Information towards Precise Muscle Force Estimation 176-179
Tang, Xiao* *(University of Science and Technology of China)*; Chen, Maoqi *(University of Science and Technology of China)*; Chen, Xun *(University of British Columbia)*; Chen, Xiang *(University of Science & Technology of China)*; Zhang, Xu *(University of Science and Technology of China)*

Optimal Scree-CNN for Detecting NS1 Molecular Fingerprint from Salivary SERS Spectra 180-183
Saifuzzaman, Aiman Tariq *(Universiti Teknologi MARA)*; Lee, Yoot* *(Universiti Teknologi MARA)*; Mohd Radzol, Afaf Rozan *(Universiti Teknologi MARA)*; Wong, Peng Shyan *(Infectious Disease Unit, Pulau Pinang General Hospital)*; Looi, Irene *(Head of Dept., Consultant Neurologist, Hospital Seberang Ja)*

Attention Networks for Multi-Task Signal Analysis 184-187
Ahmedt-Aristizabal, David* *(CSIRO)*; Armin, Mohammad Ali *(CSIRO (Data61))*; Denman, Simon *(Queensland University of Technology)*; Fookes, Clinton *(Queensland University of Technology)*; Petersson, Lars *(CSIRO Data61)*

Blood Pressure Prediction by a Smartphone Sensor using Fully Convolutional Networks 188-191
Baek, Sanghyun *(Seoul National University)*; Jang, Jiyong *(Seoul National University)*; Cho, Sung-Hwan *(Samsung)*; Choi, Jong Min *(Samsung Advanced Institute of Technology)*; Yoon, Sungroh* *(Seoul National University)*

Classify Motor Imagery by a Novel CNN with Data Augmentation 192-195
Huang, Weijian* *(Guangzhou University)*; Wang, Li *(Guangzhou University)*; Yan, ZhenXiong *(GuangZhou University)*; Liu, Yanjun *(Guangzhou University)*

Theme 01. Independent and Principal Component Analysis (Oral Session)

Potential Pitfalls of Widely used Implementations of Common Spatial Patterns 196-199
Rybář, Milan* *(University of Essex)*; Daly, Ian *(University of Essex)*; Poli, Riccardo *(University of Essex)*

Inter-Subject Correlations during Natural Viewing: A Filter-Bank Approach 200-203
Gait, Arslan* *(Nazarbayev University)*; Duisenbinov, Vladimir *(Nazarbayev University)*; Lee, Min-Ho *(Nazarbayev University)*; Bießmann, Felix *(Beuth University of Applied Sciences Berlin)*; FazLi, Siamac *(Nazarbayev University)*

Stereo-Electroencephalography (SEEG) Reference based on Low-Variance Signals 204-207
Uher, Daniel* *(Institute of Scientific Instruments, The Czech Academy of Science)*; Klimes, Petr *(Institute of Scientific Instruments of the ASCR, v.v.i.)*; Cimbalnik, Jan *(International Clinical Research Center, St. Annes University Hospital)*; Roman, Robert *(-Central European Institute of Technology, Masaryk University, B)*; Martin, Pail *(Brno Epilepsy Center, Dept. of Neurology, St Anne's Univers)*; Brazdil, Milan *(Masaryk University Brno)*; Jurak, Pavel *(Inst of Scientific Instruments Academy)*

A Comprehensive Approach for Classification of the Cough Type 208-212
Nemati, Ebrahim* *(Digital Health Lab in Samsung Research America)*; Rahman, Md Mahbubur *(Samsung Research America)*; Nathan, Viswam *(Samsung Research America Inc.)*; Vatanparvar, Korosh *(Samsung Research America)*; Kuang, Jilong *(Samsung Research America)*

Introducing a Deflationary Approach to Space-Time ICA that uses Temporal Methods in Brain Signals Processing 213-216
Chiu, Hok Yin Stephen* *(University of Warwick)*; James, Christopher *(University of Warwick)*

Eye-Blinking Artifacts Removal by ICA in Cross-Modal Long-Term EEG Recording 217-220
Huang, Gan* *(Shenzhen University)*; Hu, Zhenxing *(Shenzhen University)*; Zhang, Li *(Shenzhen University)*; Li, Linling *(Shenzhen University)*; Liang, Zhen *(Shenzhen University)*; Zhang, Zhiguo *(Shenzhen University)*

Theme 01. Neural Networks and Support Vector Machines for Biosignal Analysis (Oral Session)

Neural Network-Based Classification of Static Lung Volume States using Vibrational Cardiography 221-224
Clairmonte, Nathan* *(McGill University)*; Skoric, James *(McGill University)*; D'Mello, Yannick *(McGill University)*; Hakim, Siddiqui *(McGill University)*; Aboulezz, Ezz *(McGill University)*; Lortie, Michel *(MacDonald, Dettwiler and Associates Corporation)*; Plant, David *(McGill University)*

Robust Methods to Detect Spatial Abnormalities of the Gastric Slow Wave from Cutaneous Recordings 225-231
Coleman, Todd* *(UCSD)*; Agrusa, Anjulie *(UCSD)*; Allegra, Alexis *(UCSD)*; Kunkel, David *(UCSD)*

High Accuracy Respiration and Heart Rate Detection based on Artificial Neural Network Regression 232-235
Tsai, Yu-Chiao* *(National Chiao Tung University)*; Lai, Shih-Hsuan *(National Chiao Tung University)*; Ho, Ching-Ju *(National Chiao Tung University)*; Wu, Fang-Ming *(National Chiao Tung University)*; Henrickson, Lindor *(National Chiao Tung University)*; Wei, Chia-Chien *(National Sun Yat-sen University)*; Chen, Irwin *(Wistron Corporation)*; Wu, Vincent *(Wistron Corporation)*; Chen, Jyehong *(National Chiao Tung University)*

Parkinson's Disease Classification using Pitch Synchronous Speech Segments and Fine Gaussian Kernels based SVM 236-239
Appakaya, Sai Bharadwaj* *(University of South Florida)*; Sankar, Ravi *(University of South Florida)*

Impulse Classification Network for Video Head Impulse Test 240-243
Baydadaev, Shokhrukh *(INHA University)*; Usmankhujaev, Saidrasul *(INHA University)*; Kwon, Jang Woo *(Inha University)*; Kim, Kyu-Sung* *(Associate Professor, Dept. of Otolaryngology-Head & Neck Su)*

Prediction of Freezing of Gait in Parkinson's Disease from Foot Plantar-Pressure Arrays using a Convolutional Neural Network 244-247
Shalin, Gaurav* *(University of Waterloo)*; Pardoel, Scott *(University of Waterloo)*; Nantel, Julie *(University of Ottawa)*; Lemaire, Edward *(The Ottawa Hospital Rehab Centre)*; Kofman, Jonathan *(University of Waterloo)*

Theme 01. Neural Networks and Support Vector Machines for Electrophysiological Signals (Oral Session)

EEG-Based Driving Fatigue Detection during Operating the Steering Wheel Data Section 248-251
Zou, Bing* *(Beijing University of Posts and Telecommunications)*; Shen, Mu *(Beijing University of Posts and Telecommunications)*; Li, Xinhang *(Beijing University of Posts and Telecommunications)*; Zheng, Yubo *(Beijing University of Posts and Telecommunication)*; Zhang, Lin *(Beijing University of Posts and Telecommunications)*

Tensor-Based EEG Network Formation and Feature Extraction for Cross-Session Driving Drowsiness Detection 252-255
Shen, Mu* *(Beijing University of Posts and Telecommunications)*; Zou, Bing *(Beijing University of Posts and Telecommunications)*; Li, Xinhang *(Beijing University of Posts and Telecommunications)*; Zheng, Yubo *(Beijing University of Posts and Telecommunication)*; Zhang, Lin *(Beijing University of Posts and Telecommunications)*

Classification of Mild Cognitive Impairment from Multi-Domain Features of Resting-State EEG 256-259
Li, Yuling *(Shanghai University)*; Xiao, Shasha *(Shang Hai University)*; Li, YingJie* *(Shanghai University)*; Li, Yunxia *(Tongji Hospital of Tongji University)*; Yang, Banghua *(Shanghai University)*

MaDeNet: Disentangling Individuality of EEG Signals through Feature Space Mapping and Detachment 260-263
Moon, Seong-Eun *(Yonsei University)*; Lee, Jong-Seok* *(Yonsei University)*

EEG-Based Neglect Detection for Stroke Patients 264-267
Kocanaogullari, Deniz* *(University of Pittsburgh)*; Mak, Jennifer *(University of Pittsburgh)*; Kersey, Jessica *(University of Pittsburgh)*; Khalaf, Aya *(University of Pittsburgh)*; Ostadabbas, Sarah *(Northeastern University)*; Wittenberg, George *(University of Pittsburgh)*; Skidmore, Elizabeth *(University of Pittsburgh)*; Akcakaya, Murat *(University of Pittsburgh)*

Sequential Attention-Based Detection of Semantic Incongrueties from EEG while Listening to Speech 268-271
Motomura, Shunnosuke* *(Nara Institute of Science and Technology)*; Tanaka, Hiroki *(Nara Institute of Science and Technology)*; Satoshi, Nakamura *(Nara Institute of Science and Technology)*

Theme 01. Nonlinear Analysis of Biosignals (Oral Session)

Improving EEG-Based Error Detection using Relative Peak Features 272-275
Ashley, Adrian* *(University of Sheffield)*; Arvaneh, Mahnaz *(University of Sheffield)*

Reliability of Electroencephalogram-Based Individual Markers – Case Study 276-279
Uudeberg, Tuuli* *(Tallinn University of Technology)*; Päeske, Laura *(Dept. of Health Technologies, School of Information Technology)*; Hinrikus, Hiie *(Tallinn University of Technology)*; Lass, Jaanus *(Tallinn University of Technology)*; Bachmann, Maie *(Tallinn University of Technology)*

Sample Entropy Analysis of Pupillary Signals in Glaucoma Patients and Control via Light-Induced Pupillometry 280-283
Bhowmik, Susmit *(RMIT University)*; Motin, Mohammod Abdul *(PhD Student, University of Melbourne)*; Sarossy, Marc *(RMIT University)*; Radcliffe, Pj *(RMIT University)*; Kant Kumar, Dinesh* *(RMIT University)*

Dynamical Systems Modeling of Day-to-Day Signal-Based Patterns of Emotional Self-Regulation and Stress Spillover in Highly-Demanding Health Professions 284-287
Hadjiantonis, George *(Texas A&M University)*; Paromita, Projna* *(Texas A&M University)*; Mundnich, Karel *(University of Southern California)*; Nadarajan, Amrutha *(University of Southern California)*; Booth, Brandon *(University of Southern California)*; Narayanan, Shrikanth *(University of Southern California)*; Chaspari, Theodora *(Texas A&M University)*

Theme 01. Pattern Detection and Classification in ECG Signals – I (Oral Session)

Robust Classification of Cardiac Arrhythmia using a Deep Neural Network 288-291
Mahmud, Mdshaad* *(University of New Hampshire)*; Lennox, Connor *(University of New Hampshire)*

Arrhythmia Classification using Deep Learning and Machine Learning with Features Extracted from Waveform-Based Signal Processing 292-295
Hsu, Po-Ya* *(UC San Diego)*; Cheng, Chung-Kuan *(University of California, San Diego)*

Feature Matching based ECG Generative Network for Arrhythmia Event Augmentation 296-299
Cao, Fan* *(Biofourmis)*; Budhota, Aamani *(Biofourmis)*; Chen, Hao *(Biofourmis)*; Rajput, Kuldeep Singh *(Biofourmis)*

Interpreting Deep Neural Networks for Single-Lead ECG Arrhythmia Classification 300-303
Vijayarangan, Sricharan *(Healthcare Tech. and Innovation Center (HTIC-IITM))*; Murugesan, Balamurali *(Indian Institute of Tech. Madras)*; R, Vignesh *(Healthcare Technology Innovation Center, IIT Madras)*; Sreeletha Premkumar, Preejith *(Healthcare Technology Innovation Center (HTIC), IIT Madras)*; Joseph, Jayaraj *(HTIC, Indian Institute of Technology Madras)*; Sivaprakasam, Mohanasankar* *(Indian Institute of Tech. Madras)*

Unsupervised Domain Adaptation for ECG Arrhythmia Classification 304-307
Chen, Ming *(Tsinghua University)*; Wang, Guijin* *(Tsinghua University)*; Ding, Zijian *(Tsinghua University)*; Li, Jiawei *(Tsinghua University)*; Yang, Huazhong *(Tsinghua University)*

Arrhythmias Classification using Short-Time Fourier Transform and GAN based Data Augmentation 308-311
Lan, Tianjie *(Fudan University)*; Hu, Qihan *(School of Information Science and Technology, Fudan University)*; Liu, Xin *(Fudan University)*; He, Kaiyue *(Fudan University)*; Yang, Cuiwei* *(Fudan University)*

Theme 01. Pattern Detection and Classification in ECG Signals – II (Oral Session)

A Faster approach to ECG Analysis in Emergency Situations 312-315
Di Gennaro, Marco *(Politecnico di Milano)*; Fusco, Luigi *(Politecnico di Milano)*; Di Dio Lavore, Ian *(Politecnico di Milano)*; D'Arnese, Eleonora* *(Politecnico di Milano)*; Santambrogio, Marco *(Politecnico di Milano)*

A Novel Approach for Atrial Fibrillation Signal Classification based on Temporal Attention Mechanism 316-319
Gao, Yibo *(Univ. of Electronic Science and Technology of China)*; Wang, Huan* *(Univ. of Electronic Science and Technology of China, Chengd)*; Liu, Zuhao *(Univ. of Electronic Science and Technology of China)*

Estimation of Heart Rate Directly from ECG Spectrogram in Neonate Intensive Care Units 320-323
Cabrera-Quiros, Laura* *(Eindhoven University of Technology)*; Varisco, Gabriele *(Eindhoven University of Technology)*; Zhan, Zhuozhao *(Eindhoven University of Technology)*; Long, Xi *(Eindhoven University of Technology and Philips Research)*; Andriessen, Peter *(Maxima Medical Center)*; Cottaar, Ward *(Eindhoven University of Technology)*; van Pul, Carola *(Maxima Medical Center)*

A New Spectrum Driven Index for the Assessment of ECG Signal Quality 324-327
Jarchi, Delaram* *(University of Essex)*; Prochazka, Ales *(University of Chemistry and Technology)*; Sanei, Saeid *(University of Surrey)*

MNDL Sparsity Order Selection for Compressed Sensing with Application in ECG Compression 328-331
Shamsi, Mahdi* *(Ryerson Univ.)*; Beheshti, Soosan *(Ryerson Univ.)*; Yousefi Rezaii, Tohid *(Ryerson Univ.)*

A Graph-Constrained Changepoint Detection Approach for ECG Segmentation 332-336
Fotoohinasab, Atiyeh *(Northern Arizona University)*; Hocking, Toby *(Northern Arizona University)*; Afghah, Fatemeh* *(Northern Arizona University)*

Theme 01. Pattern Detection and Classification in ECG Signals – III (Oral Session)

Detection of Premature Ventricular Complexes using Semisupervised Autoencoders and Random Forests 337-340
Kalidas, Vignesh* *(The University of Texas at Dallas)*; Tamil, Lakshman *(University of Texas at Dallas)*

Adversarial Multi-Task Learning for Robust End-to-End ECG-Based Heartbeat Classification 341-344
Shahin, Mostafa* *(University of New South Wales)*; Oo, Ethan *(University of New South Wales)*; Ahmed, Beena *(University of New South Wales)*

RPnet: A Deep Learning Approach for Robust R Peak Detection in Noisy ECG 345-348
Vijayarangan, Sricharan *(Healthcare Technology and Innovation Center (HTIC-IITM))*; R, Vignesh *(Healthcare Technology Innovation Center, IIT Madras)*; Murugesan, Balamurali *(Indian Institute of Technology Madras)*; Sreeletha Premkumar, Preejith *(Healthcare Technology Innovation Center (HTIC), IIT Madras)*; Joseph, Jayaraj *(HTIC, Indian Institute of Technology Madras)*; Sivaprakasam, Mohanasankar* *(Indian Institute of Technology Madras)*

Recognition of Premature Ventricular Contraction Beat from 12-Lead ECG based on a Novel Detection Function of QRS Onset 349-352
He, Kaiyue *(Fudan University)*; Zhong, Gaoyan *(Fudan University)*; Ding, Xiaoman *(Fudan University)*; Yang, Cuiwei* *(Fudan University)*

Deep Multi-Instance Networks for Bundle Branch Block Detection from Multi-Lead ECG 353-356
Hu, Jing* *(Guangzhou Shiyuan Electronic Technology Co., Ltd.)*; Zhao, Wei *(Guangzhou Shiyuan Electronics Co., Ltd)*; Jia, Dongya *(Guangzhou Shiyuan Electronics Co., Ltd)*; Yan, Cong *(Guangzhou Shiyuan Electronics Co., Ltd)*; Wang, Hongmei *(Guangzhou Shiyuan Electronics Co., Ltd)*; Li, Zhenqi *(Guangzhou Shiyuan Electrionics Co., Ltd)*; Fang, Jiansheng *(Harbin Institute of Technology)*; Yang, Ming *(CVTE Research)*

Compressive Sampling based Multi-Spectrum Deep Learning for Sub-Nyquist Pacemaker ECG Analysis 357-360
Chen, Hao* *(Biofourmis)*; Wibowo, Sandi *(Biofourmis)*; Rajput, Kuldeep Singh *(Biofourmis)*

Theme 01. Physiological Systems Modeling – I (Oral Session)

Individualized Closed-Loop Anesthesia through Patient Model Partitioning 361-364
Wahlquist, Ylva* *(Lund University)*; van Heusden, Klaske *(The University of British Columbia)*; Dumont, Guy *(University of British Columbia)*; Soltesz, Kristian *(Lund University)*

Realistic Mathematical Model of Retinal Outer Plexiform Layer for Edge Detection 365-368
Inagaki, Keiichiro* *(Chubu University)*; Imanaka, Seiya *(Chubu University)*

Efficiently Training Two-DoF Hand-Wrist EMG-Force Models 369-373
Bardizbanian, Berj *(Worcester Polytechnic Institute)*; Zhu, Ziling *(Worcester Polytechnic Institute)*; Li, Jianan *(Worcester Polytechnic Institute)*; Huang, Xinming *(Worcester Polytechnic Institute)*; Dai, Chenyun *(Fudan University)*; Martinez Luna, Carlos *(Liberating Technologies, Inc.)*; McDonald, Benjamin E. *(Liberating Technologies, Inc.)*; Farrell, T *(Liberating Technologies, Inc.)*; Clancy, Edward A.* *(Worcester Polytechnic Institute)*

Robust Modelling of Reflectance Pulse Oximetry for SpO2 Estimation 374-377
Vijayarangan, Sricharan *(Healthcare Technology and Innovation Center (HTIC-IITM))*; Suresh, Prithvi *(Healthcare Technology and Innovation Center (HTIC-IITM))*; Sreeletha Premkumar, Preejith *(Healthcare Technology Innovation Center (HTIC), IIT Madras)*; Joseph, Jayaraj *(HTIC, Indian Institute of Technology Madras)*; Sivaprakasam, Mohanasankar* *(Indian Institute of Technology Madras)*

Self-Regulated and Co-Ordinated Smart Tumor Homing for Complex Vascular Networks 378-381
Ali, Muhammad* *(University of Waikato)*; Sharifi, Neda *(The University of Waikato)*; McGrath, Nicholas *(The University of Waikato)*; Cree, Michael *(University of Waikato)*; Chen, Yifan *(The University of Waikato)*

Reducing Tachycardia in Septic Shock Patients: Do Esmolol and Ivabradine Have a Chronotropic Effect Only? 382-385
Carrara, Marta* *(Politecnico di Milano, Italy)*; Niccolò, Arianna *(Politecnico di Milano)*; Herpain, Antoine *(Université libre de Bruxelles)*; Ferrario, Manuela *(Politecnico di Milano)*

Theme 01. Physiological Systems Modeling – II (Oral Session)

Roles of the Cerebellar Interneurons on Cerebellar Motor Learning: A Computational Study 386-389
Takagi, Ryunosuke *(Chubu Univ.)*; Matsuda, Taiga *(Chubu Univ.)*; Inagaki, Keiichiro* *(Chubu Univ.)*

Effect of Stimulation Duration to the Existence of Initial Dip 390-393
Khan, M. N. Afzal *(Pusan National University)*; Bhutta, M. Raheel* *(Dept. of Computer Science and Engineering, Sejong University)*; Hong, Keum-Shik *(Pusan National University)*

Tensor Decomposition of Functional Near-Infrared Spectroscopy (fNIRS) Signals for Pattern Discovery of Cognitive Response in Infants 394-397
Hssayeni, Murtadha *(Florida Atlantic University)*; Wilcox, Teresa *(Florida Atlantic University)*; Ghoraani, Behnaz* *(Florida Atlantic University)*

Modeling BOLD-fMRI Hemodynamics via Multidimensional Decomposition of Electrophysiology Data: A Simulation Study 398-401
Mann-Krzisnik, Dylan* *(McGill University)*; Mitsis, Georgios D. *(McGill University)*

Pole-Zero REM Modeling with Application in EEG Artifact Removal 402-405
Nassif, Farah* *(Ryerson Univ.)*; Yousefi Rezaii, Tohid *(Ryerson Univ.)*; Beheshti, Soosan *(Ryerson Univ.)*

Theme 01. Signal Processing and Classification for Atrial Fibrillation (Oral Session)

Data Augmentation for Automatic Identification of Spatiotemporal Dispersion Electrograms in Atrial Fibrillation Ablation using Machine Learning 406-409
Ghrissi, Amina* *(Université Côte d'azur, CNRS, I3S)*; Almonfrey, Douglas *(Federal Institute of Esprito Santo)*; Costa de Almeida, Rafael *(Federal University of Esprito Santo)*; Squara, Fabien *(Université Côte dAzur, CHU Pasteur, Cardiology Dept., Nice,)*; Montagnat, Johan *(Université Côte d'azur, CNRS, I3S)*; Zarzoso, Vicente *(Université Nice Sophia Antipolis - CNRS)*

Non-Invasive Identification of Atrial Fibrillation Driver Location using the 12-Lead ECG: Pulmonary Vein Rotors vs. Other Locations 410-413
Luongo, Giorgio* *(Karlsruhe Institute of Technology)*; Azzolin, Luca *(Karlsruhe Institute of Technology)*; Rivolta, Massimo Walter *(Università degli Studi di Milano)*; Martínez, Juan Pablo *(University of Zaragoza)*; Doessel, Olaf *(Karlsruhe Institute of Technology (KIT))*; Sassi, Roberto *(Università degli Studi di Milano)*; Laguna, Pablo *(Zaragoza University and CIBER-BBN)*; Loewe, Axel *(Karlsruhe Institute of Technology (KIT))*

Optimizing Multiscale Entropy Approach for Rotor Core Identification using Simulated Intracardiac Electrograms 414-417
Ravikumar, Vasanth* *(University of Minnesota)*; Tolkacheva, Elena *(University of Minnesota)*

A Weighted Graph Attention Network based Method for Multi-Label Classification of Electrocardiogram Abnormalities 418-421
Wang, Hongmei* *(Guangzhou Shiyuan Electronics Co., Ltd)*; Zhao, Wei *(Guangzhou Shiyuan Electronics Co., Ltd)*; Li, Zhenqi *(Guangzhou Shiyuan Electrionics Co., Ltd)*; Jia, Dongya *(Guangzhou Shiyuan Electronics Co., Ltd)*; Yan, Cong *(Guangzhou Shiyuan Electronics Co., Ltd)*; Hu, Jing *(Guangzhou Shiyuan Electronic Technology Co., Ltd.)*; Fang, Jiansheng *(Harbin Institute of Technology)*; Yang, Ming *(CVTE Research)*

Disentangled Adversarial Transfer Learning for Physiological Biosignals 422-425
Han, Mo* *(Northeastern University)*; Ozdenizci, Ozan *(Northeastern University)*; Wang, Ye *(Mitsubishi Electric Research Laboratories (MERL))*; Koike-Akino, Toshiaki *(Mitsubishi Electric Research Laboratories (MERL))*; Erdogmus, Deniz *(Northeastern University)*

Unsupervised Classification of Atrial Fibrillation Triggers using Heart Rate Variability Features Extracted from Implantable Cardiac Monitor Data 426-429
Saiz-Vivo, Javier* *(Politecnico di Milano and Medtronic)*; Corino, Valentina *(Politecnico di Milano)*; De Melis, Mirko *(Università Politecnica Delle Marche)*; Mainardi, Luca *(Politecnico di Milano)*

Theme 01. Signal Processing and Classification for Brain Computer Interfaces (Oral Session)

The Impact of Electrode Density and Precision on Brain-Computer Interfaces 430-433
Aarabi, Pegah* *(Roya AI)*; Aarabi, Parham *(Dept. of Electrical and Computer Engineering, University of)*

EEG Signal Classification using Convolutional Neural Networks on Combined Spatial and Temporal Dimensions for BCI Systems 434-437
Anwar, Ayman M.* *(Cairo University)*; Eldeib, Ayman M. *(Cairo University)*

Detecting EEG Outliers for BCI on the Riemannian Manifold using Spectral Clustering 438-441
Yamamoto, Maria Sayu* *(Tokyo University of Agriculture and Technology)*; Sadatnejad, Khadijeh *(INRIA Bordeaux Sud-Ouest)*; Tanaka, Toshihisa *(Tokyo University of Agriculture and Technology)*; Islam, Md. Rabiul *(Tokyo University of Agriculture and Technology)*; Tanaka, Yuichi *(Tokyo University of Agriculture and Technology)*; Lotte, Fabien *(Inria Bordeaux Sud-Ouest)*

Siamese Neural Networks for EEG-Based Brain-Computer Interfaces 442-446
Shahtalebi, Soroosh *(Concordia Univ.)*; Asif, Amir *(Concordia Univ.)*; Mohammadi, Arash* *(Concordia Univ.)*

Subject-Independent Classification on Brain-Computer Interface using Autonomous Deep Learning for Finger Movement Recognition 447-450
Anam, Khairul* *(University of Jember)*; Bukhori, Saiful *(Faculty of Computer Science, Universitas Jember)*; Hanggara, Faruq Sandi *(Intelligent System and Robotics, CDAST, Universitas Jember)*; Pratama, Mahardhika *(Nanyang Technological University)*

Theme 01. Signal Processing and Classification for Cardiovascular Signals (Oral Session)

Heartbeat Detection and Rate Estimation from Ballistocardiograms using the Gated Recurrent Unit Network 451-454
Hai, Dong *(Xidian University)*; Chen, Chao *(IBM Research)*; Yi, Ruhan *(University of Missouri-Columbia)*; Gou, Shuiping *(Xidian University)*; Su, Bo-Yu *(Brigham and Women Hospital)*; Jiao, Changzhe* *(Xidian University)*; Skubic, Marjorie *(University of Missouri)*

Unobtrusive Inter-Beat Interval Estimation from Multichannel Ballistocardiogram Signal using Kalman Filter 455-460
Huang, Yongfeng* *(Donghua University)*; Sun, Chenxi *(Donghua University)*; Jin, Tianchen *(Donghua University)*; Yang, Shuchen *(Shanghai Yueyang Medtech Co., Ltd.)*; Zhang, Zhiming *(Shanghai Yueyang Medtech Co., Ltd.)*

Enhancement of Synchronization between Physiological Signals during Exercise: A Preliminary Investigation 461-464
Perry, Sean* *(Univ. of Warwick)*; Khovanova, Natasha *(Univ. of Warwick)*; Khovanov, Igor *(Univ. of Warwick)*

U-Net Neural Network for Heartbeat Detection in Ballistocardiography 465-468
Cathelain, Guillaume* *(Ecole Pratique des Hautes Etudes)*; Rivet, Bertrand *(Grenoble Universities)*; Achard, Sophie *(CNRS, GIPSA-Lab, Images and Signals Dept.)*; Bergounioux, Jean *(Assistance Publique des Hôpitaux de Paris)*; Jouen, François *(Ecole Pratique des Hautes Etudes)*

Method for Measurement of Arterial Compliance by Fusion of Oscillometry and Pulse Wave Velocity 469-472
Bogatu, Laura* *(Philips Research, Eindhoven Univ. of Tech.)*; Turco, Simona *(Eindhoven Univ. of Tech.)*; Mischi, Massimo *(Eindhoven Univ. of Tech.)*; Woerlee, Pierre *(TUe Eindhoven)*; Bouwman, R Arthur *(Catharina Hospital, Eindhoven)*; Korsten, Erik *(Catharina Hospital Eindhoven)*; Muehlsteff, Jens *(Philips)*

Localizing Placement of Cardiomechanical Sensors during Dynamic Periods via Template Matching 473-476
Zia, Jonathan* *(Georgia Institute of Technology)*; Kimball, Jacob *(Georgia Institute of Technology)*; Inan, Omer *(Georgia Institute of Technology)*

Theme 01. Signal Processing and Classification for Contactless and Wearable Systems (Oral Session)

Contactless Heartbeat Detection from CW-Doppler Radar using Windowed-Singular Spectrum Analysis 477-480
Iwata, Yuki* *(The University of Electro-Communications)*; Ishibashi, Koichiro *(The University of Electro-Communications)*; Sun, Guanghao *(The University of Electro-Communications)*; Luu, Manh Ha *(AVITECH, University of Engineering and Technology, VNU Hanoi)*; Han Trong, Thanh *(Hanoi University of Science and Technology)*; Linh-Trung, Nguyen *(Vietnam National University Hanoi)*; Do Trong, Tuan *(Hanoi University of Science and Technology)*

Detection of Respiratory Signal based on Depth Camera Body Tracking 481-484
Yang, Fan *(University of Ottawa)*; Zixiong, Han *(University of Ottawa)*; Bolic, Miodrag* *(University of Ottawa)*

Body Orientation and Vital Sign Measurement with IR-UWB Radar Network 485-488
Yang, Xiuzhu* *(Beijing Univ. of Posts and Telecommunications)*; Yu, Yibo *(Beijing Univ. of Posts and Telecommunications)*; Qian, Hongyu *(Beijing Univ. of Posts and Telecommunications)*; Zhang, Xinyue *(Beijing Univ. of Posts and Telecommunications)*; Zhang, Lin *(Beijing Univ. of Posts and Telecommunications)*

A Joint Localization Assisted Respiratory Rate Estimation using IR-UWB Radars 489-493
He, Shan* *(University of Ottawa)*; Mehta, Varun *(University of Ottawa)*; Bolic, Miodrag *(University of Ottawa)*

Using IMU Sensors to Assess Motor Degradation of PD Patients by Modeling In-Meal Plate-to-Mouth Movement Elongation 494-497
Kyritsis, Konstantinos* *(Aristotle University of Thessaloniki)*; Fagerberg, Petter *(Karolinska Institute)*; Ioakimidis, Ioannis *(Karolinska Institute, NVS, Division of Applied Neuroendocrinolog)*; Klingelhoefer, Lisa *(Dept. of Neurology Technical University Dresden, Dresden, G)*; Reichmann, Heinz *(Dept. of Neurology Technical University Dresden, Dresden, G)*; Delopoulos, Anastasios *(Aristotle University of Thessaloniki)*

Theme 01. Signal Processing and Classification for Motor Imagery (Oral Session)

Neural Component Analysis: Source Localisation for Motor Imagery Classification 498-501
Daly, Ian* *(University of Essex)*; Rybář, Milan *(University of Essex)*

Online Recursive ICA Algorithm used for Motor Imagery EEG Signal 502-505
Lin, Xueyi* *(Keio University)*; Wang, Lu *(Keio University)*; Ohtsuki, Tomoaki *(Keio University)*

Random Matrix Theory for Analysing the Brain Functional Network in Lower Limb Motor Imagery 506-509
Gu, Lingyun *(Southeast University)*; Yu, Zhenhua *(Xi'an University of Science and Technology)*; Ma, Tian *(Xi'an University of Science and Technology)*; Wang, Haixian* *(Southeast University)*; Li, Zhanli *(Xi'an University of Science and Technology)*; Fan, Hui *(Shandong Technology and Business University)*

MI3DNet: A Compact CNN for Motor Imagery EEG Classification with Visualizable Dense Layer Parameters 510-513
Yang, Qihang *(Xi'an Jiaotong University)*; Zhang, Xuan *(Xian Jiaotong University)*; Chen, Badong* *(Xi'an Jiaotong University)*

A Computationally Efficient Multiclass Time-Frequency Common Spatial Pattern Analysis on EEG Motor Imagery 514-518
Zhang, Ce* *(Virginia Polytechnic Institute and State University)*; Eskandarian, Azim *(Virginia Tech)*

Bio-Inspired Algorithms for Optimal Feature Selection in Motor Imagery-Based Brain-Computer Interface 519-522
Idowu, Oluwagbenga Paul *(Shenzhen Institutes of Advanced Technology, Chinese Academy of Science)*; Fang, Peng* *(Shenzhen Institutes of Advanced Technology, Chinese Academy of Science)*; Li, Guanglin *(Shenzhen Institutes of Advanced Technology)*

Theme 01. Signal Processing and Classification for Seizure Detection and Prediction (Oral Session)

A Comparison of Dynamic Modeling Approaches for Epileptic EEG Detection and Classification 523-527
Song, Xiaomu* *(Widener University)*; Aguilar, Luis *(Widener University)*; Yoon, Suk-Chung *(Widener University)*

Unsupervised Online Learning for Long-Term High Sensitivity Seizure Detection 528-531
Chua, Adelson* *(University of California at Berkeley)*; Jordan, Michael *(University of California at Berkeley)*; Muller, Rikky *(University of California at Berkeley)*

Automatic Absence Seizures Detection in EEG Signals: An Unsupervised Module 532-535
Tsiouris, Kostas *(Biomedical Engineering Laboratory, School of Electrical and Comp)*; Konitsiotis, Spiros *(Medical School, Univ. of Ioannina)*; Gatsios, Dimitris *(Univ. of Ioannina)*; Koutsouris, Dimitrios *(Biomedical Engineering Laboratory, School of Electrical and Comp)*; Fotiadis, Dimitrios I.* *(Univ. of Ioannina)*

Detection of Epileptic Seizures from Surface EEG using Hyperdimensional Computing 536-540
Asgarinejad, Fatemeh* *(University of California, San Diego)*; Thomas, Anthony *(University of California San Diego)*; Rosing, Tajana *(University of California San Diego)*

Tensor-Based Uncorrelated Multilinear Discriminant Analysis for Epileptic Seizure Prediction 541-544
Zhang, Renjie *(Fudan University)*; Jiang, Xinyu *(Fudan University)*; Dai, Chenyun *(Fudan University)*; Chen, Wei* *(Fudan University)*

Epileptic Seizure Detection using Multi-Channel EEG Wavelet Power Spectra and 1-D Convolutional Neural Networks 545-548
Sharan, Roneel V.* *(Macquarie University)*; Berkovsky, Shlomo *(Macquarie University)*

Theme 01. Signal Processing and Classification for the Analysis of Brain-Heart Interactions (Oral Session)

Influence of Individual Heart Rate on Nonlinear Brain-Heart Interactions Estimated by Convergent Cross Mapping in Schizophrenic Patients and Healthy Controls 549-552
Schiecke, Karin* *(Jena University Hospital. Friedrich Schiller University Jena)*; Schumann, Andy *(Psychiatric Brain & Body Research Group Jena, Dept. of Psyc)*; Bär, Karl-Jürgen *(Friedrich-Schiller-University of Jena)*

Methodological Considerations on EEG Electrical Reference: A Functional Brain-Heart Interplay Study 553-556
Candia-Rivera, Diego* *(Universita di Pisa)*; Catrambone, Vincenzo *(Università di Pisa)*; Valenza, Gaetano *(University of Pisa)*

An Inhomogeneous Point-Process Model for the Assessment of the Brain-to-Heart Functional Interplay: A Pilot Study 557-560
Talebi, Alireza *(University of Pisa)*; Catrambone, Vincenzo* *(Università di Pisa)*; Barbieri, Riccardo *(Politecnico di Milano)*; Valenza, Gaetano *(University of Pisa)*

Quantifying Functional Links between Brain and Heartbeat Dynamics in the Multifractal Domain: A Preliminary Analysis 561-564
Catrambone, Vincenzo* *(Università di Pisa)*; Wendt, Herwig *(CNRS, University of Toulouse)*; Barbieri, Riccardo *(Politecnico di Milano)*; Abry, Patrice *(ENS Lyon, CNRS)*; Valenza, Gaetano *(University of Pisa)*

Closed-Loop Electroencephalogram-Based Modulated Audio to Fall and Deepen Sleep Faster 565-568
Garcia-Molina, Gary Nelson* *(Philips Sleep and Respiratory Care)*; Kalyan, Boomika *(Philips North America)*; Aquino, Antonio *(Philips)*

Neural Memory Networks for Seizure Type Classification 569-575
Ahmedt-Aristizabal, David* *(CSIRO)*; Fernando, Tharindu *(Queensland University of Technology)*; Denman, Simon *(Queensland University of Technology)*; Petersson, Lars *(CSIRO Data61)*; Aburn, Matthew J *(QIMR Berghofer)*; Fookes, Clinton *(Queensland University of Technology)*

Theme 01. Signal Processing and Classification for Wearable Systems (Oral Session)

Emotion Assessment using Machine Learning and Low-Cost Wearable Devices 576-579
Laureanti, Rita *(Politecnico di Milano)*; Bilucaglia, Marco* *(Behavior and Brain Lab - Università IULM)*; Zito, Margherita *(Università IULM)*; Circi, Riccardo *(Behavior and Brain Lab - Università IULM)*; Fici, Alessandro *(Behavior and Brain Lab - Università IULM)*; Rivetti, Fiamma *(Behavior and Brain Lab - Università IULM)*; Valesi, Riccardo *(Behavior and Brain Lab - Università IULM)*; Oldrini, Carlo *(Ipsos)*; Mainardi, Luca *(Politecnico di Milano)*; Russo, Vincenzo *(IULM University of Milan)*

Multi-Label Arrhythmia Classification from Fixed-Length Compressed ECG Segments in Real-Time Wearable ECG Monitoring 580-583
Cheng, Yunfei *(University of Electronic Science and Technology of China)*; Ye, Yalan* *(University of Electronic Science and Technology of China)*; Hou, Mengshu *(University of Electronic Science and Technology of China)*; He, Wenwen *(University of Electronic Science and Technology of China)*; Pan, Tongjie *(University of Electronic Science and Technology of China)*

Assessment of Athletes' Attitude: Physiological Evaluation via Wearable Sensors during Grappling Competitions 584-587
Borghini, Gianluca* *(Sapienza Univ. of Rome)*; Arico, Pietro *(Fondazione Santa Lucia)*; Di Flumeri, Gianluca *(Univ. of Rome Sapienza)*; Sciaraffa, Nicolina *(Univ. of Rome Sapienza)*; Ronca, Vincenzo *(Sapienza Univ. of Rome)*; Vozzi, Alessia *(Sapienza Univ. of Rome)*; Babiloni, Fabio *(Univ. of Rome)*

Poincaré Descriptors for Identifying Hemiparesis in Acute Stroke using Wearable Accelerometry 588-591
Datta, Shreyasi* *(University of Melbourne)*; Karmakar, Chandan *(Deakin University)*; Yan, Bernard *(The Royal Melbourne Hospital)*; Palaniswami, Marimuthu *(The University of Melbourne)*

Denoising Wearable Armband ECG Data using the Variable Frequency Complex Demodulation Technique 592-595
Hossain, Md Billal* *(University of Connecticut)*; Lázaro, Jesús *(University of Zaragoza)*; Noh, Yeon Sik *(University of Massachusetts Amherst)*; Chon, Ki *(University of Connecticut)*

Electrocardiogram Derived Respiration for Tracking Changes in Tidal Volume from a Wearable Armband 596-599
Lázaro, Jesús* *(University of Zaragoza)*; Reljin, Natasa *(University of Connecticut)*; Bailon, Raquel *(University of Zaragoza)*; Gil, Eduardo *(Zaragoza University and CIBER-BBN)*; Noh, Yeon Sik *(University of Massachusetts Amherst)*; Laguna, Pablo *(Zaragoza University and CIBER-BBN)*; Chon, Ki *(University of Connecticut)*

Theme 01. Signal Processing and Classification in Fetal and Neonatal Physiology (Oral Session)

Automated Movement Detection Reveals Features of Maturation in Preterm Infants 600-603
Zuzarte, Ian* *(Northeastern University)*; Gee, Alan *(University of Texas at Austin)*; Sternad, Dagmar *(Northeastern University)*; Paydarfar, David *(The University of Texas at Austin, Dell Medical School)*

Estimating Fetal Age by Fetal Maternal Heart Rate Coupling Parameters 604-607
Khandoker, Ahsan H* *(Khalifa University of Science, Technology and Research)*; Wahbah, Maisam *(Khalifa University of Science and Technology)*; Al Sakaji, Raghad *(Khalifa University of Science and Technology)*; Funamoto, Kiyoe *(Tohoku University)*; Krishnan, Anita *(Children's National Medical Center)*; Kimura, Yoshitaka *(Tohoku University)*

Deep Convolutional Long Short-Term Memory Network for Fetal Heart Rate Extraction 608-611
Fotiadou, Eleni* *(Eindhoven University of Technology)*; Xu, Mengzhu *(Eindhoven University of Technology)*; van Erp, Bart *(Eindhoven University of Technology)*; van Sloun, Ruud *(Eindhoven University of Technology)*; Vullings, Rik *(Eindhoven University of Technology)*

A Point Process Framework for the Characterization of Fetal Sleep States 612-615
Pini, Nicolò* *(Politecnico di Milano)*; Lucchini, Maristella *(Columbia Univ. Irving Medical Center)*; Fifer, William P. *(Dept. of Psychiatry and Pediatrics, Columbia Univ. Col)*; Barbieri, Riccardo *(Politecnico di Milano)*

Joint Multiple Subspace-Based BSS Method for Fetal Heart Rate Extraction from Non-Invasive Recordings 616-620
Wang, Lu* *(Keio University)*; Ohtsuki, Tomoaki *(Keio University)*; Ohwada, Kazunari *(Atom medical Co Ltd)*; Honma, Naoki *(Atom Medical Co.)*; Hayashi, Hayato *(Atom Medical Co.)*

Entropy Profiling for Detection of Fetal Arrhythmias in Short Length Fetal Heart Rate Recordings 621-624
Keenan, Emerson* *(The University of Melbourne)*; Udhayakumar, Radhagayathri *(University of Melbourne)*; Karmakar, Chandan *(Deakin University)*; Brownfoot, Fiona *(The University of Melbourne)*; Palaniswami, Marimuthu *(The University of Melbourne)*

Theme 01. Signal Processing and Classification in Sleep Studies (Oral Session)

Automatic Sleep Stage Classification using Marginal Hilbert Spectrum Features and a Convolutional Neural Network 625-628
Wang, Wenshuai *(Univ. of Chinese Academy of Sciences)*; Liao, Pan *(Beijing Intelligent Brain Cloud Inc)*; Sun, Yi *(Univ. of Chinese Academy of Sciences)*; Su, Guiping *(Univ. of Chinese Academy of Sciences)*; Ye, Shiwei *(Univ. of Chinese Academy of Sciences)*; Liu, Yan* *(Univ. of Chinese Academy of Sciences)*

Unsupervised Sleep and Wake State Identification in Long-Term Electrocorticography Recordings 629-632
Sun, Samantha* *(University of Washington)*; Jiang, Preston Linxing *(University of Washington)*; Peterson, Steven M. *(University of Washington)*; Herron, Jeffrey *(University of Washington)*; Weaver, Kurt *(University of Washington)*; Ko, Andrew *(University of Washington)*; Ojemann, Jeffrey G *(University of Washington)*; Rao, Rajesh PN *(University of Washington)*

Automatic Assessment of Pediatric Sleep Apnea Severity using Overnight Oximetry and Convolutional Neural Networks 633-636
Vaquerizo-Villar, Fernando *(Biomedical Engineering Group, University of Valladolid, CIF Q471)*; Álvarez González, Daniel *(Río Hortega University Hospital)*; Kheirandish-Gozal, Leila *(Section of Sleep Medicine, Dept. of Pediatrics, Pritzker Sc)*; Gutierrez, Gonzalo Cesar *(University of Valladolid)*; Gomez-Pilar, Javier *(University of Valladolid, CIF: Q4718001C)*; Crespo, Andrea *(Hospital Universitario Rio Hortega, Valladolid)*; del Campo, Félix *(Hospital del Río Hortega. Universidad De Valladolid)*; Gozal, David *(Section of Sleep Medicine, Dept. of Pediatrics, Pritzker Science)*; Hornero, Roberto* *(University of Valladolid)*

ECG-Derived Heart Rate Variability Interpolation and 1-D Convolutional Neural Networks for Detecting Sleep Apnea 637-640
Sharan, Roneel V.* *(Macquarie University)*; Berkovsky, Shlomo *(Macquarie University)*; Xiong, Hao *(Macquarie University)*; Coiera, Enrico *(Macquarie University)*

TinySleepNet: An Efficient Deep Learning Model for Sleep Stage Scoring based on Raw Single-Channel EEG 641-644
Supratak, Akara* *(Mahidol University)*; Guo, Yike *(Imperial College London)*

Predicting Sleep Classification Performance without labels 645-648
Mikkelsen, Kaare* *(University of Aarhus)*; Rezaei Tabar, Yousef *(Aarhus University)*; Kidmose, Preben *(Aarhus University, Denmark)*

Theme 01. Signal Processing and Classification of Electromyographic Signals – I (Oral Session)

A Normalisation Approach Improves the Performance of Inter-Subject sEMG-Based Hand Gesture Recognition with a ConvNet 649-652
Lin, Yuzhou *(The University of Kent)*; Ramaswamy, Palaniappan *(University of Kent)*; De Wilde, Philippe *(The University of Kent)*; Li, Ling* *(University of Kent)*

Pose Estimation from Electromyographical Data using Convolutional Neural Networks 653-656
Ayling, Robin* *(University of Kent)*; Johnson, Colin *(University of Nottingham)*; Li, Ling *(University of Kent)*; Ramaswamy, Palaniappan *(University of Kent)*

Recurrent Fusion of Time-Domain Descriptors Improves EMGbased Hand Movement Recognition 657-661
Ahmed, Ahmed* *(University of Technology Sydney)*; Khushaba, Rami N. *(University of Technology, Sydney (UTS))*; Al-Timemy, Ali Hussian *(University of Baghdad)*; Al-Jumaily, Adel *(University of Technology Sydney)*

Classification of Facial Movements in Chronic Facial Palsy based on Intramuscular EMG Signals Recorded from the Paretic Side 662-665
Leistritz, Lutz* *(Jena University Hospital, Friedrich Schiller University Jena)*; Hochreiter, Jakob *(Med-El Elektromedizinische Geräte Gesellschaft m.b.H.)*; Bachl, Fabian *(University of Applied Sciences Upper Austria)*; Volk, Gerd Fabian *(Jena University Hospital)*

Genetic Algorithm Application to Feature Selection in sEMG Movement Recognition with Regularized Extreme Learning Machine 666-669
Tosin, Maurício C* *(UFRGS)*; Bagesteiro, Leia *(SFSU)*; Balbinot, Alexandre *(Federal University of Rio Grande do Sul (UFRGS))*

Trapezius or Facial Muscles: Which One is More Suitable for the Measurement of Stress using sEMG Signals? 670-673
Fatima, Mashal* *(Riphah International University)*; Gulzar, Kashaf *(Riphah International University, Islamabad, Pakistan)*; Khan, Kainat Raza *(Riphah International University Islamabad, Pakistan)*; Amjad, Fatima *(Riphah International University, Islamabad)*; Shafique, Muhammad *(Riphah International University)*

Theme 01. Signal Processing and Classification of Electromyographic Signals – II (Oral Session)

Analysis and Usage: Subject-to-Subject Linear Domain Adaptation in sEMG Classification 674-677
Hoshino, Takayuki* *(Keio University)*; Kanoga, Suguru *(National Institute of Advanced Industrial Science and Technology)*; Tsubaki, Masashi *(National Institute of Advanced Industrial Science and Technology)*; Aoyama, Atsushi *(Keio University)*

Entropy and Clustering Information Applied to sEMG Classification 678-681
Barbosa, Luiz* *(University of Brasilia)*; Nogueira, Otávio *(University of Brasilia)*; Silva, Vinícius *(University of Brasilia)*; Cotta, Paulo Vitor Pereira *(Universidade de Brasília, UnB)*; Souza, Fernando *(Universidade de Brasília)*; Araújo, Michael *(Stefanini)*; López Delis, Alberto *(Center of Medical Biophysics)*; da Rocha, Adson F. *(University of Brasilia)*; Inazawa, Pedro *(University of Brasilia)*

Hand Gesture Recognition using Surface Electromyography 682-685
Sharif, Hajar* *(University of Illinois at Urbana-Champaign)*; Seo, Seung Byum *(University of Illinois at Urbana-Champaign)*; Kesavadas, Thenkurussi *(UIUC/HCESC)*

On the Classification of Electromyography Signals to Control a Four Degree-of-Freedom Prosthetic Device 686-689
Oleinikov, Artemiy *(Nazarbayev University)*; Abibullaev, Berdakh *(Nazarbayev University)*; Folgheraiter, Michele* *(Nazarbayev University)*

A Method to Differentiate Fatiguing Conditions in Surface Electromyography Signals using Instantaneous Spectral Centroid 690-693
Sam Jeeva Raj, Edward Jero *(Indian Institute of Technology Madras)*; Krishnamani, Divya Bharathi* *(Indian Institute of Technology Madras)*; Ramakrishnan, Swaminathan *(IIT Madras, India)*

Neuromuscular Disease Detection Employing Deep Feature Extraction from Cross Spectrum Images of Electromyography Signals 694-697
Samanta, Kaniska *(Techno India Univ.)*; Roy, Sayanjit Singha *(Techno India Univ.)*; Modak, Sudip *(Techno India Univ.)*; Chatterjee, Soumya *(Techno India Univ.)*; Bose, Rohit* *(National Univ. of Singapore)*

Theme 01. Signal Processing and Classification of Heart Rate Variability (Oral Session)

Unsupervised Clustering of HRV Features Reveals Preictal Changes in Human Epilepsy 698-701
Gagliano, Laura* *(Polytechnique Montréal)*; Bou Assi, Elie *(University of Montreal Hospital Center, University of Montreal)*; Toffa, Denahin Hinnoutontondji *(University of Montreal Hospital Center, University of Montreal)*; Nguyen, Dang Khoa *(CHUM Hôpital Notre-Dame)*; Sawan, Mohamad *(Westlake University)*

Time-Frequency Analysis of Cardiovascular Variability during an Orthostatic Stress by Complete EMD 702-705
Alvarado-Alvarez, Norma Angelica *(Universidad Autónoma Metropolitana)*; Charleston-Villalobos, Sonia* *(Universidad Autonoma Metropolitana)*; Reulecke, Sina *(Universidad Autónoma Metropolitana)*; Dorantes Méndez, Guadalupe *(Universidad Autónoma de San Luis Potosí)*; Voss, Andreas *(University of Applied Sciences Jena)*; Gonzalez-Camarena, Ramon *(Universidad Autonoma Metropolitana)*; Aljama-Corrales, Tomas *(Universidad Autonoma Metropolitana)*

A Quality Metric for Heart Rate Variability from Photoplethysmogram Sensor Data 706-709
Zanon, Mattia* *(Roche)*; Kriara, Lito *(Roche)*; Lipsmeier, Florian *(Roche)*; Nobbs, David *(Roche)*; Chatham, Christopher *(Roche)*; Hipp, Joerg *(Roche)*; Lindemann, Michael *(Roche)*

Sex Differences in Heart Rate Nonlinearity by Multifractal Multiscale Detrended Fluctuation Analysis 710-713
Castiglioni, Paolo* *(IRCCS Fondazione Don Carlo Gnocchi)*; Lazzeroni, Davide *(Fondazione Don Carlo Gnocchi, Parma, Italy)*; Coruzzi, Paolo *(Dept. of Clinical and Experimental Medicine, University of)*; Faini, Andrea *(Istituto Auxologico Italiano)*

Investigating Circadian Heart Rate Variability in Coronary Artery Disease Patients with Various Degrees of Left Ventricle Ejection Fraction 714-717
Alkhodari, Mohanad *(Khalifa University of Science and Technology)*; Jelinek, Herbert Franz *(Khalifa University)*; Werghi, Naoufel *(Khalifa University of Science, Technology & Research)*; Hadjileontiadis, Leontios *(Aristotle University of Thessaloniki)*; Khandoker, Ahsan H* *(Khalifa University of Science, Technology and Research)*

Concurrent Model for Three Negative Emotions using Heart Rate Variability in a Driving Simulator Environment 718-721
Muhammad, Shaufil Adha* *(Kumamoto University)*; Igasaki, Tomohiko *(Kumamoto University)*

Theme 01. Signal Processing and Classification of High-Density Electromyographic Signals (Oral Session)

Forearm High-Density Electromyography Data Visualization and Classification with Machine Learning for Hand Prosthesis Control 722-727
Tam, Simon* *(Laval University)*; Boukadoum, Mounir *(University of Quebec at Montréal)*; Campeau-Lecours, Alexandre *(Universite Laval)*; Gosselin, Benoit *(Laval University)*

High-Density Surface Electromyogram-Based Biometrics for Personal Identification 728-731
Jiang, Xinyu *(Fudan University)*; Xu, Ke *(School of Information Science and Technology, Fudan University)*; Liu, Xiangyu *(School of Art Design and Media, East China University of Science)*; Liu, Da *(Fudan University)*; Dai, Chenyun *(Fudan University)*; Chen, Wei* *(Fudan University)*

Analysis of Isometric Muscle Contractions using Analytic Bump Continuous Wavelet Transform 732-735
Hari, Lakshmi Madathil* *(Indian Institute of Technology Madras)*; Gopinathakaimal, Venugopal *(NSS College of Engineering, Palakkad)*; Ramakrishnan, Swaminathan *(IIT Madras, India)*

On the Selection of Neural Network Architecture for Supervised Motor Unit Identification from High-Density Surface EMG 736-739
Urh, Filip* *(Univ. of Maribor, Faculty of Electrical Engineering and Com)*; Strnad, Damjan *(Univ. of Maribor, Faculty of Electrical Engineering and Com)*; Clarke, Alexander *(Imperial College London)*; Farina, Dario *(Imperial College London)*; Holobar, Ales *(Univ. of Maribor, Faculty of Electrical Engineering and Computer)*

Subject-Specific EMG Modeling with Multiple Muscles: A Preliminary Study 740-743
Ma, Shihan *(Shanghai Jiao Tong University)*; Chen, Chen *(Shanghai Jiao Tong University)*; Han, Dong *(Huashan Hospital, Fudan University)*; Sheng, Xinjun* *(Shanghai Jiao Tong University)*; Farina, Dario *(Imperial College London)*; Zhu, Xiangyang *(Shanghai Jiao Tong University)*

S-Convnet: A Shallow Convolutional Neural Network Architecture for Neuromuscular Activity Recognition using Instantaneous High-Density Surface EMG Images 744-749
Islam, Md Rabiul* *(Université du Québec à Trois-Rivières)*; Massicotte, Daniel *(Université du Québec à Trois-Rivières)*; Nougarou, François *(Laval University)*; Massicotte, Philippe *(Université du Québec à Trois-Rivières)*; Zhu, Weiping *(Concordia University)*

Theme 01. Signal Processing and Classification of Lung and Breathing Sounds (Oral Session)

Temporal Orders and Causal Vector for Physiological Data Analysis 750-753
Młyńczak, Marcel* *(Warsaw University of Technology, Faculty of Mechatronics, Institute)*

Breathing Sound Segmentation and Detection using Transfer Learning Techniques on an Attention-Based Encoder-Decoder Architecture 754-759
Hsiao, Chiu-Han *(Academia Sinica)*; Lin, Ting-Wei *(National Taiwan University)*; Lin, Chii-Wann *(National Taiwan University)*; Lin, Frank Yeong-Sung *(National Taiwan University)*; Hsu, Fu-Shun* *(Far Eastern Memorial Hospital)*; Chen, Chung-Wei *(Dept. of Critical Care Medicine, Far Eastern Memorial Hospital)*; Chung, Chi-Ming *(National Taiwan University)*

Lung Sound Classification using Snapshot Ensemble of Convolutional Neural Networks 760-763
Nguyen, Truc* *(Graz University of Technology)*; Pernkopf, Franz *(Graz University of Technology)*

Removing of Snoring Segments from Tracheal Breathing Sounds using a Wavelet-Based Algorithm 764-767
Ghahjaverestan, Nasim *(University Health Network)*; Saha, Shumit *(University of Manitoba)*; Gavrilovic, Bojan *(University of Toronto/Toronto Rehabilitation Institute)*; Yadollahi, Azadeh* *(University of Toronto)*

Investigating into Segmentation Methods for Diagnosis of Respiratory Diseases using Adventitious Respiratory Sounds 768-771
Wu, Liqun* *(University of Kent)*; Li, Ling *(University of Kent)*

An Objective Measure of Signal Quality for Pediatric Lung Auscultations 772-775
Kala, Annapurna* *(Johns Hopkins University)*; Husain, Amyna *(Johns Hopkins Medicine)*; McCollum, Eric *(Johns Hopkins School of Medicine, Dept. of Pediatrics, Eudo)*; Elhilali, Mounya *(Johns Hopkins University)*

Theme 01. Signal Processing and Classification of Motion Signals for Parkinson's Disease (Oral Session)

Predicting Early Stage Drug Induced Parkinsonism using Unsupervised and Supervised Machine Learning 776-779
Nair, Parvathy* *(IITB-Monash Research Academy, IIT Bombay, Monash University)*; Trisno, Roth *(Monash Alfred Psychiatry Research Centre)*; Shojaei Baghini, Maryam *(Indian Institute of Technology Bombay)*; Pendharkar, Gita *(Monash University)*; Chung, Hoam *(Monash University)*

Time Series Clustering to Examine Presence of Decrement in Parkinson's Finger-Tapping Bradykinesia 780-783
Zhao, Zhibin *(Xi'an Jiaotong Univerity)*; Fang, Hui *(Loughborough University)*; Williams, Stefan *(University of Leeds)*; Relton, Samuel *(University of Leeds)*; Alty, Jane *(University of Tasmania)*; Casson, Alexander James* *(The University of Manchester)*; Wong, David *(University of Manchester)*

Unsupervised Pre-Trained Models from Healthy ADLs Improve Parkinson's Disease Classification of Gait Patterns 784-788
Som, Anirudh* *(Arizona State University)*; Krishnamurthi, Narayanan *(Arizona State University)*; Buman, Matthew P. *(Arizona State University)*; Turaga, Pavan *(Arizona State University)*

Automatic Clinical Gait Test Detection from Inertial Sensor Data 789-792
Fischer, Stefan* *(Friedrich-Alexander-Universität Erlangen-Nürnberg)*; Ullrich, Martin *(Friedrich-Alexander-Universität Erlangen-Nürnberg)*; Küderle, Arne *(Friedrich-Alexander-Universität Erlangen-Nürnberg)*; Gaßner, Heiko *(Universitätsklinikum Erlangen, Dept. of Molecular Neurology)*; Klucken, Jochen *(University Hospital Erlangen)*; Eskofier, Bjoern M *(Friedrich-Alexander-Universität Erlangen-Nürnberg)*; Kluge, Felix *(Digital Sports Group, Pattern Recognition Lab, Dept. of Com)*

Topological Descriptors for Parkinson's Disease Classification and Regression Analysis 793-797
Nawar, Afra *(Arizona State University)*; Rahman, Farhan *(Arizona State University)*; Krishnamurthi, Narayanan *(Arizona State University)*; Som, Anirudh* *(Arizona State University)*; Turaga, Pavan *(Arizona State University)*

Automatic Gait Phases Detection in Parkinson Disease: A Comparative Study 798-802
Castaño-Pino, Yor Jaggy *(Universidad Icesi)*; Gonzalez, Maria Camila *(Fundación Valle del Lili)*; Quintana-Peña, Valentina *(Universidad Icesi)*; Valderrama-Chaparro, Jaime *(Fundacion Valle del Lili)*; Munoz, Beatriz *(Fundacion Clinica Valle del Lili)*; Orozco, Jorge Luis *(Fundacion Clinica Valle del Lili)*; Navarro, Andres* *(Universidad Icesi)*

Theme 01. Signal Processing and Classification of Movement-Related Signals (Oral Session)

Deep-Learning-Based Human Motion Tracking for Rehabilitation Applications using 3D Image Features 803-807
Chen, Kai-Yu *(National Yang Ming University)*; Zheng, Wei-Zhong *(National Yang Ming University)*; Lin, Yu Yi *(National Yang-Ming University)*; Tang, Shih-Tsang *(Ming Chuan University)*; Chou, Li-Wei *(National Yang-Ming University)*; Lai, Ying-Hui* *(National Yang-Ming University)*

Machine Learning based Walking Aid Detection in Timed Up-and-Go Test Recordings of Elderly Patients 808-811
Ziegl, Andreas* *(AIT Austrian Institute of Technology GmbH)*; Hayn, Dieter *(AIT Austrian Institute of Technology)*; Kastner, Peter *(AIT Austrian Institute of Technology)*; Loeffler, Kerstin *(Geriatric Health Care Centers Graz, Graz, Austria)*; Weidinger, Lisa *(Albert Schweitzer Institute of Geriatric and Gerontology, Geriat)*; Brix, Bianca *(Medical University of Graz)*; Goswami, Nandu *(Medical University of Graz)*; Schreier, Guenter *(AIT Austrian Institute of Technology GmbH)*

Exploration of Machine Learning to Identify Community Dwelling Older Adults with Balance Dysfunction using Short Duration Accelerometer Data 812-815
Hu, Yang *(University of Illinois at Urbana-Champaign)*; Bishnoi, Alka *(University of Illinois at Urbana-Champaign)*; Kaur, Rachneet *(University of Illinois at Urbana Champaign)*; Sowers, Richard *(University of Illinois at Urbana-Champaign)*; Hernandez, Manuel* *(University of Illinois)*

A Sensor-Based Comprehensive Objective Assessment of Motor Symptoms in Cerebellar Ataxia 816-819
Kashyap, Bipasha* *(Deakin University)*; Phan, Dung *(Deakin University)*; Pathirana, Pubudu N *(Deakin University)*; Horne, Malcolm *(Florey Institute of Neuroscience and Mental Health)*; Power, Laura *(Royal Victorian Eye and Ear Hospital)*; Szmulewicz, David *(Victorian Eye and Ear Hospital)*

Quantitative Assessment of Friedreich Ataxia through the Self-Drinking Activity 820-823
Krishna, Ragil* *(Deakin University)*; Pathirana, Pubudu N *(Deakin University)*; Corben, Louise Anne *(Murdoch Children's Research Institute)*; Horne, Malcolm *(Florey Institute of Neuroscience and Mental Health)*; Delatycki, Martin *(Murdoch Children's Research Institute)*; Szmulewicz, David *(Victorian Eye and Ear Hospital)*

Theme 01. Signal Processing and Classification of Multivariate and Multimodal Biosignals – I (Oral Session)

Detecting Loss and Regain of Consciousness during Propofol Anesthesia using Multimodal Indices of Autonomic State 824-827
Subramanian, Sandya* *(Massachusetts Institute of Technology)*; Barbieri, Riccardo *(Politecnico di Milano)*; Purdon, Patrick L *(Massachusetts General Hospital)*; Brown, Emery N *(MGH-Harvard Medical School-MIT)*

Impedance Plethysmography as an Alternative Measure of Reactive Hyperemia 828-831
Samarawickrama, Kasun* *(University of Moratuwa)*; Perera, Nipun *(University of Moratuwa)*; Jayasinghe, Saroj *(Dept. of Clinical Medicine, University of Colombo)*; De Silva, Anjula *(University of Moratuwa)*

Audio, Visual, and Electrodermal Arousal Signals as Predictors of Mental Fatigue Following Sustained Cognitive Work 832-836
Williamson, James* *(MIT Lincoln Laboratory)*; Heaton, Kristin *(United States Army Research Institute of Environmental Medicine)*; Lammert, Adam *(MIT Lincoln Laboratory)*; Finkestein, Katherine *(Seton Hall University)*; Sturim, Douglas *(MIT Lincoln Laboratory)*; Smalt, Christopher *(Purdue University)*; Ciccarelli, Gregory *(Massachusetts Institute of Technology)*; Quatieri, Thomas *(MIT Lincoln Laboratory)*

Detection of Slow Wave Propagation Direction using Bipolar High-Resolution Recordings 837-840
Han, Henry *(The University of Auckland)*; Cheng, Leo K *(The University of Auckland)*; Avci, Recep *(The University of Auckland)*; Paskaranandavadivel, Niranchan* *(The University of Auckland)*

Exploring EEG Microstates for Affective Computing: Decoding Valence and Arousal Experiences during Video Watching 841-846
Shen, Xinke *(Tsinghua University)*; Hu, Xin *(Dept. of Psychology, Tsinghua University)*; Liu, Shizhao *(Tsinghua University)*; Song, Sen *(Tsinghua University)*; Zhang, Dan* *(Tsinghua University)*

Freezing of Gait Detection in Parkinson's Disease via Multimodal Analysis of EEG and Accelerometer Signals 847-850
Wang, Ying* *(Radboud Univ.)*; Beuving, Floris *(Radboud Univ.)*; Nonnekes, Jorik *(Radboud Univ. Medical Centre; Donders Institute for Brain,)*; X Cohen, Mike *(Radboud Univ.)*; Long, Xi *(Eindhoven Univ. of Technology and Philips Research)*; Aarts, Ronald M. *(Philips)*; van Wezel, Richard *(Univ. of Twente)*

Theme 01. Signal Processing and Classification of Multivariate and Multimodal Biosignals – II (Oral Session)

Stress Assessment by Combining Neurophysiological Signals and Radio Communications of Air Traffic Controllers 851-854
Borghini, Gianluca* *(Sapienza University of Rome)*; Bandini, Andrea *(University Health Network)*; Orlandi, Silvia *(Holland Bloorview Kids Rehabilitation Hospital)*; Di Flumeri, Gianluca *(University of Rome Sapienza)*; Arico, Pietro *(Fondazione Santa Lucia)*; Sciaraffa, Nicolina *(University of Rome Sapienza)*; Ronca, Vincenzo *(Sapienza University of Rome)*; Bonelli, Stefano *(Deep Blue)*; Ragosta, Martina *(Deep Blue srl)*; Tommasello, Paola *(Deep Blue srl)*; Turhan, Uğur *(University of Anadolu)*; Açikel, Birsen *(University of Anadolu)*; Ozan, Ali *(University of Anadolu)*; Imbert, Jean-Paul *(ENAC)*; Granger, Geraud *(ENAC)*; Benhacene, Railane *(ENAC)*; Drogoul, Fabrice *(EUROCONTROL);* Babiloni, Fabio *(University of Rome)*

Learning-Based Model for Central Blood Pressure Estimation using Feature Extracted from ECG and PPG Signals 855-858
Singla, Muskan* *(International institute of Information and Technology, Hyderabad)*; Syed, Azeemuddin *(International Institute of Information and Technology, Hyderabad)*; Sistla, Prasad *(Care Foundation)*

Multimodal Data Acquisition for the Assessment of Cerebellar Ataxia via Ballistic Tracking 859-862
Tran, Ha* *(Deakin University)*; Nguyen, Khoa D. *(Deakin University)*; Pathirana, Pubudu N *(Deakin University)*; Horne, Malcolm *(Florey Institute of Neuroscience and Mental Health)*; Power, Laura *(Royal Victorian Eye and Ear Hospital)*; Szmulewicz, David *(Victorian Eye and Ear Hospital)*

A Review of Photoplethysmography-Based Physiological Measurement and Estimation, Part 2: Multi-Input Methods 863-866
Johnson, Mizpah Selvam S *(University of Ontario Institute of Technology)*; Eklund, J. Mikael* *(University of Ontario Institute of Technology)*

Physiological Signal Analysis and Classification of Stress from Virtual Reality Video Game 867-870
Ishaque, Syem* *(Mr)*; Rueda, Alice *(Ryerson University)*; Krishnan, Sridhar *(Ryerson University)*; Khan, Naimul *(Ryerson University)*

Predicting Core Characteristics of ASD through Facial Emotion Recognition and Eye Tracking in Youth 871-875
Jiang, Ming* *(University of Minnesota)*; Francis, Sunday *(University of Minnesota)*; Tseng, Angela *(University of Minnesota)*; Srishyla, Diksha *(University of Minnesota)*; DuBois, Megan *(University of Minnesota)*; Beard, Katie *(University of Minnesota)*; Conelea, Christine *(University of Minnesota)*; Zhao, Qi *(University of Minnesota)*; Jacob, Suma *(University of Minnesota)*

Theme 01. Signal Processing and Classification of Neural Signals (Oral Session)

Detection of Information Flow between Cortical Laminae Activities and Auditory Evoked Potentials in Rats by Means of Granger Causality 876-879
Schäfer, Zeinab *(Aarhus University)*; Haab, Lars *(Saarland University Hospital)*; Strauss, Daniel J.* *(Saarland University, Medical Faculty)*; Takahashi, Kazutaka *(University of Chicago)*; Schwerdtfeger, Karsten *(Saarland University Hospital)*

Research on the Characteristics of Action Potentials and Local Field Potentials in Cortex of Parkinson's Disease Mode Monkey 880-883
Xu, Shengwei *(Institute of Electronics, Chinese Academy of Science)*; Zhang, Yu *(Chinese Academy of sciences, Institutes of Electronics)*; Xiao, Guihua *(University of Chinese Academy of Sciences)*; Duan, YiMing *(University of Chinese Academy of Sciences)*; Wang, Mixia *(Institute of Electronics, Chinese Academy of Sciences)*; Song, Yilin *(State Key Laboratory of Transducer Technology, Institute of Elec)*; Dai, Yuchuan *(Institute of Electronics, Chinese Academy of Sciences)*; Liu, Juntao *(Institute of Electronics, Chinese Academy of Sciences)*; Luo, Jinping *(Institute of Electronics, Chinese Academy of Sciences)*; Zhang, Song *(Institute of Electronics, Chinese Academy of Sciences)*; Zhuang, Ping *(Dept. of Neurobiology, Xuanwu Hospital, Capital Medical Univ)*; Chan, Piu *(Xuanwu Hospital, Capital Medical University)*; Yue, Feng *(Xuanwu Hospital, Capital Medical University)*; Cai, Xinxia* *(Institute of Electronics, Chinese Academy of Sciences)*

Predicting Single-Unit Activity from Local Field Potentials with LSTMs 884-887
Savolainen, Oscar* *(Imperial College London)*; Constandinou, Timothy *(Imperial College of Science, Technology and Medicine)*

SepaConvNet for Localizing the Subthalamic Nucleus using One Second Micro-Electrode Recordings 888-893
Peralta, Maxime* *(Univ. of Rennes 1)*; Bui, Quoc Anh *(Univ. of Rennes 1)*; Ackaouy, Antoine *(Univ. of Rennes 1)*; Martin, Thibault *(Univ. of Rennes 1)*; Gilmore, Greydon *(Univ. of Western Ontario)*; Haegelen, Claire *(Univ. of Rennes 1)*; Sauleau, Paul *(Univ. of Rennes 1)*; Baxter, John *(Univ Rennes, CLCC Eugène Marquis, INSERM, LTSI - UMR 1099)*; Jannin, Pierre *(INSERM, Université de Rennes 1)*

Spike Detection Technique based on Spike Augmentation with Low Computational and Hardware Complexity 894-897
Mirzaei, Sepideh *(K. N. Toosi University of Technology)*; Hosseini-Nejad, Hossein *(K. N. Toosi University of Technology)*; Sodagar, Amir M.* *(York University)*

Spatial Redundancy Reduction in Multi-Channel Implantable Neural Recording Microsystems 898-901
Khazaei, Yousef *(K. N. Toosi University of Technology)*; Ali, Abbasi Shahkooh *(York University)*; Sodagar, Amir M.* *(York University)*

Theme 01. Signal Processing and Classification of Photoplethysmographic Signals (Oral Session)

Photoplethysmographic Subject Identification by Considering Feature Values Derived from Heartbeat and Respiration 902-905
Hinatsu, Shun* *(Mitsubishi Electric Corporation)*; Suzuki, Daisuke *(Mitsubishi Electric)*; Ishizuka, Hiroki *(Osaka University)*; Ikeda, Sei *(Osaka University)*; Oshiro, Osamu *(Osaka University)*

Atrial Fibrillation Detection using Photoplethysmographic Signal: The Effect of the Observation Window 906-909
Corino, Valentina* *(Politecnico di Milano)*; Salibra, Federico *(Politecnico di Milano)*; Mainardi, Luca *(Politecnico di Milano)*

Machine Learning Approaches for Improved Continuous, Non-Occlusive Arterial Pressure Monitoring using Photoplethysmography 910-913
Jorge, João* *(Swiss Center for Electronics and Microtechnology (CSEM))*; Proenca, Martin *(CSEM SA)*; Aguet, Clémentine *(Swiss Center for Electronics and Microtechnology (CSEM))*; Van Zaen, Jérôme *(Swiss Center for Electronics and Microtechnology (CSEM), Neuchât)*; Bonnier, Guillaume *(CSEM SA)*; Renevey, Philippe *(CSEM)*; Lemkaddem, Alia *(CSEM)*; Schoettker, Patrick *(CHUV – Centre Hospitalier Universitaire Vaudois)*; Lemay, Mathieu *(CSEM)*

Optimal Filter Characterization for Photoplethysmography-Based Pulse Rate and Pulse Power Spectrum Estimation 914-917
Cassani, Raymundo* *(Institut National de la Recherche Scientifique)*; Tiwari, Abhishek *(Institut National de la Recherche Scientifique)*; Falk, Tiago *(Institut National de la Recherche Scientifique)*

Parameter Estimation of Hemodynamic Cardiovascular Model for Synthesis of Photoplethysmogram Signal 918-922
Roy, Dibyendu* *(TCS Research)*; Mazumder, Oishee *(Tata Consultancy Services)*; Chakravarty, Kingshuk *(Tata Consultancy Services Ltd.)*; Sinha, Aniruddha *(Tata Consultancy Services Ltd.)*; Ghose, Avik *(TCS Research & Innovation)*; Pal, Arpan *(Tata Consultancy Services)*

A Review of Photoplethysmography-based Physiological Measurement and Estimation, Part 1: Single Input Methods 923-927
Johnson, Mizpah Selvam S *(University of Ontario Institute of Technology)*; Eklund, J. Mikael* *(University of Ontario Institute of Technology)*

Theme 01. Signal Processing for Biosignal Artefact Detection and Removal (Oral Session)

Extraction of Nystagmus Patterns from Eye-Tracker Data with Convolutional Sparse Coding 928-931
Lalanne, Clement *(Centre Borelli, CNRS, ENS Paris Saclay, Université de Paris, SSA)*; Rateaux, Maxence *(ôpital Necker-Enfants Malades, AP-HP, and Centre Borelli, CNRS,)*; Oudre, Laurent *(L2TI, Université Paris 13)*; Robert, Matthieu *(Hôpital Necker-Enfants Malades, AP-HP, and Centre Borelli, CNRS,)*; Moreau, Thomas* *(Inria)*

EEG Artifact Removal by Bayesian Deep Learning and ICA 932-935
Lee, Sangmin S.* *(Company)*; Lee, Kiwon *(Ybrain Research Institute)*; Kang, Guiyeom *(Univ. College Dublin)*

Post-Processing Algorithm for Removing Soft-Tissue Movement Artifacts from Vibroarthrographic Knee-Joint Signal 936-939
Gong, Rui* *(Tokyo Metropolitan University)*; Hase, Kazunori *(Tokyo Metropolitan University)*; Goto, Hiroaki *(livet Inc.)*; Yoshioka, Keisuke *(Livet Inc)*

Simulating Motion Artifact using an Autoregressive Model for Research in Biomedical Signal Quality Analysis 940-943
Farago, Emma* *(Carleton University)*; Chan, Adrian *(Carleton University)*

Artifact Removal in tACS-EEG Recordings: A Combined Methodology based on the Empirical Wavelet Transform 944-947
Yan, Xuanteng* *(McGill Univ.)*; Boudrias, Marie-Helene *(McGill Univ.)*; Mitsis, Georgios D. *(McGill Univ.)*

Task-Related Systemic Artifacts in Functional Near-Infrared Spectroscopy 948-951
Cheong, Daniel *(University of Oklahoma)*; Zhang, Fan* *(University of Oklahoma)*; Kim, Kaitlyn *(University of Oklahoma)*; Reid, Adaira *(University of Oklahoma)*; Hanan, Cameron *(University of Oklahoma)*; Ding, Lei *(University of Oklahoma)*; Yuan, Han *(University of Oklahoma)*

Theme 01. Speech Signal Processing and Classification for Hearing-Aid Systems (Oral Session)

Real-Time Dual-Channel Speech Enhancement by VAD Assisted MVDR Beamformer for Hearing Aid Applications using Smartphone 952-955
Shankar, Nikhil* *(University of Texas at Dallas)*; Shreedhar Bhat, Gautam *(University of Texas at Dallas)*; Panahi, Issa *(University of Texas at Dallas)*

Automated Machine Learning based Speech Classification for Hearing Aid Applications and Its Real-Time Implementation on Smartphone 956-959
Shreedhar Bhat, Gautam* *(University of Texas at Dallas)*; Shankar, Nikhil *(University of Texas at Dallas)*; Panahi, Issa *(University of Texas at Dallas)*

Analyzing Stimulus-Frequency Otoacoustic Emission Fine Structure using an Additive Model 960-963
Liu, Yin *(Tsinghua University)*; Ji, Fei *(Chinese PLA General Hospital)*; Gong, Qin* *(Tsinghua University)*

Screening and Analysis of Specific Language Impairment in Young Children by Analyzing the Textures of Speech Signal 964-967
Sharma, Garima* *(Ryerson University)*; Prasad, Deepak *(NIT Sikkim)*; Umapathy, Karthikeyan *(Ryerson University)*; Krishnan, Sridhar *(Ryerson University)*

Compression Fitting of Hearing Aids and Implementation 968-971
Patel, Kashyap* *(The University of Texas at Dallas)*; Panahi, Issa *(University of Texas at Dallas)*

Efficient Real-Time Acoustic Feedback Cancellation using Adaptive Noise Injection Algorithm 972-975
Patel, Kashyap* *(The University of Texas at Dallas)*; Panahi, Issa *(University of Texas at Dallas)*

Theme 01. Time-Frequency Analysis of Biosignals (Oral Session)

Relationship between Vowel Sound Features and Pharyngeal Airway Cross-Sectional Area during Normal Breathing 976-979
Saha, Shumit *(University of Toronto)*; Viswanathan, Keerthana *(Toronto Rehabilitation Institute)*; Ghahjaverestan, Nasim *(University Health Network)*; Yadollahi, Azadeh* *(University of Toronto)*

Instantaneous Respiratory Response of Gamer with High-Risk Internet Gaming Disorder during Game-Film Stimuli by using Complementary Ensemble Empirical Mode Decomposition 980-983
Ji, Hong-Ming *(National Chiao Tung University)*; Hsiao, Tzu-Chien* *(National Chiao Tung University)*

Signal Feature Analysis of Contact Force at the Tip of a Flexible Ureteroscope 984-987
Deng, Yinan* *(Beijing Jiaotong University)*; Yang, Tangwen *(Beijing Jiaotong University)*

Acoustoelectric Signal Decoding based on Fourier Approximation 988-991
Su, Mengyue *(Tianjin University)*; Song, Xizi* *(Tianjin University)*; Zhou, Yijie *(Tianjin University)*; Yang, Jiajia *(Tianjin University)*; Ke, Yufeng *(Tianjin University)*; Ming, Dong *(Tianjin University)*

Validation of Auscultation Technologies using Objective and Clinical Comparisons 992-997
Graceffo, Stephanie* *(Johns Hopkins University)*; Husain, Amyna *(Johns Hopkins Medicine)*; Ahmed, Salahuddin *(Projahnmo Research Foundation)*; McCollum, Eric *(Johns Hopkins School of Medicine, Dept. of Pediatrics, Eudo)*; Elhilali, Mounya *(Johns Hopkins University)*

Voice Command Recognition using Biologically Inspired Time-Frequency Representation and Convolutional Neural Networks 998-1001
Sharan, Roneel V.* *(Macquarie Univ.)*; Berkovsky, Shlomo *(Macquarie Univ.)*; Liu, Sidong *(Macquarie Univ.)*

Theme 01. Time-Frequency Analysis of Electrophysiological Signals – I (Oral Session)

Different sEMG and EEG Features Analysis for Gait Phase Recognition 1002-1006
Wei, Pengna *(Xi'an Jiaotong University)*; Zhang, Jinhua* *(Xi'an Jiaotong University)*; Wei, Pingping *(Xi'an Jiaotong University)*; Wang, Baozeng *(Xi'an Jiaotong University)*; Hong, Jun *(Xi'an Jiaotong University)*

Muscle Activity Detection during Sleep by Ear-EEG 1007-1010
Rezaei Tabar, Yousef* *(Aarhus University)*; Mikkelsen, Kaare *(University of Aarhus)*; Rank, Mike Lind *(Widex A/S)*; Hemmsen, Martin Christian *(T&W Engineering)*; Kidmose, Preben *(Aarhus University, Denmark)*

Wavelet Spectral Deep-Training of Convolutional Neural Networks for Accurate Identification of High-Frequency Micro-Scale Spike Transients in the Post-Hypoxic-Ischemic EEG of Preterm Sheep 1011-1014
Abbasi, Hamid* *(University of Auckland)*; Gunn, Alistair Jan *(University of Auckland)*; Bennet, Laura *(The University of Auckland)*; Unsworth, Charles Peter *(University of Auckland)*

Deep Convolutional Neural Network and Reverse Biorthogonal Wavelet Scalograms for Automatic Identification of High Frequency Micro-Scale Spike Transients in the Post-Hypoxic-Ischemic EEG 1015-1018
Abbasi, Hamid* *(University of Auckland)*; Gunn, Alistair Jan *(University of Auckland)*; Bennet, Laura *(The University of Auckland)*; Unsworth, Charles Peter *(University of Auckland)*

A Time-Frequency Analysis for the Online Detection of the N2pc Event-Related Potential (ERP) Component in Individual EEG Datasets 1019-1022
Marturano, Francesca* *(University of Padova)*; Brigadoi, Sabrina *(University of Padova)*; Doro, Mattia *(Dept. of Developmental Psychology, University of Padova)*; Dell'Acqua, Roberto *(University of Padova)*; Sparacino, Giovanni *(University of Padova)*

Detection of Transient Bursts in EEG of Preterm Infants using Time – Frequency Distributions and Machine Learning 1023-1026
Murphy, Brian Michael* *(Univ. College Cork)*; Goulding, Robert M *(Neurogen Ltd)*; O'Toole, John M. *(Univ. College Cork)*

Theme 01. Time-Frequency Analysis of Electrophysiological Signals – II (Oral Session)

Trait Empathy Modulates Brain Response to Empathy for Social Rejection: Evidence from Electrophysiology 1027-1030
Tao, Dan *(Southeast University)*; Leng, Yue* *(Southeast University)*; Ge, Sheng *(Southeast University)*; Deng, Huihua *(Southeast University)*

Potential Prognostic Markers in the Heart Rate Variability Features for Early Diagnosis of Sepsis in the Pediatric Intensive Care Unit using Convolutional Neural Network Classifiers 1031-1034
Amiri, Paria* (*Tehran University of Medical Sciences*); Abbasi, Hamid* *(University of Auckland)*; Derakhshan, Amin (*Imam Reza International University*); Gharib, Behdad (*Tehran University of Medical Sciences*); Nooralishahi, Behrang (*Tehran University of Medical Sciences*); Mirzaaghayan, Mohamadreza (*Tehran University of Medical Sciences*)

High Frequency Activity in the Orbital Frontal Cortex Modulates with Mismatched Expectations during Gambling in Humans 1035-1038
Gunaratnam, Sejal *(University of Michigan)*; Talluri, Dinakar *(University of Michigan)*; Greene, Patrick* *(Johns Hopkins University)*; Sacré, Pierre *(University of Liège)*; Gonzalez-Martinez, Jorge *(Cleveland Clinic)*; Sarma, Sridevi V. *(Johns Hopkins University)*

Wavelet Spectral Time-Frequency Training of Deep Convolutional Neural Networks for Accurate Identification of Micro-Scale Sharp Wave Biomarkers in the Post-Hypoxic-Ischemic EEG of Preterm Sheep 1039-1042
Abbasi, Hamid* *(University of Auckland)*; Gunn, Alistair Jan *(University of Auckland)*; Unsworth, Charles Peter *(University of Auckland)*; Bennet, Laura *(The University of Auckland)*

Emotion Evaluation during Working on a Puzzle by Spatiotemporal Pattern of Band Power of Electroencephalogram 1043-1046
Igasaki, Tomohiko* *(Kumamoto University)*; Hiramatsu, Sho *(Kumamoto University)*; Yanagihara, Daiki *(Kumamoto University)*; Baba, Yuta *(Kumamoto University)*

Personalized Sleep Spindle Detection in Whole Night Polysomnography 1047-1050
Scafa, Stefano* *(Politecnico di Torino)*; Fiorillo, Luigi *(University of Bern)*; Lucchini, Marta *(Institute for Information Systems and Networking, University of)*; Roth, Corinne *(Dept. of Neurology (Sleep- Wake-Epilepsy Centre), University)*; Agostini, Valentina *(Politecnico di Torino)*; Vancheri, Alberto *(University of Applied Sciences and Arts of Southern Switzerland)*; Faraci, Francesca *(1973)*

Theme 02. Brain Image Analysis (Oral Session)

A Novel Approach to Segment Cortical Neurons in Histological Images of the Near-Term Fetal Sheep Brain Model 1051-1054
Bhattacharya, Saheli* *(University of Auckland)*; Bennet, Laura *(The University of Auckland)*; Davidson, Joanne *(University of Auckland)*; Unsworth, Charles Peter *(University of Auckland)*

A Two Cascaded Network Integrating Regional-Based YOLO and 3D-CNN for Cerebral Microbleeds Detection 1055-1058
Al-masni, Mohammed *(College of Engineering, Yonsei University)*; Kim, Woo-Ram *(Gachon University)*; Kim, Eung Yeop *(Gachon University Gil Medical Center)*; Noh, Young *(Gachon University Gil Medical Center)*; Kim, Dong-Hyun* *(Yonsei University)*

Minimizing Hybrid Dice Loss for Highly Imbalanced 3D Neuroimage Segmentation 1059-1062
Lu, Yuhao *(Nanyang Technological University, Singapore)*; Zhou, Juan Helen *(National University of Singapore)*; Guan, Cuntai* *(Nanyang Technological University)*

A Cascaded Deep-Learning Framework for Segmentation of Metastatic Brain Tumors before and after Stereotactic Radiation Therapy 1063-1066
Jalalifar, Ali* *(York University)*; Soliman, Hany *(University of Toronto, Sunnybrook Health Sciences Centre)*; Sahgal, Arjun *(Sunnybrook Health Sciences Centre, University of Toronto)*; Sadeghi-Naini, Ali *(York University)*

A Brain Tumor Segmentation Framework based on Outlier Detection using One-Class Support Vector Machine 1067-1070
Jalalifar, Ali* *(York University)*; Soliman, Hany *(University of Toronto, Sunnybrook Health Sciences Centre)*; Ruschin, Mark *(Sunnybrook Health Sciences Centre, University of Toronto)*; Sahgal, Arjun *(Sunnybrook Health Sciences Centre, University of Toronto)*; Sadeghi-Naini, Ali *(York University)*

A Novel Graph Attention Network Architecture for Modeling Multimodal Brain Connectivity 1071-1074
Filip, Alexandru Catalin* *(University of Cambridge)*; Azevedo, Tiago *(Computer Science and Technology Dept.)*; Passamonti, Luca *(University of Cambridge)*; Toschi, Nicola *(University of Rome "Tor Vergata", Faculty of Medicine)*; Liò, Pietro *(University of Cambridge)*

Theme 02. Brain Imaging and Image Analysis – I (Oral Session)

BoostCaps: A Boosted Capsule Network for Brain Tumor Classification 1075-1079
Afshar, Parnian *(Concordia University)*; Plataniotis, Konstantinos *(University of Toronto)*; Mohammadi, Arash* *(Concordia University)*

Automatic Whole Brain Vascular Territory Mapping 1080-1083
Matsubara, Ryota* *(Canon Medical Systems Corporation)*; Parsons, Mark *(University of Melbourne)*; Bivard, Andrew *(University of Melbourne)*; Sakashita, Naotaka *(Canon Medical Systems Corporation)*

Different Glucose Metabolic Brain Networks between Subjective Cognitive Decline and Health Control based on Graph Theory 1084-1087
Dong, Qiuyue *(Shanghai University)*; Han, Ying *(XuanWu Hospital of Capital Medical University)*; Jiang, Jiehui* *(Shanghai University)*

Drosophila Brain Functional Data Analysis: A Unified Framework 1088-1091
Chang, Wei *(National Tsing Hua University)*; Hsiao, Ching-Chun *(National Tsing Hua University)*; Lin, Yen-Yin *(National Tsing Hua University)*; Chu, Li-An *(National Tsing Hua University)*; Swindlehurst, A. Lee *(University of California, Irvine)*; Chu, Shi-Wei *(National Taiwan University)*; Chiang, AnnShyn *(National Tsing Hua University)*; Wu, Shun-Chi* *(National Tsing Hua University)*

Stability-Based Sparse Paradigm Free Mapping Algorithm for Deconvolution of Functional MRI Data 1092-1095
Uruñuela, Eneko* *(Basque Center on Cognition, Brain and Language)*; Jones, Stephen *(Imaging Institute, Cleveland Clinic)*; Crawford, Anna *(Imaging Institute, Cleveland Clinic)*; Shin, Wanyong *(Imaging Institute, Cleveland Clinic)*; Oh, Sehong *(Imaging Institute, Cleveland Clinic)*; Lowe, Mark *(Imaging Institute, Cleveland Clinic)*; Caballero Gaudes, Cesar *(Basque Center on Cognition, Brain and Language)*

Exploring the Relevance between Brain Glucose Metabolism and Functional Connectivity in Chinese Cognitive Dysfunctions' subjects using Integrated Resting-State PET/MRI Images 1096-1099
Ding, Changchang *(Shanghai University)*; Han, Ying *(XuanWu Hospital of Capital Medical University)*; Jiang, Jiehui* *(Shanghai University)*

Theme 02. Brain Imaging and Image Analysis – II (Oral Session)

Early Detection of Amyloid β Pathology in Alzheimer's Disease by Molecular MRI 1100-1103
Dong, Celia M. *(The University of Hong Kong)*; Guo, Audrey S. *(The University of Hong Kong)*; To, Anthea *(The University of Hong Kong)*; Chan, Kannie W.Y. *(City University of Hong Kong)*; Chow, Aviva S.F. *(The University of Hong Kong)*; Bian, Liming *(Chinese University of Hong Kong)*; Leong, Alex T. L. *(The University of Hong Kong)*; Wu, Ed X.* *(The University of Hong Kong)*

Use of Multilayer Network Modularity and Spatiotemporal Network Switching Rate to Explore Changes of Functional Brain Networks in Alzheimer's Disease 1104-1107
Yang, Fan *(Shanghai University)*; Li, Yu Xia *(Xuanwu Hospital of Capital Medical University)*; Han, Ying *(XuanWu Hospital of Capital Medical University)*; Jiang, Jiehui* *(Shanghai University)*

Reconstructing the Perceived Faces from Brain Signals without Large Number of Training Samples 1108-1111
Zhang, Hui* *(Beihang University)*; Wei, Zixiang *(Beihang University)*; Zhou, Jiaqi *(Beihang University)*; Tian, Jie *(Chinese Academy of Sciences)*

In-Plane, Mirror-Symmetric Visualization Tool for Deep Brain Stimulation 1112-1115
Richner, Thomas* *(Mayo Clinic)*; Klassen, Bryan T. *(Mayo Clinic)*; Miller, Kai J. *(Mayo Clinic)*

Effects of Visceral Interoception on Topological Properties of the Brain – A Graph Theory Analysis of Resting State fMRI 1116-1119
Jarrahi, Behnaz* *(Stanford University)*; Kollias, Spyros *(University Hospital Zurich)*

A Deep Spatiotemporal Graph Learning Architecture for Brain Connectivity Analysis 1120-1123
Azevedo, Tiago* *(Computer Science and Technology Dept.)*; Passamonti, Luca *(University of Cambridge)*; Liò, Pietro *(University of Cambridge)*; Toschi, Nicola *(University of Rome "Tor Vergata", Faculty of Medicine)*

Theme 02. Breast Cancer – Mammography and Histopathology (Oral Session)

Weakly-Supervised Self-Training for Breast Cancer Localization 1124-1127
Liang, Gongbo* *(University of Kentucky)*; Wang, Xiaoqin *(University of Kentucky)*; Zhang, Yu *(University of Kentucky)*; Jacobs, Nathan *(University of Kentucky)*

A Two-Stage Multiple Instance Learning Framework for the Detection of Breast Cancer in Mammograms .. 1128-1131
Chandra K, Sarath *(Indian Institute of Technology Kharagpur, India)*; Chakravarty, Arunava* *(Indian Institute of Technology Kharagpur, India)*; Ghosh, Nirmalya *(Indian Institute of Technology (IIT), Kharagpur)*; Sarkar, Tandra *(Apollo Gleneagles Hospital, Kolkata)*; Sethuraman, Ramanathan *(Intel)*; Sheet, Debdoot *(Indian Institute of Technology Kharagpur)*

A New Benchmark and Method for the Evaluation of Chest Wall Detection in Digital Mammography 1132-1135
Africano, Gerson* *(Universidad Industrial de Santander)*; Otso, Arponen *(Tampere University Hospital)*; Sassi, Antti *(Tampere University Hospital)*; Rinta-Kiikka, Irina *(Tampere University Hospital)*; Laaperi, Anna-Leena *(Tampere University Hospital)*; Pertuz, Said *(Universidad Industrial de Santander)*

A Comparison of Regions of Interest in Parenchymal Analysis for Breast Cancer Risk Assessment 1136-1139
Africano, Gerson* *(Universidad Industrial de Santander)*; Otso, Arponen *(Tampere University Hospital)*; Sassi, Antti *(Tampere University Hospital)*; Karivaara-Mäkelä, Mirva *(Tampere University Hospital)*; Holli-Helenius, Kirsi *(Tampere University Hospital)*; Rinta-Kiikka, Irina *(Tampere University Hospital)*; Laaperi, Anna-Leena *(Tampere University Hospital)*; Pertuz, Said *(Universidad Industrial de Santander)*

Deep Understanding of Breast Density Classification 1140-1143
Cogan, Timothy* *(University of Texas at Dallas)*; Tamil, Lakshman *(University of Texas at Dallas)*

Convolutional Neural Network based Breast Cancer Histopathology Image Classification 1144-1147
Yamlome, Pascal* *(Norfolk State University, Norfolk)*; Akwaboah, Akwasi Darkwah *(Norfolk State University)*; Marz, Aylin *(Norfolk State University, Norfolk)*; Deo, Makarand *(Norfolk State University)*

Theme 02. Cancer Image Analysis-Machine Learning Approach (Oral Session)

Combining Multiple Contrasts for Improving Machine-Learning based Classification of Cervical Cancers with a Low-Cost Point-of-Care Pocket Colposcope 1148-1151
Asiedu, Mercy* *(Duke University)*; Skerrett, Erica *(Rice University)*; Sapiro, Guillermo *(Duke University, Surgical Information Sciences, Inc)*; Ramanujam, Nimmi *(Duke University)*

Methodology and Technology for the Development of a Prognostic MRI-Based Radiomic Model for the Outcome of Head and Neck Cancer Patients 1152-1155
Bologna, Marco* *(Politecnico di Milano)*; Corino, Valentina *(Politecnico di Milano)*; Tenconi, Chiara *(IRCCS Istituto Nazionale dei Tumori)*; Facchinetti, Nadia *(IRCCS Istituto Nazionale dei Tumori)*; Calareso, Giuseppina *(Istituto Nazionale dei Tumori)*; Iacovelli, Nicola Alessandro *(IRCCS Istituto Nazionale dei Tumori)*; Cavallo, Anna *(IRCCS Istituto Nazionale dei Tumori)*; Alfieri, Salvatore *(IRCCS Istituto Nazionale dei Tumori)*; Cavalieri, Stefano *(IRCCS Istituto Nazionale dei Tumori)*; Fallai, Carlo *(IRCCS Istituto Nazionale dei Tumori)*; Valdagni, Riccardo *(Fondazione IRCCS Istituto Nazionale dei Tumori)*; Rancati, Tiziana *(IRCCS Istituto Nazionale dei Tumori)*; Trama, Annalisa *(IRCCS Istituto Nazionale dei Tumori)*; Licitra, Lisa *(Fondazione IRCCS Istituto Nazionale dei Tumori)*; Orlandi, Ester *(IRCCS Istituto Nazionale dei Tumori)*; Mainardi, Luca *(Politecnico di Milano)*

Computer-Aided Diagnosis for Colorectal Cancer using Deep Learning with Visual Explanations 1156-1159
Choi, Kihwan* *(Korea Institute of Science and Technology)*; Choi, Sung Ji *(Korea University)*; Kim, Eun Sun *(Korea University)*

A Novel and Efficient Tumor Detection Framework for Pancreatic Cancer via CT Images 1160-1164
Zhang, Zhengdong* *(Beihang University)*; Li, Shuai *(Beihang University)*; Wang, Ziyang *(University of Oxford)*; Lu, Yun *(Qingdao University)*

Automated Classification of Osteosarcoma and Benign Tumors using RNA-Seq and Plain X-Ray 1165-1168
Alge, Olivia* *(University of Michigan)*; Lu, Lu *(University of Michigan)*; Li, Zhi *(University of Michigan)*; Hua, Yingqi *(Shanghai Jiaotong University)*; Gryak, Jonathan *(University of Michigan)*; Najarian, Kayvan *(University of Michigan - Ann Arbor)*

Hyperspectral Imaging for Colon Cancer Classification in Surgical Specimens: Towards Optical Biopsy during Image-Guided Surgery 1169-1173
Manni, Francesca* *(Eindhoven University of Technology)*; Fonolla, Roger *(Eindhoven University of Technology)*; van der Sommen, Fons *(Eindhoven University of Technology)*; Zinger, Svitlana *(Eindhoven University of Technology)*; Shan, Caifeng *(Philips Research)*; Kho, Esther *(Netherlands Cancer Institute)*; Brouwer de Koning, Susan G *(Netherlands Cancer Institute)*; Ruers, T.J.M. *(Netherlands Cancer Institute)*; de With, Peter *(Eindhoven University of Technology)*

Theme 02. Cardiac Image Analysis – I (Oral Session)

Validation of Diffeomorphic Registration on Cine Cardiac MR via Direct Frame-to-Frame Comparison with HARP Tracking on Tagged MR 1174-1177
Ahmed, Ahmed *(University of Alberta)*; Krishnaswamy, Deepa* *(University of Alberta)*; Punithakumar, Kumaradevan *(University of Alberta)*; Noga, Michelle *(University of Alberta)*

Strain Maps of the Left Atrium Imaged with a Novel High-Resolution CINE MRI Protocol 1178-1181
Varela, Marta* *(Imperial College London)*; Queiros, Sandro *(University of Minho)*; Anjari, Mustafa *(University College London NHS Trust)*; Correia, Teresa *(Biomedical Engineering Dept., School of Biomedical Engineer)*; King, Andrew Peter *(King's College London)*; Bharath, Anil Anthony *(Imperial College)*; Lee, Jack *(King's College London)*

Left Ventricular Flow Analysis in Atrial Fibrillation 1182-1185
Kim, Hansuk *(University of Calgary)*; Sheitt, Hana *(University of Calgary)*; Jamalidinan, Fatemehsadat *(University of Calgary)*; Wilton, Stephen B *(Hospital Haut Leveque)*; White, James A *(University of Calgary)*; Garcia, Julio* *(University of Calgary)*

Convolution Pyramid Network: A Classification Network on Coronary Artery Angiogram Images 1186-1189
Chen, Shuang *(Beijing University of Posts and Telecommunications)*; Tang, Yang *(Beijing University of Posts and Telecommunications)*; Shi, Xiaotong *(Beijing University of Posts and Telecommunication)*; Zhang, Honggang* *(Beijing University of Posts and Telecommunications)*; Xie, Lihua *(Fu Wai Hospital, National Center for Cardiovascular Diseases, Ch)*; Xu, Bo *(Fu Wai Hospital, National Center for Cardiovascular Diseases, Ch)*

End-to-End Deep Learning Model for Cardiac Cycle Synchronization from Multi-View Angiographic Sequences 1190-1193
Royer-Rivard, Raphaël* *(Polytechnique Montréal)*; Girard, Fantin *(Polytechnique Montreal)*; Dahdah, Nagib *(Ste-Justine University Hospital Research Center)*; Cheriet, Farida *(Ecole Polytechnique of Montreal)*

PPG3D: Does 3D Head Tracking Improve Camera-Based PPG Estimation? 1194-1197
Nagamatsu, Genki* *(Kyushu University)*; Nowara, Ewa *(Rice University)*; Pai, Amruta *(Rice University)*; Veeraraghavan, Ashok *(Rice University)*; Kawasaki, Hiroshi *(Kyushu University)*

Theme 02. Cardiac Image Analysis – II (Oral Session)

A Semi-Automatic Method to Segment the Left Atrium in MR Volumes with Varying Slice Numbers 1198-1202
Uslu, Fatmatulzehra *(Bursa Technical University)*; Varela, Marta* *(Imperial College London)*; Bharath, Anil Anthony *(Imperial College)*

Improving the Generalization of Deep Learning Methods to Segment the Left Ventricle in Short Axis MR Images 1203-1206
Graves, Catharine De* *(Heart Institute, Univ. of São Paulo Medical School)*; Moreno, Ramon Alfredo *(Univ. of Sao Paulo Medical)*; Rebelo, Marina de Fátima de Sá *(Univ of Sao Paulo Medical School)*; Nomura, Cesar *(Heart Institute - HCFMUSP)*; Gutierrez, Marco *(Heart Institute, Univ. of Sao Paulo Medical School)*

Automatic Pulmonary Vein and Left Atrium Segmentation for TAPVC Preoperative Evaluation using V-Net with Grouped Attention 1207-1210
Li, Jiang *(Shanghai Jiao Tong University)*; Chen, Huai *(Shanghai Jiao Tong University)*; Zhu, Fang *(Shanghai Jiaotong University School of Medicine)*; Wen, Chen *(Shanghai Jiaotong University School of Medicine)*; Chen, Huiwen *(Shanghai Jiaotong University School of Medicine)*; Wang, Lisheng* *(Shanghai Jiao Tong University)*

Cardiac Chamber Segmentation using Deep Learning on Magnetic Resonance Images from Patients before and after Atrial Septal Occlusion Surgery 1211-1216
Lu, Yu* *(Shenzhen Technology University)*; Fu, Xianghua *(Shenzhen Technology University)*; Li, Xiaoqing *(Shenzhen Technology University)*; Qi, Yingjian *(Shenzhen Technology University)*

L-CO-Net: Learned Condensation-Optimization Network for Segmentation and Clinical Parameter Estimation from Cardiac Cine MRI 1217-1220
Hasan, S. M. Kamrul* *(Rochester Institute of Technology)*; Linte, Cristian A. *(Rochester Institute of Technology)*

Fully Automated Quantification of Cardiac Indices from Cine MRI using a Combination of Convolution Neural Networks 1221-1224
Pereira, Renato F. *(Heart Institute, University of São Paulo Medical School)*; Rebelo, Marina de Fátima de Sá *(Univ of Sao Paulo Medical School)*; Moreno, Ramon Alfredo *(University of Sao Paulo Medical)*; Gonçalves Marco, Anderson *(Heart Institute, University of São Paulo Medical School)*; Lima, Daniel M. *(Heart Institute, University of São Paulo Medical School)*; Toledo, Marcelo A. F.* *(Heart Institute, University of São Paulo Medical School)*; Krieger, José E. *(Heart Institute, University of São Paulo Medical School)*; Gutierrez, Marco *(Heart Institute, University of Sao Paulo Medical School)*

Theme 02. Chest X-Ray (Oral Session)

A Systematic Search Over Deep Convolutional Neural Network Architectures for Screening Chest Radiographs 1225-1228
Mitra, Arka *(Indian Institute of Technology Kharagpur)*; Chakravarty, Arunava* *(Indian Institute of Technology Kharagpur, India)*; Ghosh, Nirmalya *(Indian Institute of Technology (IIT), Kharagpur)*; Sarkar, Tandra *(Apollo Gleneagles Hospital, Kolkata)*; Sethuraman, Ramanathan *(Intel)*; Sheet, Debdoot *(Indian Institute of Technology Kharagpur)*

AI Chest 4 All 1229-1233
Thammarach, Purinat *(Thammasat University)*; Khaengthanyakan, Suntara *(Thammasat University)*; Vongsurakrai, Sethavudh *(Shrewsbury International School Bangkok)*; Phienphanich, Phongphan *(Thammasat University)*; Pooprasert, Pakinee *(Cardiff University School of Medicine)*; Yaemsuk, Akarachai *(Thammasat University)*; Vanichvarodom, Podsirin *(Thammasat University)*; Munpolsri, Namtip *(Udonthani Cancer Hospital)*; Khwayotha, Sirihattaya *(Udonthani Cancer Hospital)*; Lertkowit, Meyhininat *(Udonthani Cancer Hospital)*; Tungsagunwattana, Sutarat *(Central Chest Institute of Thailand)*; Vijitsanguan, Chomphunut *(Central Chest Institute of Thailand)*; Lertrojanapunya, Saijai *(Central Chest Institute of Thailand)*; Noisiri, Weeraya *(Central Chest Institute of Thailand)*; Chiawiriyabunya, Isara *(Central Chest Institute of Thailand)*; Aphikulvanich, Narong *(Ministry of Public Health)*; Tantibundhit, Charturong* *(Thammasat University)*

Learning Decision Ensemble using a Graph Neural Network for Comorbidity Aware Chest Radiograph Screening 1234-1237
Chakravarty, Arunava* *(Indian Institute of Technology Kharagpur, India)*; Sarkar, Tandra *(Apollo Gleneagles Hospital, Kolkata)*; Ghosh, Nirmalya *(Indian Institute of Technology (IIT), Kharagpur)*; Sethuraman, Ramanathan *(Intel)*; Sheet, Debdoot *(Indian Institute of Technology Kharagpur)*

Multi-View Ensemble Convolutional Neural Network to Improve Classification of Pneumonia in Low Contrast Chest X-Ray Images 1238-1241
Ferreira Junior, Jose Raniery* *(Univ. of Sao Paulo Medical School)*; Cardona Cardenas, Diego Armando *(Heart Institute, Univ. of Sao Paulo Medical School)*; Moreno, Ramon Alfredo *(Univ. of Sao Paulo Medical)*; Rebelo, Marina de Fátima de Sá *(Univ of Sao Paulo Medical School)*; Krieger, José E. *(Heart Institute, Univ. of São Paulo Medical School)*; Gutierrez, Marco *(Heart Institute, Univ. of Sao Paulo Medical School)*

Dense-Unet: A Light Model for Lung Fields Segmentation in Chest X-Ray Images 1242-1245
Yahyatabar, Mohammad* *(Ecole Polytechnique of Montreal)*; Philipe, Jouvet *(Pediatric Intensive Care Unit, CHU Sainte-Justine, Universite)*; Cheriet, Farida *(Ecole Polytechnique of Montreal)*

Lung Region Segmentation in Chest X-Ray Images using Deep Convolutional Neural Networks 1246-1249
Portela, Ronaldo *(Universidade Federal do Amazonas)*; Gomes Pereira, José Raimundo *(Universidade Federal do Amazonas)*; Costa, Marly G. F. *(Federal University of Amazonas - UFAM)*; Costa Filho, Cicero F. F.* *(Universidade Federal do Amazonas)*

Theme 02. CT and X-Ray Image Analysis – I (Oral Session)

Machine Learning-Based a Priori Chemotherapy Response Prediction in Breast Cancer Patients using Textural CT Biomarkers 1250-1253
Moghadas-Dastjerdi, Hadi* *(Univ. of Toronto, Sunnybrook Health Sciences Centre)*; Shan-E-Tallat, Hira. R. *(Univ. of Waterloo, Sunnybrook Health Sciences Centre)*; Sannachi, Lakshmanan *(Univ. of Toronto, Depts. of Radiation Oncology, and Ph)*; Osapoeta, Laurentius O. *(Univ. of Toronto, Depts. of Radiation Oncology, and Ph)*; Sadeghi-Naini, Ali *(York Univ.)*; Czarnota, Gregory *(Univ. of Toronto, Sunnybrook Health Sciences Centre)*

Learning Latent Spiculated Features for Lung Nodule Characterization 1254-1257
Qiu, Bowen* *(DePaul University)*; Furst, Jacob D. *(DePaul University)*; Rasin, Alexander *(DePaul University)*; Tchoua, Roselyne *(DePaul University)*; Raicu, Daniela S. *(DePaul University)*

An Attention-Guided Deep Neural Network for Annotating Abnormalities in Chest X-Ray Images: Visualization of Network Decision Basis 1258-1261
Saednia, Khadijeh* *(York University)*; Jalalifar, Ali *(York University)*; Ebrahimi, Shahin *(York University)*; Sadeghi-Naini, Ali *(York University)*

A Deep Learning Aided Drowning Diagnosis for Forensic Investigations using Post-Mortem Lung CT Images 1262-1265
Homma, Noriyasu* *(Tohoku Univ. Graduate School of Medicine)*; Zhang, Xiaoyong *(Tohoku Univ.)*; Qureshi, Amber Habib *(Graduate School of Biomedical Engineering, Tohoku Univ.)*; Konno, Takuya *(Akita Univ. Hospital)*; Kawasumi, Yusuke *(Tohoku Univ.)*; Usui, Akihito *(Tohoku Univ.)*; Funayama, Masato *(Tohoku Univ.)*; Bukovsky, Ivo *(Czech Technical Univ. in Prague)*; Ichiji, Kei *(Tohoku Univ. Graduate School of Medicine)*; Sugita, Norihiro *(Tohoku Univ.)*; Yoshizawa, Makoto *(Tohoku Univ.)*

Y-Net for Chest X-Ray Preprocessing: Simultaneous Classification of Geometry and Segmentation of Annotations 1266-1269
McManigle, John* *(Duke University School of Medicine)*; Bartz, Raquel *(Duke University School of Medicine)*; Carin, Lawrence *(Duke University)*

3D Auto-Segmentation of Mandibular Condyles 1270-1273
Brosset, Serge* *(Univ. of Michigan)*; Dumont, Maxime *(Univ. of Michigan)*; Bianchi, Jonas *(Univ. of Michigan)*; Ruellas, Antonio *(Univ. of Michigan, School of Dentistry, Dept. of Ortho)*; Cevidanes, Lucia *(Univ. of Michigan, School of Dentistry, Dept. of Ortho)*; Yatabe, Marilia *(Univ. of Michigan)*; Goncalves, Joao *(Universidade Estadual Paulista Júlio de Mesquita Filho)*; Benavides, Erika *(Univ. of Michigan, School of Dentistry, Dept. of Oral)*; Soki, Fabiana *(Univ. of Michigan)*; Paniagua, Beatriz *(Kitware, Inc.)*; Prieto, Juan *(Univ. of North Carolina)*; Najarian, Kayvan *(Univ. of Michigan - Ann Arbor)*; Gryak, Jonathan *(Univ. of Michigan)*; Soroushmehr, Sayedmohammadreza *(Univ. of Michigan, Ann Arbor)*

Theme 02. CT and X-Ray Image Analysis – II (Oral Session)

Multiphase Computed Tomographic Angiography with Bone Subtraction using 3D Multichannel Convolution Neural Networks 1274-1277
Huang, Adam* *(National Central Univ.)*; Cheng, Wen-Hsiang *(National Central Univ.)*; Lee, Chung-Wei *(National Taiwan Univ. Hospital)*; Yang, Chung-Yi *(E-Da Hospital)*; Liu, Hon-Man *(Fu Jen Catholic Univ. Hospital)*

Deep Learning based Lung Region Segmentation with Data Preprocessing by Generative Adversarial Nets 1278-1281
Nitta, Jumpei* *(Kyoto University)*; Nakao, Megumi *(Kyoto University)*; Imanishi, Keiho *(e-Growth Co. Ltd.)*; Matsuda, Tetsuya *(Kyoto University)*

MDL-IWS: Multi-View Deep Learning with Iterative Watershed for Pulmonary Fissure Segmentation 1282-1285
Roy, Rukhmini* *(Jadavpur University)*; Mazumder, Suparna *(Chittaranjan National Cancer Institute)*; Chowdhury, Ananda *(Jadavpur University)*

Volumetric Choroidal Segmentation using Sequential Deep Learning Approach in High Myopia Subjects 1286-1289
Cahyo, Dheo Arokhim Yusufi* *(Singapore Eye Research Institute)*; Wong, Damon *(Institute of Health Technologies, Nanyang Technological University)*; Yow, Ai Ping *(Nanyang Technological University)*; Saw, Seang Mei *(National University of Singapore)*; Schmetterer, Leopold *(Singapore Eye Research Institute)*

Feasible Study on Intracranial Hemorrhage Detection and Classification using a CNN-LSTM Network ... 1290-1293
Ko, Hoon *(Wonkwang University School of Medicine)*; Chung, Heewon *(Wonkwang University School of Medicine)*; Lee, Hooseok *(Wonkwang University School of Medicine)*; Lee, Jinseok* *(Wonkwang University School of Medicine)*

Malocclusion Classification on 3D Cone-Beam CT Craniofacial Images using Multi-Channel Deep Learning Models 1294-1298
Kim, Incheol *(National Library of Medicine)*; Misra, Dharitri *(National Library of Medicine, NIH)*; Rodriguez, Laritza *(National Institutes of Health, National Library of Medicine)*; Gill, Michael *(National Library of Medicine)*; Liberton, Denise K *(National Institute of Dental and Craniofacial Research (NIDCR),)*; Almpani, Konstantinia *(NIH/NIDCR)*; Lee, Janice *(National Institute of Dental and Craniofacial Research (NIDCR),)*; Antani, Sameer* *(National Library of Medicine)*

Theme 02. CT Imaging and Applications – I (Oral Session)

Short Scan Source-Detector Trajectories for Target-Based CBCT 1299-1302
Hatamikia, Sepideh* *(Austrian Center for Medical Innovation and Technology, Wiener Neu)*; Biguri, Ander *(Institute of Sound and Vibration Research, University of Southam)*; Kronreif, Gernot *(Austrian Center for Medical Innovation and Technology, Wiener Neu)*; Russ, Tom *(Medical Faculty Mannheim, Heidelberg University)*; Kettenbach, Joachim *(Dept. of Diagnostic and Interventional Radiology and Nuclea)*; Birkfellner, Wolfgang *(Center for Medical Physics and Biomedical Engineering, Medical U)*

Statistical Image Restoration for Low-Dose CT using Convolutional Neural Networks 1303-1306
Choi, Kihwan* *(Korea Institute of Science and Technology)*; Kim, Sungwon *(Yonsei University)*

Compressed Sensing based Image Reconstruction with Projection Recovery for Limited Angle Cone-Beam CT Imaging 1307-1310
Xie, Shoulie* *(Institute for Infocomm Research)*; Huang, Weimin *(Institute for Infocomm Research, Agency for Science Technology a)*; Yang, Tao *(Institute of Infocomm Research)*; Wu, Dajun *(Institute for Infocomm Research)*; Liu, Huiying *(Institute for Infocomm Research)*

NMAR3: Normalized Metal Artifact Reduction for Cone Beam Computed Tomography 1311-1314
Liu, Huiying *(Institute for Infocomm Research)*; Yang, Tao* *(Institute of Infocomm Research)*; Huang, Weimin *(Institute for Infocomm Research, Agency for Science Technology a)*; Xie, Shoulie *(Institute for Infocomm Research)*; Wu, Dajun *(Institute for Infocomm Research)*

Locate the Superficial Femoral Artery with Occlusion by Deep Neural Network Correcting Interpolation 1315-1318
Ku, Yijie* *(Tsinghua University)*; Weng, Wenhai *(Tsinghua University)*; Chen, Zhong *(Beijing Anzhen Hospital, Capital Medical University)*; Zheng, Huanqin *(Beijing Anzhen Hospital, Capital Medical University)*; Xu, Chuang *(Beijing Anzhen Hospital, Capital Medical University)*; Ding, Hui *(Tsinghua University)*; Li, Lei *(No.1 Hospital of Tsinghua University)*; Wang, Guangzhi *(Tsinghua University)*

Metal Artifacts Reduction in CT Scans using Convolutional Neural Network with Ground Truth Elimination ... 1319-1322
Mai, Qi* *(University of Waterloo)*; Wan, Justin *(University of Waterloo)*

Theme 02. CT Imaging and Applications – II (Oral Session)

Predicting Local Failure after Stereotactic Radiation Therapy in Brain Metastasis using Quantitative CT and Machine Learning 1323-1326
Jaberipour, Majid* *(Physical Sciences Platform, Sunnybrook Research Institute, Sunny)*; Sahgal, Arjun *(Sunnybrook Health Sciences Centre, University of Toronto)*; Soliman, Hany *(University of Toronto, Sunnybrook Health Sciences Centre)*; Sadeghi-Naini, Ali *(York University)*

Lumbar Vertebrae Synthetic Segmentation in Computed Tomography Images using Hybrid Deep Generative Adversarial Networks 1327-1330
Vania, Malinda *(Korea Institute of Science and Tech.)*; Lee, Deukhee* *(Korea Institute of Science and Tech.)*

Lung Segmentation and Nodule Detection in Computed Tomography Scan using a Convolutional Neural Network Trained Adversarially using Turing Test Loss 1331-1334
Sathish, Rakshith *(Indian Institute of Technology Kharagpur)*; Sathish, Rachana* *(Indian Institute of Technology Kharagpur)*; Sethuraman, Ramanathan *(Intel)*; Sheet, Debdoot *(Indian Institute of Technology Kharagpur)*

Evaluating Deep Learning Algorithms in Pulmonary Nodule Detection 1335-1338
Traore, Abdarahmane *(Université de Moncton)*; Abdoulaye Oumar, Ly *(Université de Moncton)*; Akhloufi, Moulay* *(Université de Moncton)*

An Innovative Radiomics Approach to Predict Response to Chemotherapy of Liver Metastases based on CT Images 1339-1342
Giannini, Valentina* *(University of Turin)*; Defeudis, Arianna *(University of Turin; Candiolo Cancer Institute, FPU-IRCC)*; Rosati, Samanta *(Politecnico di Torino)*; Cappello, Giovanni *(Candiolo Cancer Institute, FPO-IRCCS)*; Mazzetti, Simone *(Institute for Cancer Research and Treatment)*; Panic, Jovana *(Candiolo Cancer Institute, FPO-IRCCS)*; Regge, Daniele *(Institute for Cancer Research and Treatment)*; Balestra, Gabriella *(Politecnico di Torino)*

An Approach for Asbestos-Related Pleural Plaque Detection 1343-1346
de Melo e Sousa, Azael* *(Unicamp)*; Castelo-Fernández, Cesar *(Unicamp)*; Osaku, Daniel *(Unicamp)*; Bagatin, Ericson *(Unicamp)*; Reis, Fabiano *(School of Medical Sciences, University of Campinas)*; Falcao, Alexandre Xavier *(University of Campinas)*

Theme 02. Deformable Registration (Oral Session)

Deformable Registration of Coronary Arteries with Topological Constraints for Image-Guided Vascular Interventions 1347-1350
Zhang, Hong *(Shanghai Jiao Tong Univ.)*; Zhang, Jingyang *(Shanghai Jiao Tong Univ.)*; Wu, Wei *(Shanghai Jiao Tong Univ.)*; Xie, Hongzhi *(Peking Union Medical College Hospital)*; Gu, Lixu* *(Shanghai Jiaotong Univ.)*

Validation of a Diffeomorphic Registration Algorithm using True Deformation Computed from Thin Plate Spline Interpolation 1351-1354
Krishnaswamy, Deepa* *(University of Alberta)*; Noga, Michelle *(University of Alberta)*; Punithakumar, Kumaradevan *(University of Alberta)*

Unsupervised 3D End-to-End Deformable Network for Brain MRI Registration 1355-1359
Zhu, Zhenyu *(Shenzhen University)*; Cao, Yiqin *(Shenzhen University)*; Qin, Chenchen *(Shenzhen University)*; Rao, Yi *(Shenzhen University)*; Ni, Dong *(Shenzhen University)*; Wang, Yi* *(Shenzhen University)*

Multi-Scale U-Net with Edge Guidance for Multimodal Retinal Image Deformable Registration 1360-1363
Tian, Yuntong *(University of Chinese Academy of Sciences, Cixi Institute)*; Hu, Yan* *(Southern University of Science and Technology)*; Ma, Yuhui *(University of Chinese Academy of Sciences, Cixi Institute of Bio)*; Hao, Huaying *(Ningbo University)*; Mou, Lei *(Cixi Institute of Biomedical Engineering, Chinese Academy of Sci)*; Yang, Jianlong *(Cixi Institute of Biomedical Engineering, Chinese Academy of Sci)*; Zhao, Yitian *(Chinese Academy of Sciences)*; Liu, Jiang *(Southern University of Science and Technology)*

Statistical Shape Modeling to Determine the Anterior Pelvic Plane for Total Hip Arthroplasty 1364-1367
Guezou-Philippe, Aziliz* *(LaTIM - INSERM - UMR 1101 - SFR IBSAM, UBO)*; Dardenne, Guillaume *(University Hospital of Brest)*; Salhi, Asma *(IMT Atlantique)*; Burdin, Valerie *(IMT Atlantique/Institut Mines Telecom - INSERM U1101)*; Lefevre, Christian *(Université de Bretagne Occidentale)*; Stindel, Eric *(Université de Bretagne Occidentale)*

Lung CT Image Registration through Landmark-Constrained Learning with Convolutional Neural Network 1368-1371
Hu, Ruxue *(University of Jyväskylä)*; Wang, Hongkai *(Dalian University of Technology)*; Ristaniemi, Tapani *(University of Jyväskylä)*; Zhu, Wentao *(Zhejiang Lab)*; Sun, Xiaobang* *(University of Jyväskylä)*

Theme 02. Digital Pathology – I (Oral Session)

A Weak Supervision-Based Framework for Automatic Lung Cancer Classification on Whole Slide Image 1372-1375
Xu, Xiaowei *(ShangHai Jiaotong University)*; Hou, Runping *(School of Biomedical Engineering, Shanghai Jiao Tong University)*; Zhao, Wangyuan *(Shanghai Jiao Tong University)*; Teng, Haohua *(Shanghai Chest Hospital)*; Sun, Jianqi *(Shanghai Jiao Tong University)*; Zhao, Jun* *(Shanghai Jiao Tong University)*

Effectiveness of GAN-Based Synthetic Samples Generation of Minority Patterns in HEp-2 Cell Images 1376-1379
Gupta, Krati* *(Indian Institute of Technology, Mandi)*; Thapar, Daksh *(IIT Mandi)*; Bhavsar, Arnav *(IIT Mandi, India)*; Sao, Anil *(Indian Institute of Technology Mandi)*

Carcino-Net: A Deep Learning Framework for Automated Gleason Grading of Prostate Biopsies 1380-1383
Lokhande, Avinash *(Aira Matrix)*; Bonthu, Saikiran *(Aira Matrix)*; Singhal, Nitin* *(AIRA Matrix)*

A Novel Pathological Images and Genomic Data Fusion Framework for Breast Cancer Survival Prediction 1384-1387
Li, Shuai *(Beihang University)*; Shi, Haolei *(Beihang University)*; Sui, Dong* *(Beijing University of Civil Engineering and Architecture (BUCEA))*; Hao, Aimin *(School of Computer Science and Engineering, Beihang University)*; Qin, Hong *(Stony Brook University)*

Telepathology Support System with Gross Specimen Image using High Resolution 4K Multispectral Camera 1388-1391
Kobayashi, Naoki* *(Saitama Medical University)*; Suzuki, Hiroyuki *(Tokyo Institute of Technology)*; Ishikawa, Masahiro *(Saitama Medical University)*; Obi, Takashi *(Tokyo Institute of Technology)*; Ichimura, Takaya *(Saitama Medical University)*; Yanagisawa, Hiroto *(Saitama Medical University)*; Sasaki, Atsushi *(Saitama Medical University)*; Tsuchida, Tetsuya *(Saitama Medical University)*

Recursive Additive Complement Networks for Cell Membrane Segmentation in Histological Images 1392-1395
Yamami, Satoshi* *(Shibaura Institute of Technology)*; Sugimoto, Keita *(Graduate School of Engineering and Science, Shibaura Institute o)*; Takahashi, Masanobu *(Shibaura Institute of Technology)*; Nakano, Masayuki *(Yokohama City University)*

Theme 02. Digital Pathology – II (Oral Session)

Vacuole Segmentation and Quantification in Liver Images of Wistar Rat 1396-1399
Deshmukh, Sanket *(Aira Matrix)*; Lokhande, Avinash *(Aira Matrix)*; Wasnik, Ratul *(Aira Matrix)*; Singhal, Nitin* *(AIRA Matrix)*

Supervision and Source Domain Impact on Representation Learning: A Histopathology Case Study 1400-1403
Sikaroudi, Milad *(Kimia Lab, University of Waterloo)*; Safarpoor, Amir *(KIMIA Lab, University of Waterloo)*; Ghojogh, Benyamin *(Dept. of Electrical and Computer Engineering, University of)*; Shafiei, Sobhan *(University of Waterloo)*; Crowley, Mark *(Dept. of Electrical and Computer Engineering, University of)*; Tizhoosh, Hamid Reza* *(University of Waterloo)*

Diabetic Retinopathy (DR) Severity Level Classification using Multimodel Convolutional Neural Networks 1404-1407
Abidalkareem, Ali *(Florida Atlantic University)*; Abd, Moaed *(Florida Atlantic University)*; Ibrahim, Ali k Ibrahim* *(Florida Atlantic University)*; Zhuang, Hanqi *(Florida Atlantic University)*; Altaher, Ali *(Florida Atlantic University)*; Muhamed Ali, Ali *(Florida Atlantic University)*

Supervised Machine Learning Segmentation and Quantification of Gastric Pacemaker Cells 1408-1411
Mah, Sue Ann *(University of Auckland)*; Avci, Recep *(The University of Auckland)*; Du, Peng *(The University of Auckland)*; Vanderwinden, Jean-Marie *(Université libre de Bruxelles)*; Cheng, Leo K* *(The University of Auckland)*

Deep Learning Model based Ki-67 Index Estimation with Automatically Labelled Data 1412-1415
S, Lakshmi* *(National Institute of Technology Karnataka, Surathkal, Mangalore)*; Kotra Venkata, Sai Ritwik *(National Institute of Technology Karnataka, Surathkal)*; Vijayasenan, Deepu *(National Institute of Technology, Karnataka, Surathkal)*; David S, Sumam *(National Institute of Technology Karnataka)*; Sreeram, Saraswathy *(Kasturba Medical College Mangalore)*; K Suresh, Pooja *(Kasturba Medical College Mangalore)*

Theme 02. Digital Pathology – III (Oral Session)

Recognizing Magnification Levels in Microscopic Snapshots 1416-1419
Zaveri, Manit *(University of Waterloo)*; Shivam, Karla *(University of Waterloo)*; Morteza, Babaie *(KimiaLab, University of Waterloo)*; Shah, Sultaan *(Huron Digital Pathology)*; Damaskinos, Savvas *(Huron Digital Pathology)*; Kashani, Hany *(University of Waterloo)*; Tizhoosh, Hamid Reza* *(University of Waterloo)*

Segmentation of Tau Stained Alzheimers Brain Tissue using Convolutional Neural Networks 1420-1423
Wurts, Alexander *(Worcester Polytechnic Institute)*; Oakley, Derek H. *(Massachusetts General Hospital and Harvard Medical School)*; Hyman, Bradley T. *(Massachusetts General Hospital and Harvard Medical School)*; Samsi, Siddharth* *(Massachusetts Institute of Technology)*

Visualizing Functional Network Connectivity Difference between Healthy Control and Major Depressive Disorder using an Explainable Machine-Learning Method 1424-1427
Ji Ye, Chun *(Georgia Institute of Technology)*; Eslampanah Sendi, Mohammad Sadegh* *(Georgia Institute of Technology)*; Sui, Jing *(Institute of Automation, Chinese Academy of Science)*; Zhi, Dongmei *(Institute of Automation, Chinese Academy of Sciences, Beijing)*; Calhoun, Vince D *(Tri-Institutional Center for Translational Research in Neuroimag)*

Combining Deep Learning with Handcrafted Features for Cell Nuclei Segmentation 1428-1431
Narotamo, Hemaxi* *(Institute for Systems and Robotics, Instituto Superior Técnico,)*; Sanches, J. Miguel *(Institute for Systems and Robotics, Instituto Superior Técnico,)*; Silveira, Margarida *(Institute for Systems and Robotics - Instituto Superior Técnico)*

Interphase Cell Cycle Staging using Deep Learning 1432-1435
Narotamo, Hemaxi* *(Institute for Systems and Robotics, Instituto Superior Técnico,)*; Fernandes, Maria Sofia *(Institute of Pathology and Immunology of the University of Porto)*; Sanches, J. Miguel *(Institute for Systems and Robotics, Instituto Superior Técnico,)*; Silveira, Margarida *(Institute for Systems and Robotics - Instituto Superior Técnico)*

A V-Net based Deep Learning Model for Segmentation and Classification of Histological Images of Gastric Ablation 1436-1439
Aghababaie, Zahra *(University of Auckland)*; Jamart, Kevin Pascal Benjamin *(Auckland Bioengineering Institute, University of Auckland)*; Chan, Chih-Hsiang Alexander *(University of Auckland)*; Amirapu, Satya *(University of Auckland)*; Cheng, Leo K *(The University of Auckland)*; Paskaranandavadivel, Niranchan *(The University of Auckland)*; Avci, Recep *(The University of Auckland)*; Angeli, Timothy Robert* *(Auckland Bioengineering Institute, University of Auckland)*

Theme 02. Electrical Impedance Imaging (Oral Session)

A Novel Bounded EIT Protocol to Generate Inhomogeneous Skull Conductivity Maps Non-Invasively ... 1440-1443
Fernandez-Corazza, Mariano* *(National University of La Plata - CONICET)*; Turovets, Sergei *(University of Oregon)*; Muravchik, Carlos *(Universidad Nacional de La Plata)*

Pulmonary Ventilation and Pulsatile Perfusion Imaging on Premature Neonates using Simultaneous Multi-Source EIT 1444-1447
Kao, Tzu-Jen* *(GE Global Research Center)*; Amm, Bruce *(GE Global Research Center)*; Ashe, Jeffrey *(GE Global Research)*; Davenport, Daivd *(GE Global Research Center)*

Performance of an Adaptive Current Source for EIT Driving Loads through a Shielded Coaxial Cable 1448-1451
Abdelwahab, Ahmed* *(University at Albany - State University of New York)*; Rajabi Shishvan, Omid *(University at Albany - State University of New York)*; Saulnier, Gary *(University at Albany, SUNY)*

Measuring Current Source Output Impedance in EIT Systems while Attached to a Load 1452-1456
Rajabi Shishvan, Omid* *(University at Albany - State University of New York)*; Abdelwahab, Ahmed *(University at Albany - State University of New York)*; Saulnier, Gary *(University at Albany, SUNY)*

The Effect of Internal Electrodes on Electrical Impedance Tomography Sensitivity 1457-1460
Stowe, Symon* *(Carleton University)*; Adler, Andy *(Carleton University)*

Using Electrical Impedance Tomography in an Experimental Model of Weighted Restraint 1461-1464
Campbell, Mark* *(Carleton University)*; Mapani, Mali *(Carleton University)*; Stowe, Symon *(Carleton University)*; Dawson, Jeffery *(Carleton University)*; Adler, Andy *(Carleton University)*

Theme 02. Emerging MRI Technology (Oral Session)

High-Resolution 3D Spin-Echo MRSI using Interleaved Water Navigators, Sparse Sampling and Subspace-Based Processing 1465-1468
Ho, Ruo-Jing *(Univ. of Illinois at Urbana-Champaign)*; Lam, Fan* *(Univ. of Illinois at Urbana Champaign)*

Wireless Power Harvesting during MRI 1469-1472
Venkateswaran, Madhav *(University of Wisconsin-Madison)*; Kurpad, Krishna *(University of Wisconsin-Madison)*; Brown, James* *(MSEI)*; Fain, Sean *(University of Wisconsin-Madison, Dept of Medical Physics)*; van der Weide, Daniel *(University of Wisconsin-Madison)*

Investigation of Low-Cost Op-Amps as Decoupling Preamplifiers for MRI Array Coils 1473-1476
Sun, Chenhao *(Texas A&M University)*; Bauer, Courtney *(Texas A&M University)*; Busher, Joseph *(Texas A&M University)*; McDougall, Mary *(Texas A&M University)*; Wright, Steven M.* *(Texas A&M University)*

Exploring the Inter-Voxel Information in Pharmacokinetic Maps for Cervical Carcinoma Prediction 1477-1480
Zhang, Zhuo* *(A*STAR)*; He, Dajiang *(Institute for Infocomm Research)*; Song, Ying *(Institute for infocomm research, A*STAR)*; Wang, Xue *(Second Affiliated Hospital of Wenzhou Medical University, China)*; Yan, Zhihan *(Second Affiliated Hospital of Wenzhou Medical University, China)*; Shao, Jinbo *(Wuhan Children's Hospital, China)*; Hou, Zujun *(Suzhou Institute of Biomedical Engineering and Technology, Chine)*

High-Fidelity Accelerated MRI Reconstruction by Scan-Specific Fine-Tuning of Physics-Based Neural Networks 1481-1484
Hosseini, Seyed Amir Hossein *(University of Minnesota)*; Yaman, Burhaneddin* *(University of Minnesota)*; Moeller, Steen *(University of Minnesota)*; Akcakaya, Mehmet *(University of Minnesota)*

Positive Contrast Susceptibility MR Imaging using GPU-Based Primal-Dual Algorithm 1485-1488
Wang, Haifeng *(Shenzhen Institutes of Advanced Technology, Chinese Academy of Science)*; Cai, Fang *(Shenzhen Institutes of Advanced Technology, Chinese Academy of Science)*; Shi, Caiyun *(Shenzhen Institutes of Advanced Technology, Lauterbur Research C)*; Cheng, Jing *(Shenzhen Institutes of Advanced Technology, Chinese Academy of Science)*; Su, Shi *(Shenzhen Institutes of Advanced Technology, Chinese Academy of Science)*; Qiu, Zhilang *(Shenzhen Institutes of Advanced Technology, Chinese Academy of Science)*; Xie, Guoxi *(Shenzhen Institutes of Advanced Technology, Lauterbur Research C)*; Chen, Hanwei *(Guangzhou Panyu Central Hospital)*; Liu, Xin *(Shenzhen Institutes of Advanced Technology, Chinese Academy of Science)*; Liang, Dong* *(Shenzhen Institutes of Advanced Technology)*

Theme 02. Functional Brain Imaging (Oral Session)

Voxelwise Optimization of Hemodynamic Lags to Improve Regional CVR Estimates in Breath-Hold FMRI 1489-1492
Moia, Stefano* *(Basque Center on Cognition, Brain and Language)*; Stickland, Rachael Cecelia *(Northwestern University)*; Ayyagari, Apoorva *(Northwestern University)*; Termenon, Maite *(BCBL)*; Caballero Gaudes, Cesar *(Basque Center on Cognition, Brain and Language)*; Bright, Molly Gallogly *(Northwestern University)*

Aberrant Functional Network Connectivity Transition Probability in Major Depressive Disorder 1493-1496
Zendehrouh, Elaheh *(Georgia State University)*; Eslampanah Sendi, Mohammad Sadegh* *(Georgia Institute of Technology)*; Sui, Jing *(Institute of Automation, Chinese Academy of Science)*; Fu, Zening *(Georgia State University)*; Zhi, Dongmei *(Institute of Automation, Chinese Academy of Sciences, Beijing)*; Lv, Luxian *(Dept. of Psychiatry, Henan Mental Hospital, The Second Affi)*; Ma, Xiaohong *(Psychiatric Laboratory and Mental Health Center, the State Key L)*; Ke, Qing *(Dept. of Neurology, The First Affiliated Hospital, Zhejiang)*; Li, Xianbin *(Beijing Key Lab of Mental Disorders, Beijing Anding Hospital, Ca)*; Wang, Chuanyue *(Beijing Key Lab of Mental Disorders, Beijing Anding Hospital, Ca)*; Abbott, Christopher *(Dept. of Psychiatry, University of New Mexico)*; Turner, Jessica *(Georgia State University)*; Miller, Robyn *(The Mind Research Network)*; Calhoun, Vince D. *(Tri-Institutional Center for Translational Research in Neuroimag)*

Multi-Subject Task-Related fMRI Data Analysis via Generalized Canonical Correlation Analysis 1497-1502
Karakasis, Paris* *(University of Virginia)*; Liavas, Athanasios *(Technical University of Crete)*; Sidiropoulos, Nicholas *(University of Virginia)*; Simos, Panagiotis *(Dept. of Psychiatry, University of Crete)*; Papadaki, Efrosini *(Dept. of Radiology, School of Medicine, University of Cret)*

Anxiety and Depression Diagnosis Method based on Brain Networks and Convolutional Neural Networks 1503-1506
Xie, Yunlong *(Shanghai University)*; Yang, Banghua* *(Shanghai University)*; Lu, Xi *(Shanghai Changhai Hospital)*; Zheng, Minmin *(Shanghai University)*; Fan, Cunxiu *(Shanghai Changhai Hospital)*; Bi, Xiaoying *(Shanghai Changhai Hospital)*; Zhou, Shu *(Shanghai Changhai Hospital)*; Li, YingJie *(Shanghai University)*

An Autoencoder-Based Approach to Predict Subjective Pain Perception from High-Density Evoked EEG Potentials 1507-1511
Wang, Jiahao *(Shenzhen University)*; Mengying, Wei *(Shenzhen University)*; Zhang, Li *(Shenzhen University)*; Huang, Gan *(Shenzhen University)*; Liang, Zhen *(Shenzhen University)*; Li, Linling *(Shenzhen University)*; Zhang, Zhiguo* *(Shenzhen University)*

Patient-Clinician Brain Response during Clinical Encounter and Pain Treatment 1512-1515
Anzolin, Alessandra* *(Harvard Medical School (Athinoula A. Martinos Center for Biomedi)*; Isenburg, Kylie *(Athinoula A. Martinos Center for Biomedical Imaging, MGH)*; Grahl, Arvina *(Harvard Medical School (Athinoula A. Martinos Center for Biomedi)*; Toppi, Jlenia *(University of Rome "Sapienza")*; Yücel, Meryem *(Boston University)*; Ellingsen, Dan Mikael *(Dept. of Psychology, University of Oslo)*; Gerber, Jessica *(Athinoula A. Martinos Center for Biomedical Imaging, MGH)*; Ciaramidaro, Angela *(Dept. of Education and Human Sciences, University of Modena)*; Astolfi, Laura *(University of Rome Sapienza)*; Kaptchuk, Ted Jack *(Beth Israel Deaconess Medical Center, Harvard Medical School)*; Napadow, Vitaly *(Massachusetts General Hospital)*

Theme 02. Image Analysis-Deep Learning (Oral Session)

Deep Learning for Neuroimaging Segmentation with a Novel Data Augmentation Strategy 1516-1519
Wu, Wenshan *(Nanyang Technological University)*; Mane, Ravikiran *(Nanyang Technological University)*; Lu, Yuhao *(Nanyang Technological University, Singapore)*; Guan, Cuntai* *(Nanyang Technological University)*

Malignancy Detection in Prostate Multi-Parametric MR Images using U-Net with Attention 1520-1523
Machireddy, Archana* *(Oregon Health and Science University)*; Meermeier, Nicholas *(Oregon Health and Science University)*; Coakley, Fergus *(Oregon Health and Science University)*; Song, Xubo *(Oregon Health & Science University)*

Deep Convolutional Neural Network for Melanoma Detection using Dermoscopy Images 1524-1527
Kaur, Ranpreet *(Auckland University of Technology)*; GholamHosseini, Hamid* *(Auckland University of Technology)*; Sinha, Roopak *(Auckland University of technology)*

Thermography for the Detection of Secondary Raynaud's Phenomenon by Means of the Distal-Dorsal Distance 1528-1531
Ricci Viana, Janaína* *(Federal Technological University of Paraná)*; Campos, Daniel Prado *(Federal University of Technology - Paraná)*; Ulbricht, Leandra *(UTFPR - Federal University of Technology - Paraná)*; Sato, Gilson Yukio *(Federal University of Technology - Paraná)*; Ripka, Wagner L. *(UTFPR- Federal Technological University of Paraná)*

Deep Learning Approaches for Bone and Bone Lesion Segmentation on 18FDG PET/CT Imaging in the Context of Metastatic Breast Cancer 1532-1535
Moreau, Noémie* *(Keosys - LS2N)*; Rousseau, Caroline *(ICO Cancer Center)*; Fourcade, Constance *(Centrale Nantes, LS2N, Keosys)*; Santini, Gianmarco *(Keosys Medical Imaging)*; Ferrer, Ludovic *(ICO Gauducheau Cancer Center, SIRIC ILIAD Nantes-Angers, INCA-DG)*; Lacombe, Marie *(ICO Cancer Center, Angers)*; Guillerminet, Camille *(ICO Paul Papin)*; Campone, Mario *(Institut de Canceéologie de l'Ouest-Pays de la Loire)*; Colombié, Mathilde *(ICO Gauducheau Cancer Center, Saint Herblain, France - SIRIC ILI)*; Rubeaux, Mathieu *(Keosys)*; Normand, Nicolas *(Université de Nantes)*

Combining Superpixels and Deep Learning Approaches to Segment Active Organs in Metastatic Breast Cancer PET Images 1536-1539
Fourcade, Constance* *(Centrale Nantes, LS2N, Keosys)*; Ferrer, Ludovic *(ICO Gauducheau Cancer Center, SIRIC ILIAD Nantes-Angers, INCA-DG)*; Santini, Gianmarco *(Keosys Medical Imaging)*; Moreau, Noémie *(Keosys - LS2N)*; Rousseau, Caroline *(ICO Cancer Center)*; Lacombe, Marie *(ICO Cancer Center, Angers)*; Guillerminet, Camille *(ICO Paul Papin)*; Colombié, Mathilde *(ICO Gauducheau Cancer Center, Saint Herblain, France - SIRIC ILI)*; Campone, Mario *(Institut de Canceéologie de l'Ouest-Pays de la Loire)*; Mateus, Diana *(Centrale Nantes)*; Rubeaux, Mathieu *(Keosys)*

Theme 02. Image Classification (Oral Session)

Automatic Glaucoma Detection from Stereo Fundus Images 1540-1543
Ong, Ee Ping* *(Institute for Infocomm Research)*; Chen, Jun *(Shenzhen Institutes of Advanced Technology, Chinese Academy of Science)*; Wong, Damon *(Institute of Health Technologies, Nanyang Technological University)*; Tay, Elton L.T. *(Tan Tock Seng Hospital)*; Teo, Hwei Yee *(Tan Tock Seng Hospital)*; Loo, Rosalyn Grace *(Tan Tock Seng Hospital)*; Yip, Leonard W.L. *(Tan Tock Seng Hospital)*

Enhanced Capsule Network for Medical Image Classification 1544-1547
Zhang, Zhe* *(University of Chinese Academy of Sciences)*; Ye, Shiwei *(University of Chinese Academy of Sciences)*; Liao, Pan *(Beijing Intelligent Brain Cloud Inc)*; Liu, Yan *(University of Chinese Academy of Sciences)*; Su, Guiping *(University of Chinese Academy of Sciences)*; Sun, Yi *(University of Chinese Academy of Sciences)*

Classification of Aortic Stenosis using ECG by Deep Learning and Its Analysis using Grad-CAM 1548-1551
Hata, Erika* *(Waseda University)*; Seo, Chanjin *(Waseda University)*; Nakayama, Masafumi *(Toda Central General Hospital)*; Iwasaki, Kiyotaka *(Joint Graduate School of Tokyo Women's Medical University and Wa)*; Ohkawauchi, Takaaki *(Nihon University)*; Ohya, Jun *(Waseda University)*

A Study on Tuberculosis Classification in Chest X-Ray using Deep Residual Attention Networks 1552-1555
Zhang, Ran *(Shandong Normal University)*; Duan, Huichuan* *(Shandong Normal University)*; Cheng, Jie-Zhi *(Shenzhen University)*; Zheng, Yuanjie *(School of Information Science and Engineering at Shandong Normal)*

Autofluorescence Bronchoscopy Video Analysis for Lesion Frame Detection 1556-1559
Chang, Qi *(Penn State University)*; Bascom, Rebecca *(Penn State University)*; Jennifer, Toth *(Penn State University)*; Ahmad, Danish *(Penn State University)*; Higgins, William* *(Penn State University)*

A Multi-Label Deep Learning Model with Interpretable Grad-CAM for Diabetic Retinopathy Classification ... 1560-1563
Jiang, Hongyang* *(Beijing Zhizhen Internet Technology Co., Ltd.)*; Xu, Jie *(Beijing Tongren Eye Center, Beijing Tongren Hospital, Capital Me)*; Shi, Rongjie *(Beijing Zhizhen Internet Technology Co., Ltd.)*; Yang, Kang *(Zhizhen)*; Zhang, Dongdong *(Beijing Zhizhen Internet Technology Co., Ltd.)*; Gao, Mengdi *(College of Engineering, Peking Univ., Beijing)*; Ma, He *(Northeastern Univ.)*; Qian, Wei *(Univ. of Texas at El Paso)*

Theme 02. Image Reconstruction and Enhancement (Oral Session)

Multiple Slice K-Space Deep Learning for Magnetic Resonance Imaging Reconstruction 1564-1567
Du, Tianming* *(Beijing University of Posts and Telecommunications)*; Zhang, Yanci *(Wharton School of the University of Pennsylvania)*; Shi, Xiaotong *(Beijing University of Posts and Telecommunication)*; Chen, Shuang *(Beijing University of Posts and Telecommunications)*

Unsupervised Stratification in Neuroimaging through Deep Latent Embeddings 1568-1571
Dimitri, Giovanna Maria *(Univ. of Cambridge (UK), Univ. of Siena (Italy))*; Spasov, Simeon *(Univ. of Cambridge)*; Duggento, Andrea *(Univ. of Rome "Tor Vergata")*; Passamonti, Luca *(Univ. of Cambridge)*; Liò, Pietro *(Univ. of Cambridge)*; Toschi, Nicola* *(Univ. of Rome "Tor Vergata", Faculty of Medicine)*

Limited-Angle Computed Tomography Reconstruction using Combined FDK-Based Neural Network and U-Net 1572-1575
Wang, Yiying *(University College London)*; Yang, Tao* *(Institute of Infocomm Research)*; Huang, Weimin *(Institute for Infocomm Research, Agency for Science Technology a)*

Validation Study of a Novel Method for the 3D Reconstruction of Coronary Bifurcations 1576-1579
Tsompou, Panagiota *(Unit of Medical Technology and Intelligent Information Systems,)*; Andrikos, Ioannis *(University of Ioannina)*; Karanasiou, Georgia *(University of Ioannina,)*; Sakellarios, Antonis *(Forth-Biomedical Research Institute)*; Tsigkas, Nikolaos *(Dept. of Biomedical Research, FORTH-IMBB)*; Kigka, Vassiliki *(University of Ioannina)*; Kyriakidis, Savvas *(Institute of Molecular Biology and Biotechnology, FORTH)*; Michalis, Lampros *(University of Ioannina)*; Fotiadis, Dimitrios I.* *(University of Ioannina)*

3D MR Image Denoising using a Modified Adaptive High Order Singular Value Decomposition Method 1580-1583
Wang, Li *(Chongqing University)*; Hou, Wensheng *(Bioengineering Inst of Chongqing Univ)*; Wu, Xiaoying *(Chongqing University)*; Chen, Lin* *(Chongqing University)*

MRI Super-Resolution using Laplacian Pyramid Convolutional Neural Networks with Isotropic Undecimated Wavelet Loss 1584-1587
Ramanarayanan, Sriprabha *(Healthcare Technology Innovation Center)*; Murugesan, Balamurali *(Indian Institute of Technology Madras)*; Kalyanasundaram, Ananth *(SRM Institute of Science and Technology, Kattankulathur, Chennai)*; Prabhakaran, Surya *(SRM Institute of Science and Technology, Kattankulathur, Chennai)*; Sirukarumbur Shanmugaram, Keerthi Ram *(IIT Madras)*; Patil, Shantanu *(SRM Medical College)*; Sivaprakasam, Mohanasankar* *(Indian Institute of Technology Madras)*

Theme 02. Image Reconstruction and Enhancement – Image Synthesis and Performance Evaluation (Oral Session)

Generating X-Ray Images from Point Clouds using Conditional Generative Adversarial Networks 1588-1591
Haiderbhai, Mustafa* *(University of Ottawa)*; Ledesma, Sergio *(University of Guanajuato, University of Ottawa)*; Navab, Nassir *(Technische Universität München)*; Fallavollita, Pascal *(University of Ottawa)*

Triple Multi-Scale Adversarial Learning with Self-Attention and Quality Loss for Unpaired Fundus Fluorescein Angiography Synthesis 1592-1595
Cai, Zhuotong *(Xi'an Jiaotong University)*; Xin, Jingmin* *(Xi'an Jiaotong University)*; Wu, Jiayi *(Xi'an Jiaotong University)*; Liu, Sijie *(Xi'an Jiaotong University)*; Zuo, Weiliang *(Xi'an Jiaotong University)*; Zheng, Nanning *(Xi'an Jiaotong University)*

3-to-1 Pipeline: Restructuring Transfer Learning Pipelines for Medical Imaging Classification via Optimized GAN Synthetic Images 1596-1599
Choong, Ross Zhi Jian *(National Taiwan University)*; Harding, Seth *(National Taiwan University)*; Tang, Bo-Yen *(National Taiwan University)*; Liao, Shih-wei* *(National Taiwan University)*

Generating Hyperspectral Skin Cancer Imagery using Generative Adversarial Neural Network 1600-1603
Annala, Leevi* *(University of Jyväskylä)*; Neittaanmäki, Noora *(Depts. of Pathology and Dermatology, Institutes of Biomedic)*; Paoli, John *(Dept. of Dermatology and Venereology, Institute of Clinical)*; Zaar, Oscar *(Dept. of Dermatology and Venereology, Institute of Clinical)*; Pölönen, Ilkka *(University of Jyväskylä)*

Low-Cost Eye Phantom for Stereophotogrammetry-Based Optic Nerve Head Topographical 3D Imaging ... 1604-1607
Coghill, Ian* *(University of Strathclyde)*; Black, Richard Anthony *(University of Strathclyde)*; Livingstone, Iain *(NHS Greater Glasgow & Clyde)*; Giardini, Mario Ettore *(University of Strathclyde)*

X-ray2Shape: Reconstruction of 3D Liver Shape from a Single 2D Projection Image 1608-1611
Tong, Fei* *(Kyoto University)*; Nakao, Megumi *(Kyoto University)*; Wu, Shuqiong *(Graduate School of Informatics, Kyoto University)*; Nakamura, Mitsuhiro *(Kyoto University)*; Matsuda, Tetsuya *(Kyoto University)*

Theme 02. Image Segmentation – I (Oral Session)

UENet: A Novel Generative Adversarial Network for Angiography Image Segmentation 1612-1615
Shi, Xiaotong *(Beijing University of Posts and Telecommunication)*; Du, Tianming *(Beijing University of Posts and Telecommunications)*; Chen, Shuang *(Beijing University of Posts and Telecommunications)*; Zhang, Honggang* *(Beijing University of Posts and Telecommunications)*; Xu, Bo *(Fu Wai Hospital, National Center for Cardiovascular Diseases, Ch)*; Guan, Changdong *(Fu Wai Hospital, National Center for Cardiovascular Diseases, Ch)*

AEC-Net: Attention and Edge Constraint Network for Medical Image Segmentation 1616-1619
Wang, Jingyi *(Shanghai Jiao Tong University)*; Zhao, Xu* *(Shanghai Jiao Tong University)*; Ning, Qingtian *(SJTU)*; Qian, Dahong *(Shanghai Jiao Tong University)*

Deeply Supervised Active Learning for Finger Bones Segmentation 1620-1623
Zhao, Ziyuan* *(Institute for Infocomm Research (I2R), Agency for Science, Technology)*; Yang, Xiaoyan *(National Univ. of Singapore)*; Veeravalli, Bharadwaj *(National Univ. of Singapore)*; Zeng, Zeng *(I2R, A*STAR)*

Adipose Tissue Segmentation in Unlabeled Abdomen MRI using Cross Modality Domain Adaptation 1624-1628
Masoudi, Samira* *(National Cancer Institute, National Institutes of Health)*; Anwar, Syed *(Univ. of Central Florida)*; Harmon, Stephanie *(Frederick National Laboratory for Cancer Research)*; Choyke, Peter *(National Institutes of Health)*; Turkbey, Baris *(Molecular Imaging Program, NCI, NIH)*; Bagci, Ulas *(Univ. of Central Florida)*

Bladder Wall Segmentation in MRI Images via Deep Learning and Anatomical Constraints 1629-1632
Li, Ruikun *(Shanghai Jiao Tong University)*; Chen, Huai *(Shanghai Jiao Tong University)*; Gong, Guanzhong *(Shandong Cancer Hospital and Institute)*; Wang, Lisheng* *(Shanghai Jiao Tong University)*

MRI-SegFlow: A Novel Unsupervised Deep Learning Pipeline Enabling Accurate Vertebral Segmentation of MRI Images 1633-1636
Kuang, Xihe *(The University of Hong Kong)*; Cheung, Jason Pui Yin *(The University of Hong Kong)*; Wu, Honghan *(The University of Edinburgh)*; Dokos, Socrates *(University of New South Wales)*; Zhang, Teng* *(The University of Hong Kong, Queen Marry Hospital)*

Theme 02. Image Segmentation – II (Oral Session)

Chromosome Segmentation via Data Simulation and Shape Learning 1637-1640
Chen, Pingjun* *(University of Florida)*; Cai, Jinzheng *(University of Florida)*; Yang, Lin *(University of Florida)*

Deep Learning with Skip Connection Attention for Choroid Layer Segmentation in OCT Images 1641-1645
Mao, Xiaoqian *(Shanghai University)*; Ma, Yuhui *(University of Chinese Academy of Sciences, Cixi Institute of Bio)*; Gu, Zaiwang *(Southern University of Science and Technology)*; Gu, Shenshen *(Shanghai University)*; Yang, Jianlong *(Cixi Institute of Biomedical Engineering, Chinese Academy of Sci)*; Cheng, Jun *(Institute of Biomedical Engineering, Chinese Academy of Sciences)*; Zhao, Yitian* *(Chinese Academy of Sciences)*; Liu, Jiang *(Southern University of Science and Technology)*

An Efficient Lens Structures Segmentation Method on AS-OCT Images 1646-1649
Cao, Guiping *(Central Research Institute of Guangzhou Shiyuan Electronics)*; Zhao, Wei *(Guangzhou Shiyuan Electronics Co., Ltd)*; Higashita, Risa *(Tomey Corporation, Japan)*; Liu, Jiang *(Southern University of Science and Technology)*; Chen, Wan *(State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Cent)*; Yuan, Jin *(State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Cent)*; Zhang, Yubing *(Central Research Institute of Guangzhou Shiyuan Electronics)*; Yang, Ming* *(CVTE Research)*

Extracting Membrane Borders in IVUS Images using a Multi-Scale Feature Aggregated U-Net 1650-1653
Xia, Menghua *(Dept. of Electronic Engineering of Fudan University)*; Yan, Wenjun *(Dept. of Electronic Engineering of Fudan University)*; Huang, Yi *(Dept. of Electronic Engineering of Fudan University)*; Guo, Yi *(Fudan University)*; Zhou, Guohui *(Fudan University)*; Wang, Yuanyuan* *(Fudan University)*

Efficient Deep Learning-Based Wound-Bed Segmentation for Mobile Applications 1654-1657
Ong, Ee Ping* *(Institute for Infocomm Research)*; Tang, Ka Yin, Christina *(Institute for Infocomm Research, Agency for Science, Technology)*; Lee, Beng Hai *(Institute for Infocomm Research)*

Surgical Tool Segmentation and Localization using Spatio-Temporal Deep Network 1658-1661
Kanakatte, Aparna* *(Tata Consultancy Services)*; Ramaswamy, Akshaya *(TCS Research)*; Gubbi, Jayavardhana *(Tata Consultancy Services)*; Ghose, Avik *(TCS Research & Innovation)*; P, Balamuralidhar *(Tata Consultancy Services)*

Theme 02. MRI Image Analysis (Oral Session)

Further Development of Subspace Imaging to Magnetic Resonance Fingerprinting: A Low-Rank Tensor Approach 1662-1666
Zhao, Bo* *(MGH/HST Athinoula Martinos Center for Biomedical Imaging, Harvar)*; Setsompop, Kawin *(Harvard Medical School)*; Salat, David *(Massachusetts General Hospital, Harvard Medical School)*; Wald, Lawrence L. *(A. A. Martinos Center for Biomedical Imaging, Dept. of Radiology)*

Comparison of Feature Selection in Radiomics for the Prediction of Overall Survival after Radiotherapy for Hepatocellular Carcinoma 1667-1670
Fontaine, Pierre* *(Univ Rennes, CLCC Eugne Marquis, INSERM, LTSI - UMR 1099,F-35000)*; Riet, François-Georges *(Univ Rennes, CLCC Eugne Marquis, INSERM, LTSI - UMR 1099,F-35000)*; Castelli, Joël *(Univ. of Rennes 1)*; Gnep, Khemara *(Département de Radiothérapie, Centre Eugène Marquis, Rennes, Fra)*; Depeursinge, Adrien *(Univ. of Applied Sciences Western Switzerland Sierre (HES-S)*; De Crevoisier, Renaud *(INSERM, U1099, Rennes, F-35000, France - Université de Rennes 1,)*; Acosta, Oscar *(Univ. of Rennes 1)*

Comparison of Histogram-Based Textural Features between Cancerous and Normal Prostatic Tissue in Multiparametric Magnetic Resonance Images 1671-1674
De Santi, Bruno* *(Politecnico di Torino)*; Salvi, Massimo *(Politecnico di Torino)*; Giannini, Valentina *(University of Turin)*; Meiburger, Kristen M. *(Politecnico di Torino)*; Marzola, Francesco *(Politecnico di Torino)*; Russo, Filippo *(Institute for Cancer Research and Treatment)*; Bosco, Martino *(Dept. of Pathology, San Lazzaro Hospital, 12051, Alba)*; Molinari, Filippo *(Politecnico di Torino)*

A Convolutional Neural Network based System for Colorectal Cancer Segmentation on MRI Images 1675-1678
Panic, Jovana* *(Candiolo Cancer Institute, FPO-IRCCS)*; Defeudis, Arianna *(University of Turin; Candiolo Cancer Institute, FPU-IRCC)*; Mazzetti, Simone *(Institute for Cancer Research and Treatment)*; Rosati, Samanta *(Politecnico di Torino)*; Giannetto, Giuliana *(University of Turin)*; Vassallo, Lorenzo *(University of Turin)*; Regge, Daniele *(Institute for Cancer Research and Treatment)*; Balestra, Gabriella *(Politecnico di Torino)*; Giannini, Valentina *(University of Turin)*

Automated Detection of Juvenile Myoclonic Epilepsy using CNN based Transfer Learning in Diffusion MRI 1679-1682
Si, Xiaopeng* *(Tianjin University)*; Zhang, Xingjian *(Tianjin University)*; Zhou, Yu *(Tianjin University)*; Sun, Yulin *(Tianjin University)*; Jin, Weipeng *(Tianjin University Huanhu Hospital)*; Yin, Shaoya *(Tianjin University Huanhu Hospital)*; Zhao, Xin *(Tianjin University)*; Li, Qiang *(Tianjin University)*; Ming, Dong *(Tianjin University)*

Identification of Subgroup Differences using IVA: Application to fMRI Data Fusion 1683-1686
Luo, Zhongqiang* *(Sichuan University of Science and Engineering)*; Long, Qunfang *(University of Maryland, Baltimore County)*; Bhinge, Suchita *(University of Maryland Baltimore County)*; Akhonda, Mohammad Abu Baker Siddique *(University of Maryland, Baltimore County)*; Adali, Tulay *(University of Maryland Baltimore County)*

Theme 02. MRI-Diffusion Imaging (Oral Session)

Inter-Subject Clustering of Brain Fibers from Whole-Brain Tractography 1687-1691
Huerta, Isaias *(Universidad de Concepcion)*; Vázquez, Andrea *(Universidad de Concepción)*; López, Narciso *(Universidad de Concepción)*; Houenou, Josselin *(Inserm cea & aphp)*; Poupon, Cyril *(CEA I2BM NeuroSpin)*; Mangin, Jean-François *(CEA I2BM NeuroSpin)*; Guevara, Pamela* *(Universidad de Concepción)*; Hernández, Cecilia *(Universidad de Concepción)*

Pipeline Comparisons of Convolutional Neural Networks for Structural Connectomes: Predicting Sex across 3, 152 Participants 1692-1695
Yeung, Hon Wah* *(Mr)*; Luz, Saturnino *(University of Edinburgh)*; Cox, Simon *(University of Edinburgh)*; Buchanan, Colin *(University of Edinburgh)*; Whalley, Heather *(University of Edinburgh)*; Smith, Keith *(University of Edinburgh)*

GeoSP: A Parallel Method for a Cortical Surface Parcellation based on Geodesic Distance 1696-1700
López, Narciso *(Universidad de Concepción)*; Vázquez, Andrea *(Universidad de Concepción)*; Poupon, Cyril *(CEA I2BM NeuroSpin)*; Mangin, Jean-François *(CEA I2BM NeuroSpin)*; Ladra, Susana *(Universidade da Coruña)*; Guevara, Pamela* *(Universidad de Concepción)*

Rapid Quantification of White Matter Disconnection in the Human Brain 1701-1704
Zayed, Abdelrahman* *(Concordia University)*; Iturria-Medina, Yasser *(McGill University)*; Villringer, Arno *(Max Planck Institute for Human Cognitive and Brain Sciences)*; Sehm, Bernhard *(Max Planck Institute for Human Cognitive and Brain Sciences)*; Steele, Christopher *(Concordia University)*

Disruption of Structural Brain Networks in Primary Open Angle Glaucoma 1705-1708
Di Cio', Francesco* *(Tor Vergata University, Rome)*; Garaci, Francesco *(University or Rome Tor Vergata)*; Minosse, Silvia *(University of Rome "Tor Vergata", Faculty of Medicine)*; Passamonti, Luca *(University of Cambridge)*; Martucci, Alessio *(University of Rome "Tor Vergata")*; Lanzafame, Simona *(University of Rome "Tor Vergata")*; Di Giuliano, Francesca *(University of Rome Tor Vergata)*; Picchi, Eliseo *(University of Rome Tor Vergata)*; Mancino, Raffaele *(University of Rome "Tor Vergata")*; Guerrisi, Maria *(University of Rome "Tor Vergata")*; Nucci, Carlo *(University of Rome "Tor Vergata")*; Floris, Roberto *(University of Rome Tor Vergata)*; Toschi, Nicola *(University of Rome "Tor Vergata", Faculty of Medicine)*

Multi-Shell D-MRI Reconstruction via Residual Learning utilizing Encoder-Decoder Network with Attention (MSR-Net) 1709-1713
Jha, Ranjeet Ranjan Jha* *(IIT MANDI)*; Nigam, Aditya *(IIT Mandi)*; Bhavsar, Arnav *(IIT Mandi, India)*; Pathak, Sudhir *(Univ. of Pittsburgh)*; Schneider, Walter *(Univ. of Pittsburgh)*; Kumar, B. V. Rathish Kumar *(IIT Kanpur)*

Theme 02. MRI-fMRI and Connectivity (Oral Session)

Diagnosis of Myotonic Dystrophy based on Resting State fMRI using Convolutional Neural Networks ... 1714-1717
Kamali, Tahereh* *(Stanford University)*; Hagerman, Katharine *(Stanford University)*; Day, John *(Stanford University)*; Sampson, Jacinda *(Stanford University)*; Lim, Kelvin *(University of Minnesota)*; Mueller, Bryon *(University of Minnesota)*; Wozniak, Jeffrey *(University of Minnesota)*

A Novel Spatiotemporal Tool for the Automatic Classification of fMRI Noise based on Independent Component Analysis 1718-1721
Tassi, Emma* *(Politecnico di Milano)*; Maggioni, Eleonora *(Scientific Institute IRCCS E.Medea)*; Cerutti, Sergio *(Politecnico di Milano)*; Brambilla, Paolo *(University of Milan, Fondazione IRCCS Ospedale Maggiore Policlin)*; Bianchi, Anna Maria *(Politecnico di Milano)*

Impact of Intravesical Cold Sensation on Functional Network Connectivity Estimated using ICA at Rest and during Interoceptive Task 1722-1725
Jarrahi, Behnaz* *(Stanford University)*; Kollias, Spyros *(University Hospital Zurich)*

Disruption of Brain Network Organization in Patients with Human Immunodeficiency Virus (HIV) Infection .. 1726-1729
Minosse, Silvia* *(Univ. of Rome "Tor Vergata", Faculty of Medicine)*; Picchi, Eliseo *(Univ. of Rome Tor Vergata)*; Di Giuliano, Francesca *(Univ. of Rome Tor Vergata)*; Lanzafame, Simona *(Univ. of Rome "Tor Vergata")*; Manenti, Guglielmo *(Univ. of Rome "Tor Vergata", Faculty of Medicine, Rome Ital)*; Sarmati, Loredana *(Univ. of Rome "Tor Vergata", Faculty of Medicine, Rome Ital)*; Pistolese, Chiara Adriana *(Univ. or Rome Tor Vergata)*; Elisabetta, Teti *(Univ. of Rome "Tor Vergata", Faculty of Medicine, Rome Ital)*; Massimo, Andreoni *(Univ. of Rome "Tor Vergata", Faculty of Medicine, Rome Ital)*; Floris, Roberto *(Univ. of Rome Tor Vergata)*; Guerrisi, Maria *(Univ. of Rome "Tor Vergata")*; Garaci, Francesco *(Univ. or Rome Tor Vergata)*; Toschi, Nicola *(Univ. of Rome "Tor Vergata", Faculty of Medicine)*

Global and Local Reorganization of Brain Network Connectivity in Sudden Sensorineural Hearing Loss 1730-1733
Minosse, Silvia* *(University of Rome "Tor Vergata", Faculty of Medicine)*; Garaci, Francesco *(University or Rome Tor Vergata)*; Martino, Federica *(Dept. of Clinical Sciences and Translational Medicine, Tor)*; Di Mauro, Roberta *(Dept. of Clinical Sciences and Translational Medicine, Tor)*; Melis, Milena *(Neuroradiology Unit, Dept. of Biomedicine and Prevention, U)*; Di Giuliano, Francesca *(University of Rome Tor Vergata)*; Picchi, Eliseo *(University of Rome Tor Vergata)*; Floris, Roberto *(University of Rome Tor Vergata)*; Guerrisi, Maria *(University of Rome "Tor Vergata")*; Di Girolamo, Stefano *(Dept. of Clinical Sciences and Translational Medicine, Tor)*; Toschi, Nicola *(University of Rome "Tor Vergata", Faculty of Medicine)*

Altered Intramodular Functional Connectivity in Drug Naïve Obsessive-Compulsive Disorder Patients .. 1734-1737
Ye, Qianqian* *(Shanghai Jiao Tong University)*; Zhang, Zongfeng *(Shanghai Mental Health Center, Shanghai Jiao Tong University School)*; Fan, Qing *(Shanghai Mental Health Center, Shanghai Jiao Tong University Sch)*; Li, Yao *(Shanghai Jiao Tong University)*

Theme 02. MRI-Neuroimaging (Oral Session)

Disrupted Coupling between NAA and Functional Connectivity in Ventromedial Prefrontal Cortex of Drug-Naïve First-Episode Psychosis 1738-1741
Li, Wenli* *(Shanghai Jiao Tong University)*; Xiang, Qiong *(Shanghai Mental Health Center)*; Liu, Dengtang *(Shanghai Mental Health Center, School of Medicine, Shanghai Jiao)*; Li, Yao *(Shanghai Jiao Tong University)*

Brain MRI-Based 3D Convolutional Neural Networks for Classification of Schizophrenia and Controls 1742-1745
Hu, Mengjiao* *(Nanyang Technological University)*; Sim, Kang *(Institute of Mental Health)*; Zhou, Juan Helen *(National University of Singapore)*; Jiang, Xudong *(Nanyang Technological University)*; Guan, Cuntai *(Nanyang Technological University)*

Diffusion Kurtosis Imaging Reveals Optic Tract Damage that Correlates with Clinical Severity in Glaucoma 1746-1749
Sun, Zhe *(University of Southern California)*; Parra, Carlos *(New York University School of Medicine)*; Bang, Ji Won *(New York University School of Medicine)*; Fieremans, Els *(New York University School of Medicine)*; Wollstein, Gadi *(Dept. of Ophthalmology, New York University)*; Schuman, Joel S. *(NYU Langone Health, NYU School of Medicine)*; Chan, Kevin C.* *(New York University)*

Glioma Growth Prediction via Generative Adversarial Learning from Multi-Time Points Magnetic Resonance Images 1750-1753
Elazab, Ahmed* *(Shenzhen University)*; Wang, Changmiao *(Chinese University of Hong Kong, Shenzhen; University of Science)*; Gardezi, Syed Jamal Safdar *(Shenzhen University)*; Bai, Hongmin *(Dept. of Neurosurgery, Guangzhou General Hospital of Guangz)*; Wang, Tianfu *(Shenzhen University)*; Lei, Baiying *(Shenzhen University)*; Chang, Chunqi *(Shenzhen University)*

U-Net Combined with CRF and Anatomical based Spatial Features to Segment White Matter Hyperintensities 1754-1757
PengZheng, Zhou *(Dept. of Electronic and Information Engineering, Harbin Institute of Technology)*; Li, Liang *(Dept. of Electronic and Information Engineering, Harbin Institute of Technology)*; Xutao, Guo *(HIT)*; Lv, Haiyan *(Mindsgo Life Science Shenzhen Ltd.)*; Wang, Tong *(Harbin Institute of Technology, Shenzhen)*; Ma, Ting* *(Harbin Institute of Technology at Shenzhen)*

Training Deep Neural Networks for Small and Highly Heterogeneous MRI Datasets for Cancer Grading 1758-1761
Wodzinski, Marek* *(AGH University of Science and Technology)*; Tommaso, Banzato *(University of Padova)*; Atzori, Manfredo *(University of Applied Sciences Western Switzerland)*; Andrearczyk, Vincent *(HES-SO)*; Dicente Cid, Yashin *(University of Warwick)*; Müller, Henning *(University of Applied Sciences Western Switzerland (HES-SO))*

Theme 02. Novel Image Analysis Method (Oral Session)

Use of Radiomic Features and Support Vector Machine to Discriminate Subjective Cognitive Decline and Healthy Controls 1762-1765
Wu, Yue *(Shanghai University)*; Li, Taoran *(XuanWu Hospital of Capital Medical University)*; Han, Ying *(XuanWu Hospital of Capital Medical University)*; Jiang, Jiehui* *(Shanghai University)*

Evaluation and Comparison of Global-Feature-Based and Local-Feature-Based Segmentation Algorithms in Intracranial Visual Pathway Delineation 1766-1769
Liu, Yan* *(Sichuan University)*; Gu, Xuejun *(University of Texas Southwestern Medical Center)*

aNy-Way Independent Component Analysis 1770-1774
Duan, Kuaikuai* *(Georgia Institute of Technology)*; Silva, Rogers F *(Georgia State University)*; Calhoun, Vince *(Georgia State University)*; Liu, Jingyu *(Georgia State University)*

Do Cognitive Reserve Levels Affect Brain Glucose Metabolism and Amyloid-β Depositions in Subjective Cognitive Decline Subjects? 1775-1778
Liu, Chunhua *(Shanghai University)*; Chen, Guanqun *(Xuanwu Hospital of Capital Medical University)*; Han, Ying *(XuanWu Hospital of Capital Medical University)*; Jiang, Jiehui* *(Shanghai University)*

High-Resolution Mapping of Intestinal Spike Bursts and Motility 1779-1782
Kuruppu, Sachira *(University of Auckland)*; Cheng, Leo K *(The University of Auckland)*; Angeli, Timothy Robert *(Auckland Bioengineering Institute, University of Auckland)*; Avci, Recep *(The University of Auckland)*; Paskaranandavadivel, Niranchan* *(The University of Auckland)*

Customized Access Technology for Children using Head Movement Recognition 1783-1786
Orlandi, Silvia* *(Holland Bloorview Kids Rehabilitation Hospital)*; Hotzé, Fanny *(Holland Bloorview Kids Rehabilitation Hospital)*; Lim, Derrick *(Holland Bloorview Kids Rehabilitation Hospital)*; González Estrada, Sofía *(Holland Bloorview Kids Rehabilitation Hospital)*; Muir, Destinée *(Holland Bloorview Kids Rehabilitation Hospital)*; Friesen, Hilary A. *(Holland Bloorview Kids Rehabilitation Hospital)*; Chau, Tom *(University of Toronto)*

Theme 02. Novel Imaging Modalities (Oral Session)

Study of the Refraction Effects in Microwave Breast Imaging using a Dry Setup 1787-1790
Godinho, Daniela M.* *(Faculdade de Ciências da Univ. de Lisboa)*; Felício, João M. *(Centro de Investigação Naval (CINAV), Escola Naval, Almada, Port)*; Fernandes, Carlos A. *(Univ. de Lisboa, Instituto Superior Tecnico, Instituto de)*; Conceição, Raquel C. *(Faculdade de Ciências da Univ. de Lisboa)*

4D-CT Hyper-Elastography using a Biomechanical Model 1791-1794
Miranda, Dayton* *(University of Western Ontario)*; Jafari, Parya *(Western University)*; Dempsey, Sergio C. H. *(Western University)*; Samani, Abbas *(Western University)*

MNP Enhanced Microwave Imaging by Means of Pseudo-Noise Sensing with Different External Magnetic Field Modulations 1795-1798
Ley, Sebastian* *(Technische Universität Ilmenau)*; Faenger, Bernd *(University Hospital Jena)*; Hilger, Ingrid *(University Hospital Jena)*; Helbig, Marko *(Technische Universität Ilmenau)*

Towards Contactless Estimation of Electrodermal Activity Correlates 1799-1802
Bhamborae, Mayur J.* *(Saarland Univ. Faculty of Medicine)*; Flotho, Philipp *(Saarland Univ. Faculty of Medicine)*; Mai, Adrian *(Saarland Univ. Faculty of Medicine)*; Schneider, Elena N. *(Saarland Univ. of Applied Sciences)*; Francis, Alexander *(Purdue Univ.)*; Strauss, Daniel J. *(Saarland Univ., Medical Faculty)*

Adaptable Sensor Arrays for Fetal Magnetocardiographic Measurements using Optically-Pumped Magnetometers: A Pilot Study 1803-1806
Escalona-Vargas, Diana* *(University of Arkansas for Medical Sciences)*; Eswaran, Hari *(Univ of Arkansas for Medical Sci)*

Combining Millimeter-Wave Imaging, Ultrasound and Elastography in a New Multimodal Approach for Breast Cancer Detection: Initial Experimental Results 1807-1810
Di Meo, Simona *(University of Pavia)*; Pasotti, Lorenzo *(University of Pavia, via Ferrata 5, Pavia, I-27100, Italy)*; Lashkevich, Elena *(University of Pavia)*; Magenes, Giovanni* *(University of Pavia)*; Pasian, Marco *(University of Pavia)*; Matrone, Giulia *(University of Pavia)*

Theme 02. Optical Image Analysis (Oral Session)

Spatial-Temporal Mitosis Detection in Phase-Contrast Microscopy via Likelihood Map Estimation by 3DCNN 1811-1815
Nishimura, Kazuya* *(Kyushu University)*; Bise, Ryoma *(Kyushu University)*

Fully Automated Detection and Classification of White Blood Cells 1816-1819
Wijesinghe, Chinthalanka* *(University of Moratuwa, Sri Lanka)*; Wickramarachchi, Dilshan *(University of Moratuwa)*; Kalupahana, Iyani *(University of Moratuwa, Sri Lanka)*; Rasanjalee, Lokesha *(University of Moratuwa, Sri Lanka)*; Silva, Indira *(University of Peradeniya, Sri Lanka)*; Nanayakkara, Nuwan Dayananda *(University of Moratuwa)*

Prediction for Morphology and States of Stem Cell Colonies using a LSTM Network with Progressive Training Microscopy Images 1820-1823
Chu, Slo-Li *(Chung Yuan Christian Univ.)*; Abe, Kuniya *(Mammalian Genome Dynamics, RIKEN BioResource Center)*; Yokota, Hideo *(RIKEN Center for Advanced Photonics)*; Sudo, Kazuhiro *(BioResouce Center, RIKEN)*; Nakamura, Yukio *(RIKEN BioResource Center)*; Chang, Yuan-Hsiang *(Chung Yuan Christian Univ.)*; Fang, Liang-Che *(Chung Yuan Christian Univ.)*; Tsai, Ming-Dar* *(Chung-Yuan Christian Univ.)*

Automatic Quality Assessment of Reflectance Confocal Microscopy Mosaics using Attention-Based Deep Neural Network 1824-1827
Wodzinski, Marek* *(AGH University of Science and Technology)*; Pajak, Miroslawa *(AGH University of Science and Technology)*; Skalski, Andrzej *(AGH University of Science and Technology)*; Witkowski, Alexander *(Dept. of Dermatology, University of Modena and Reggio Emili)*; Pellacani, Giovanni *(Dept. of Dermatology, University of Modena and Reggio Emili)*; Łudzik, Joanna *(Dept. of Biostatistics and Telemedicine, Jagiellonian University)*

Compressed Sensing Structured Illumination Microscopy 1828-1831
Ozgurun, Baturay* *(University of Rochester)*; Cetin, Mujdat *(University of Rochester)*

Automated Circumpapillary Retinal Nerve Fiber Layer Segmentation in High-Resolution Swept-Source OCT 1832-1835
Yow, Ai Ping* *(Nanyang Technological University)*; Tan, Bingyao *(Singapore Eye Research Institute)*; Chua, Jacqueline *(Singapore Eye Research Institute)*; Aung, Tin *(Singapore Eye Research Institute)*; Husain, Rahat *(Singapore National Eye Centre)*; Schmetterer, Leopold *(Singapore Eye Research Institute)*; Wong, Damon *(Institute of Health Technologies, Nanyang Technological University)*

Theme 02. Optical Imaging (Oral Session)

Development of a Dual-Wavelength Isosbestic Wireless Fiber Photometry Platform for Live Animals Studies 1836-1839
Feshki, Mohamad* *(Laval University)*; Monfared, Mohamad Sadegh *(Laval University)*; Gosselin, Benoit *(Laval University)*

Computer Vision Challenges for Chronic Wounds Assessment 1840-1843
Teixeira, Paula *(Master in Medical Informatics, Faculty of Sciences of the Univer)*; Sousa, Paulino *(CINTESIS, Nursing School of Porto)*; Coimbra, Miguel* *(Instituto de Telecomunicações / Universidade do Porto)*

Investigation into Effect of Thrombomodulin Alfa for Septic Model Rats based on Microcirculation Image Analysis 1844-1847
Kawasaki, Mami* *(Chiba University)*; Nakano, Kazuya *(University of Miyazaki)*; Ohnishi, Takashi *(Chiba University)*; Sekine, Masashi *(Chiba University)*; Watanabe, Eizo *(Chiba University)*; Oda, Shigeto *(Chiba University)*; Nakada, Takaaki *(Chiba University)*; Haneishi, Hideaki *(Chiba University)*

Stomach 3D Reconstruction based on Virtual Chromoendoscopic Image Generation 1848-1852
Widya, Aji Resindra* *(Tokyo Institute of Technology)*; Monno, Yusuke *(Tokyo Institute of Technology)*; Okutomi, Masatoshi *(Tokyo Institute of Technology)*; Suzuki, Sho *(Nihon University School of Medicine)*; Gotoda, Takuji *(Nihon University School of Medicine)*; Miki, Kenji *(Tsujinaka Hospital Kashiwanoha)*

Fully Automated Pipeline for Body Composition Estimation from 3D Optical Scans using Principal Component Analysis: A Shape up Study 1853-1858
Sobhiyeh, Sima* *(LSU Pennington Biomedical Research Center)*; Borel, Nathan *(LSU, ESCoWell, Shape Up)*; Dechenaud, Marcelline *(Louisiana State University)*; Graham, Clinten *(Louisiana State University)*; Wong, Michael *(University of Hawaii at Manoa)*; Wolenski, Peter *(Louisiana State University)*; Shepherd, John *(University of Hawaii Cancer Center)*; Heymsfield, Steven *(Pennington Biomedical Research Center)*

Single-Axon Level Automatic Segmentation and Feature Extraction from Immuhistochemical Images of Peripheral Nerves 1859-1862
Tóth, Viktor* *(Feinstein Institutes for Medical Research)*; Jayaprakash, Naveen *(Feinstein Institutes For Medical Research)*; Abbas, Adam *(Feinstein Institute of Medical Research)*; Khan, Ariba *(Feinstein Institute of Medical Research)*; Zanos, Stavros *(Feinstein Institute for Medical Research)*; Zanos, Theodoros *(Feinstein Institutes for Medical Research)*

Theme 02. Optical Imaging – Coherence Tomography (Oral Session)

Performance Evaluation of Convolutions and Atrous Convolutions in Deep Networks for Retinal Disease Segmentation on Optical Coherence Tomography Volumes 1863-1866
Alsaih, Khaled* *(Centre for Intelligent Signal and Imaging Research-Universiti Te)*; Yusoff, Mohd Zuki *(Universiti Teknologi Petronas)*; Tang, Tong Boon *(Universiti Teknologi Petronas)*; Faye, Ibrahima *(Universiti Teknologi Petronas)*; Meriaudeau, Fabrice *(Universite de Bourgogne)*

Role of the Choroid in Automated Age-Related Macular Degeneration Detection from Optical Coherence Tomography Images 1867-1870
Srivastava, Ruchir* *(Institute for Infocomm Research)*; Ong, Ee Ping *(Institute for Infocomm Research)*; Lee, Beng Hai *(Institute for Infocomm Research)*

Intracoronary Near Infrared Autofluorescence Signal Calibration 1871-1874
Athanasiou, Lambros* *(Canon USA)*; Brushett, Christopher *(Canon Healthcare Optics Research Laboratory)*; Watanabe, Kohei *(Canon Healthcare Optics Research Laboratory)*; Yamada, Daisuke *(Canon Healthcare Optics Research Laboratory)*; Chernich, Emily *(Canon Healthcare Optics Research Laboratory)*; Verma, Sarika *(Canon Healthcare Optics Research Laboratory)*; Honda, Tokuyuki *(Canon Healthcare Optics Research Laboratory)*

Localization of Anatomical Features in Vascular-Enhanced Enface OCT Images 1875-1878
Wong, Damon* *(Institute of Health Technologies, Nanyang Technological University)*; Yow, Ai Ping *(Nanyang Technological University)*; Tan, Bingyao *(Singapore Eye Research Institute)*; Yao, Xinwen *(Nanyang Technological Institute)*; Chua, Jacqueline *(Singapore Eye Research Institute)*; Schmetterer, Leopold *(Singapore Eye Research Institute)*

Super-Resolution Technology to Simultaneously Improve Optical and Digital Resolution of Optical Coherence Tomography via Deep Learning 1879-1882
Cao, Shengting *(University of Alabama)*; Yao, Xinwen *(Nanyang Technological Institute)*; Koirala, Nischal *(University of Alabama)*; Brott, Brigitta *(University of Alabama at Birmingham)*; Litovsky, Silvio Hector *(University of Alabama Birmingham)*; Ling, Yuye *(Shanghai Jiao Tong University)*; Gan, Yu* *(The University of Alabama)*

Three-Dimensional Choroidal Vessel Network Quantification using Swept Source Optical Coherence Tomography 1883-1886
Tan, Bingyao* *(Singapore Eye Research Institute)*; Wong, Damon *(Institute of Health Technologies, Nanyang Technological University)*; Yow, Ai Ping *(Nanyang Technological University)*; Yao, Xinwen *(Nanyang Technological Institute)*; Schmetterer, Leopold *(Singapore Eye Research Institute)*

Theme 02. Optical Imaging – Microscopy (Oral Session)

OrgaNet: A Robust Network for Subcellular Organelles Classification in Fluorescence Microscopy Images 1887-1890
Tran, Duc Hoa* *(Polytechnique Montreal)*; Meunier, Michel *(Polytechnique Montreal)*; Cheriet, Farida *(Ecole Polytechnique of Montreal)*

Deep Learning in Ex-Vivo Lung Cancer Discrimination using Fluorescence Lifetime Endomicroscopic Images 1891-1894
Wang, Qiang* *(University of Edinburgh)*; Hopgood, James R. *(The University of Edinburgh)*; Finlayson, Neil *(University of Edinburgh)*; Williams, Gareth Owen Scott *(Queens Medical Research Institute, University of Edinburgh)*; Fernandes, Susan *(University of Edinburgh)*; Williams, Elvira *(School of Chemistry, University of Edinburgh)*; Akram, Ahsan R *(University of Edinburgh)*; Dhaliwal, Kevin *(University of Edinburgh)*; Vallejo, Marta *(Heriot-Watt University)*

Detection of Filamentous Microorganisms in Fluorescence Microscopy Images 1895-1898
Yu, Yongjian *(Axon Connected, LLC)*; Wang, Jue* *(Union College)*

Time-Multiplexed Illumination for Simultaneous Structural and Functional Voltage Sensitive Dye Recordings with a Single Photo Sensor 1899-1902
Haab, Lars *(Saarland University Hospital)*; Flotho, Philipp *(Saarland University Faculty of Medicine)*; Eckert, David *(Saarland University of Applied Sciences)*; Schwerdtfeger, Karsten *(Saarland University Hospital)*; Hülser, Matthias *(Saarland University Hospital)*; Strauss, Daniel J.* *(Saarland University, Medical Faculty)*; Möller, Michael *(Saarland University of Applied Sciences)*

Automatic Bacillus Detection in Light Field Microscopy Images using Convolutional Neural Networks and Mosaic Imaging Approach 1903-1906
Kalline, Mikaela *(Universidade Federal do Amazonas)*; Costa, Marly G. F. *(Federal University of Amazonas - UFAM)*; Fujimoto, Luciana *(Instituto Nacional de Pesquisas da Amazonia)*; Ogusku, Maurício *(Instituto Nacional de Pesquisas da Amazônia)*; Costa Filho, Cicero F. F.* *(Universidade Federal do Amazonas)*

Automated Analysis of Brain Microvasculature: From Segmentation to Anatomical Modeling 1907-1910
Damseh, Rafat* *(Polytechnique Montreal)*; Delafontaine-Martel, Patrick *(Ecole Polytechnique de Montreal)*; J-Marchand, Paul *(Ecole Polytechnique de Montreal)*; Sirpal, Parikshat *(Ecole Polytechnique de Montreal)*; Cheriet, Farida *(Ecole Polytechnique of Montreal)*; Lesage, Frederic *(Polytechnique Montreal)*

Theme 02. Photoacustic Imaging (Oral Session)

Frequency-Domain Dual-Contrast Photoacoustic Imaging with Chirp Modulation 1911-1914
Wang, Yiyun* *(ShanghaiTech Univ.)*; Zhong, Hongtao *(ShanghaiTech Univ.)*; Jiang, Daohuai *(ShanghaiTech Univ.)*; Lan, Hengrong *(ShanghaiTech Univ.)*; Zhang, Juze *(ShanghaiTech)*; Ma, Yaxin *(ShanghaiTech Univ.)*; Gao, Feng *(ShanghaiTech Univ.)*; Gao, Fei *(ShanghaiTech Univ.)*

Photoacoustic-Guided Transcranial HIFU with Combined Time-Reversal and Genetic Algorithm 1915-1918
Zhang, Juze* *(ShanghaiTech)*; Lan, Hengrong *(ShanghaiTech University)*; Ma, Yaxin *(ShanghaiTech University)*; Wang, Yiyun *(ShanghaiTech University)*; Gao, Feng *(ShanghaiTech University)*; Gao, Fei *(ShanghaiTech University)*

Human Breast Numerical Model Generation based on Deep Learning for Photoacoustic Imaging 1919-1922
Ma, Yaxin* *(ShanghaiTech University)*; Yang, Changchun *(ShanghaiTech University)*; Zhang, Juze *(ShanghaiTech)*; Wang, Yiyun *(ShanghaiTech University)*; Gao, Feng *(ShanghaiTech University)*; Gao, Fei *(ShanghaiTech University)*

A Novel Reconstruction Method with Time Reversal Algorithm and Evaluations for Photoacoustic Tomography 1923-1926
Lai, Dakun* *(University of Electronic Science and Technology of China)*; Mao, Liang *(University of Electronic Science and Technology of China)*; Xu, Qi *(University of Electronic Science and Technology of China)*; Li, Jun *(Sichuan Academy of Medical Sciences and Sichuan Province People')*

Study for Quantitative Evaluation of Photoaging with Photoacoustic Microscopy 1927-1930
Hattori, Hiroki* *(Kyoto University)*; Namita, Takeshi *(Kyoto University)*; Kondo, Kengo *(Kyoto University)*; Yamakawa, Makoto *(Advanced Biomedical Engineering Research Unit, Kyoto University)*; Shiina, Tsuyoshi *(Kyoto University)*

Theme 02. Photographic Biomedical Imaging (Oral Session)

Development of a Semaphore of Anemia: Screening Method based on Photographic Images of the Ungueal Bed using a Digital Camera 1931-1935
Hermoza, Luis* *(Pontificia Universidad Católica del Perú)*; Javier, De La Cruz *(Pontificia Universidad Católica del Perú)*; Elsa, Fernandez *(Pontificia Universidad Católica del Perú)*; Castañeda, Benjamín *(Pontificia Universidad Católica del Perú)*

Towards an Automated Classification Method for Ureteroscopic Kidney Stone Images using Ensemble Learning 1936-1939
Martinez, Adriana* *(Universidad Autónoma de Guadalajara)*; Trinh, Dinh Hoan *(Universite de Lorraine)*; El Beze, Jonathan *(CHU Nancy)*; Hubert, Jacques *(IADI, UHP-Inserm ERI 13 and Urology Dept.)*; Eschwege, Pascal *(Université de Lorraine, Faculté de Médecine de Nancy, CNRS CRAN)*; Estrade, Vincent *(CH Angouleme Service Urologie)*; Aguilar Lobo, Lina Maria *((Universidad Autónoma de Guadalajara)*; Daul, Christian *(University of lorraine)*; Gilberto, Ochoa-Ruiz *(Tecnologico de Monterrey)*

Deep Convolutional Neural Network Ensembles for Multi-Classification of Skin Lesions from Dermoscopic and Clinical Images 1940-1943
Reisinho, José *(University of Porto)*; Coimbra, Miguel* *(Instituto de Telecomunicações / Universidade do Porto)*; Renna, Francesco *(Instituto de Telecomunicações e Faculdade de Ciências da Univers)*

Deep Learning-Based Image Evaluation for Cervical Precancer Screening with a Smartphone Targeting Low Resource Settings – Engineering Approach 1944-1949
Hu, Liming* *(Intellectual Ventures)*; Horning, Matthew *(Intellectual Ventures)*; Banik, Dipayan *(Intellectual Ventures)*; Ajenifuja, Olusegun Kayode *(Dept. of Obstetrics and Gynaecology, Gynae-Oncology Unit, O)*; Adepiti, Clement Akinfolarin *(Dept. of Obstetrics and Gynaecology, Gynae-Oncology Unit, O)*; Yeates, Karen *(Dept. of Medicine, Queen's University, Kingston, Canada)*; Mtema, Zac *(Ifakara Health Institute, Ifakara, Tanzania)*; Wilson, Ben *(Intellectual Ventures)*; Mehanian, Courosh *(Intellectual Ventures)*

Prediction of Patient Demographics using 3D Craniofacial Scans and Multi-View CNNs 1950-1953
Hanif, Umaer* *(Technical University of Denmark)*; Paulsen, Rasmus R. *(Technical University of Denmark)*; Leary, Eileen B *(Stanford University)*; Mignot, Emmanuel *(Stanford University)*; Jennum, Poul *(University of Copenhagen, Demnar)*; Sorensen, Helge B D *(Technical University of Denmark)*

Multi-Target Deep Learning for Algal Detection and Classification 1954-1957
Qian, Peisheng *(Institute for Infocomm Research (I2R), Agency for Science)*; Zhao, Ziyuan* *(Institute for Infocomm Research (I2R), Agency for Science, Technology)*; Liu, Haobing *(ZWEEC Analytics Pte Ltd, Singapore)*; Wang, Yingcai *(Yangtze River Basin Ecology and Environment Monitoring and Scien)*; Peng, Yu *(Yangtze River Basin Ecology and Environment Monitoring and Scien)*; Hu, Sheng *(Yangtze River Basin Ecology and Environment Monitoring and Science)*; Zhang, Jing *(Yangtze River Basin Ecology and Environment Monitoring and Science)*; Deng, Yue *(Institute for Infocomm Research (I2R), Agency for Science)*; Zeng, Zeng *(I2R, A*STAR)*

Theme 02. Retinal and Cochlear Image Analysis (Oral Session)

MAU-Net: A Retinal Vessels Segmentation Method 1958-1961
Li, Han* *(Nanjing University of Aeronautics and Astronautics)*; Wang, Yikuang *(Nanjing University of Aeronautics and Astronautics)*; Wan, Cheng *(Nanjing University of Aeronautics and Astronautics)*; Shen, Jianxin *(Nanjing University of Aeronautics and Astronautics)*; Chen, Zhiqiang *(Jiangsu Province Geriatric Hospital)*; Ye, Hui *(Jiangsu Province Hospital)*; Yu, Qiuli *(BenQ Hospital of Nanjing Medical University)*

System Design of a Physiological Ambient Illumination Adaptation for Subretinal Stimulator 1962-1965
Moll, Steffen* *(University of Ulm, Institute of Microelectronics)*; Gambach, Stefan *(University of Ulm, Institute of Microelectronics)*; Schuetz, Henning *(University of Ulm, Institute of Microelectronics)*; Steinhoff, Raphael *(University of Ulm, Institute of Microelectronics)*; Kaim, Hans *(University of Ulm, Institute of Microelectronics)*; Rothermel, Albrecht *(University of Ulm)*

Explainable Diabetic Retinopathy using EfficientNET 1966-1969
Chetoui, Mohamed *(Université de Moncton)*; Akhloufi, Moulay* *(Université de Moncton)*

Deep Volumetric Segmentation of Murine Cochlear Compartments from Micro-Computed Tomography Images 1970-1975
Moudgalya, Sanketh* *(Rochester Institute of Technology)*; Cahill, Nathan *(Rochester Institute of Technology)*; Borkholder, David A. *(Rochester Institute of Technology)*

Theme 02. Retinal Image Analysis (Oral Session)

Probability Distribution Guided Optic Disc and Cup Segmentation from Fundus Images 1976-1979
Cheng, Pujin *(Southern University of Science and Technology)*; Lyu, Junyan *(Southern University of Science & Technology)*; Huang, Yijin *(Southern University of Science and Technology)*; Tang, Xiaoying* *(Southern University of Science and Technology)*

Interretinal Symmetry in Color Fundus Photographs 1980-1983
Biswas, Sangeeta* *(Brno University of Technology)*; Rohdin, Johan *(Brno University of Technology)*; Drahansky, Martin *(Brno University of Technology, Faculty of Information Technology)*

Single Fundus Image Super-Resolution via Cascaded Channel-Wise Attention Network 1984-1987
Fan, Zhihao *(South China University of Technology)*; Dan, Tingting *(South China University of Technology)*; Cai, Hongmin* *(South China University of Technology)*; Yu, Honghua *(Guangdong Provincial People's Hospital)*; Liu, Baoyi *(Guangdong Provincial People's Hospital)*

Diabetic Peripheral Neuropathy Risk Assessment using Digital Fundus Photographs and Machine Learning 1988-1991
Benson, Jeremy* *(University of New Mexico)*; Estrada, Trilce *(University of New Mexico)*; Burge, Mark *(Clinical and Translational Science Center, University of New Mex)*; Soliz, Peter *(VisionQuest Biomedical LLC)*

DRAN: Densely Reversed Attention based Convolutional Network for Diabetic Retinopathy Detection .. 1992-1995
Hua, Cam-Hao* *(Kyung Hee University)*; Huynh-The, Thien *(Kumoh National Institute of Technology)*; Lee, Sungyoung *(Kyung Hee University)*

Automated Cytomegalovirus Retinitis Screening in Fundus Images 1996-2002
Kingkosol, Piyarat *(Thammasat University)*; Pooprasert, Pakinee *(Cardiff University School of Medicine)*; Choopong, Pitipol *(Mahidol University)*; Hunchangsith, Boonsiri *(Mahidol University)*; Laksanaphuk, Varittha *(Mahidol University)*; Tantibundhit, Charturong* *(Thammasat University)*

Theme 02. Ultrasound Image Analysis – I (Oral Session)

An End-to-End Solution for Automatic Contouring of Tumor Region in Intraoperative Images of Breast Lumpectomy 2003-2006
Gerolami, Justin* *(Queen's University)*; Wu, Victoria *(Queen's University)*; Nasute Fauerbach, Paola *(Queen's University)*; Jabs, Doris *(Queen's University)*; Engel, Jay *(Queen's University)*; Rudan, John *(Queen's University)*; Merchant, Shaila *(Queen's University)*; Walker, Ross *(Queen's University)*; Abu Anas, Emran *(University of British Columbia)*; Abolmaesumi, Purang *(UBC)*; Fichtinger, Gabor *(Queen's University)*; Ungi, Tamas *(Queen's University)*; Mousavi, Parvin *(Queen's University)*

Incorporating Multiple Observations in Global Ultrasound Elastography 2007-2010
Ashikuzzaman, Md* *(Concordia University)*; Rivaz, Hassan *(Concordia University)*

Deformable US/CT Image Registration with a Convolutional Neural Network for Cardiac Arrhythmia Therapy 2011-2014
Dahman, Batoul* *(Rennes1 University)*; Dillenseger, Jean-Louis *(Université de Rennes 1)*

Effect of Neighbourhood Size in Entropy Mapping of Ultrasound Images 2015-2018
Koh, Ryan *(Toronto Rehabilitation Institute)*; Behr, Michael *(Toronto Rehabilitation Institute)*; Kirkwood, Margaret *(University of Guelph)*; Kumbhare, Dinesh Arun* *(University of Toronto)*

ResDUnet: Residual Dilated UNet for Left Ventricle Segmentation from Echocardiographic Images 2019-2022
Amer, Alyaa* *(University of Lincoln)*; Ye, Xujiong *(University of Lincoln)*; Zolgharni, Massoud *(Imperial College London)*; Janan, Faraz *(University of Oxford)*

Adaptation of Dictionary Learning for Electrode Displacement Elastography 2023-2026
Pohlman, Robert* *(University of Wisconsin-Madison)*; Varghese, Tomy *(University of Wisconsin-Madison)*

Theme 02. Ultrasound Image Analysis – II (Oral Session)

Automatic Frame Selection using CNN in Ultrasound Elastography 2027-2030
Zayed, Abdelrahman *(Concordia University)*; Cloutier, Guy *(Laboratory of Biorheology and Medical Ultrasonics)*; Rivaz, Hassan* *(Concordia University)*

Improving Ultrasound Lateral Strain Estimation Accuracy using Log Compression of Regularized Correlation Function 2031-2034
Mukaddim, Rashid Al* *(University of Wisconsin-Madison)*; Varghese, Tomy *(University of Wisconsin-Madison)*

High Frequency Ultrasound Image Recovery using Tight Frame Generative Adversarial Networks 2035-2038
Goudarzi, Sobhan* *(Concordia Univ.)*; Asif, Amir *(Concordia Univ.)*; Rivaz, Hassan *(Concordia Univ.)*

Automatic Segmentation of 3D Ultrasound Spine Curvature using Convolutional Neural Network 2039-2042
Banerjee, Sunetra* *(University of Technology Sydney)*; Ling, Sai Ho, Steve *(University of Technology Sydney)*; Lyu, Juan *(Harbin Engineering University)*; Su, Steven Weidong *(University of Technology, Sydney)*; Zheng, Yong-Ping *(The Hong Kong Polytechnic University)*

Segmentation of Carotid Vessel Wall using U-Net and Segmentation Average Network 2043-2046
Jiang, Mingjie *(City University of Hong Kong)*; Spence, J. David *(Robarts Research Institute)*; Chiu, Bernard* *(City University of Hong Kong)*

Theme 02. Ultrasound Imaging: Breast (Oral Session)

Alternative Techniques for Breast Tumour Detection using Ultrasound 2047-2050
Wu, Haixia *(University of Alberta)*; Gole, Ruturaj* *(University of Alberta)*; Ghose, Subho *(University of Alberta)*; Basu, Anup *(University of Alberta)*

A Tissue Mechanics based Method to Improve Tissue Displacement Estimation in Ultrasound Elastography 2051-2054
Kheirkhah, Niusha* *(Western University)*; Dempsey, Sergio C. H. *(Western University)*; Rivaz, Hassan *(Concordia University)*; Samani, Abbas *(Western University)*; Sadeghi-Naini, Ali *(York University)*

Analytical Estimation of Out-of-Plane Strain in Ultrasound Elastography to Improve Axial and Lateral Displacement Fields 2055-2058
Kheirkhah, Niusha* *(Western Univ.)*; Sadeghi-Naini, Ali *(York Univ.)*; Samani, Abbas *(Western Univ.)*

A Pilot Study on Scatterer Density Classification of Ultrasound Images using Deep Neural Networks 2059-2062
Kafaee, Ali *(PhD student at Concordia University)*; Amiri, Mina *(Concordia University)*; Rosado-Mendez, Ivan Miguel *(Instituto de Fisica, Universidad Nacional Autonoma de Mexico)*; Hall, Timothy J. *(University of Wisconsin)*; Rivaz, Hassan* *(Concordia University)*

Segmentation of Ultrasound Images based on Scatterer Density using U-Net 2063-2066
Amiri, Mina *(Concordia University)*; Kafaee, Ali *(PhD student at Concordia University)*; Rivaz, Hassan* *(Concordia University)*

Denoising Rf Data via Robust Principal Component Analysis: Results in Ultrasound Elastography 2067-2070
Ashikuzzaman, Md* *(Concordia University)*; Rivaz, Hassan *(Concordia University)*

Theme 02. Ultrasound Imaging: Elastography (Oral Session)

Synthetic Aperture with High Lateral Sampling Frequency for Ultrasound Elastography 2071-2074
Mirzaei, Morteza* *(Concordia Univ.)*; Asif, Amir *(Concordia Univ.)*; Rivaz, Hassan *(Concordia Univ.)*

Real-Time and High Quality Ultrasound Elastography using Convolutional Neural Network by Incorporating Analytic Signal 2075-2078
Kafaee, Ali *(PhD student at Concordia Univ.)*; Amiri, Mina *(Concordia Univ.)*; Rivaz, Hassan* *(Concordia Univ.)*

3D Global Time-Delay Estimation for Shear-Wave Absolute Vibro-Elastography of the Placenta 2079-2083
Hashemi, Hoda S.* *(University of British Columbia)*; Honarvar, Mohammad *(University of British Columbia)*; Salcudean, Septimiu E. *(University of British Columbia)*; Rohling, Robert *(UBC)*

Visualization of Shoulder Ligaments Motion by Ultrasound Speckle Tracking Method 2084-2087
Hermawan, Norma *(Tohoku University)*; Fujiwara, Mizuki *(Tohoku University)*; Hagiwara, Yoshihiro *(Tohoku University Graduate School of Medicine)*; Saijo, Yoshifumi* *(Tohoku University)*

Study of Relationship between Ultrasound Strain Indices and Cognitive Decline for Vulnerable Carotid Plaque 2088-2091
Meshram, Nirvedh *(Columbia University)*; Jackson, Daren *(University of Wisconsin-Madison)*; Mitchell, Carol *(University of Wisconsin-Madison)*; Wilbrand, Stephanie *(University of Wisconsin-Madison)*; Dempsey, Robert *(University of Wisconsin-Madison)*; Hermann, Bruce *(University of Wisconsin-Madison)*; Varghese, Tomy* *(University of Wisconsin-Madison)*

Detecting Muscle Activation using Ultrasound Speed of Sound Inversion with Deep Learning 2092-2095
Feigin, Micha* *(Massachusetts Institute of Technology)*; Zwecker, Manuel *(Sheba Medical Center)*; Freedman, Daniel *(Google)*; Anthony, Brian W. *(Massachusetts Institute of Technology)*

Theme 02. Ultrasound Imaging: Other Organs – I (Oral Session)

A Freehand Ultrasound Framework for Spine Assessment in 3D: A Preliminary Study 2096-2100
García-Cano, Edgar* *(École de Technologie Superieure)*; Arámbula Cosío, Fernando *(National Autonomous Univ. of México)*; Torres Robles, Fabian *(Universidad Nacional Autónoma de México)*; Fanti, Zian *(UNAM)*; Bellefleur, Christian *(Research Center, Sainte-Justine Hospital)*; Joncas, Julie *(Research Center, Sainte-Justine Hospital)*; Labelle, Hubert *(Research Center, Sainte-Justine Hospital)*; Duong, Luc *(Ecole de Technologie Superieure)*

Automatic Measurement of Spinous Process Angles on Ultrasound Spine Images 2101-2104
Ge, Songhan *(ShanghaiTech University)*; Zeng, Hongye *(ShanghaiTech University)*; Zheng, Rui* *(ShanghaiTech University)*

Compact and Wireless Freehand 3D Ultrasound Real-Time Spine Imaging System: A Pilot Study 2105-2108
Chen, Hongbo *(ShanghaiTech University)*; Zheng, Rui* *(ShanghaiTech University)*; Lou, Edmond H. *(University of Alberta)*; Le, Lawrence H *(University of Alberta)*

Deep Learning based Quantification of Ovary and Follicles using 3D Transvaginal Ultrasound in Assisted Reproduction 2109-2112
Mathur, Praful *(Samsung R&D Institute - India)*; Kakwani, Karan *(Samsung R&D Institute India Bangalore)*; Diplav, Diplav *(Samsung R&D Institute, Bangalore)*; Kudavelly, Srinivas Rao* *(Samsung R&D Institute - India)*; Ga, Ramaraju *(Director, Krishna IVF Clinic, Visakhapatnam)*

Automatic Segmentation of Ultrasound Images of Gastrocnemius Medialis with Different Echogenicity Levels using Convolutional Neural Networks 2113-2116
Marzola, Francesco* *(Politecnico di Torino)*; van Alfen, Nens *(Radboud University Medical Center)*; Salvi, Massimo *(Politecnico di Torino)*; De Santi, Bruno *(Politecnico di Torino)*; Doorduin, Jonne *(Radboud University Medical Center)*; Meiburger, Kristen M. *(Politecnico di Torino)*

Receptive Field Size as a Key Design Parameter for Ultrasound Image Segmentation with U-Net 2117-2120
Behboodi, Bahareh* *(Concordia University)*; Fortin, Maryse *(Concordia University)*; Belasso, Clyde Joseph *(Concordia University)*; Brooks, Rupert *(Nuance Communications and Concordia University)*; Rivaz, Hassan *(Concordia University)*

Theme 02. Ultrasound Imaging: Other Organs – II (Oral Session)

Simultaneous Evaluation of Contrast Pulse Sequences for Super-Resolution Ultrasound Imaging 2121-2124
Brown, Katherine *(University of Texas at Dallas)*; Hoyt, Kenneth* *(University of Texas at Dallas)*

Automatic Segmentation of Lumen Intima Layer in Longitudinal Mode Ultrasound Images 2125-2128
Dhupia, Abhijeet* *(Indian Institute of Science, Bangalore)*; Harish Kumar, J. R. *(Indian Institute of Science and Manipal Institute of Technology)*; Andrade, Jasbon *(Kasturba Medical College, MAHE)*; Rajagopal, K. V. *(Kasturba Medical College, MAHE)*

Detecting Carotid Intima-Media from Small-Sample Ultrasound Images 2129-2132
Mi, Shiyu *(Tsinghua University)*; Wei, Zhanghong *(Shenzhen People's Hospital)*; Xu, Jinfeng *(Shenzhen People's Hospital)*; Yu, Zijun *(Tsinghua University)*; Yang, Wenming* *(Tsinghua University)*; Liao, Qingmin *(Tsinghua University)*

Deep Learning based Junctional Zone Quantification using 3D Transvaginal Ultrasound in Assisted Reproduction 2133-2136
Singhal, Nitin *(AIRA Matrix)*; Kudavelly, Srinivas Rao* *(Samsung R&D Institute - India)*; Ga, Ramaraju *(Director, Krishna IVF Clinic, Visakhapatnam)*

Efficacy of Kriging Interpolation in Ultrasound Imaging; Subsample Displacement Estimation 2137-2141
Rebholz, Brandon *(Pennsylvania State University)*; Almekkawy, Mohamed* *(Penn State University)*

Faster Search Algorithm for Speckle Tracking in Ultrasound Images 2142-2146
Bharadwaj, Skanda *(Local Address)*; Almekkawy, Mohamed* *(Penn State University)*

Theme 02. Video-Based Biomedical Imaging (Oral Session)

Deep Transfer Learning for Video-Based Detection of Newborn Presence in Incubator 2147-2150
Weber, Raphaël* *(Université Rennes 1)*; Simon, Antoine *(University of Rennes)*; Porée, Fabienne *(Université de Rennes 1)*; Carrault, Guy *(Université de Rennes 1)*

Towards Clustering Hand Grasps of Individuals with Spinal Cord Injury in Egocentric Video 2151-2154
Dousty, Mehdy* *(1- Institute of Biomaterials and Biomedical Engineering, Univers)*; Zariffa, Jose *(Toronto Rehabilitation Institute)*

Robust Vision-Based Workout Analysis using Diversified Deep Latent Variable Model 2155-2158
Xiong, Hao* *(Macquarie University)*; Berkovsky, Shlomo *(Macquarie University)*; Sharan, Roneel V. *(Macquarie University)*; Liu, Sidong *(Macquarie University)*; Coiera, Enrico *(Macquarie University)*

A Wearable Vision-Based System for Detecting Hand-Object Interactions in Individuals with Cervical Spinal Cord Injury: First Results in the Home Environment 2159-2162
Bandini, Andrea* *(University Health Network)*; Dousty, Mehdy *(1- Institute of Biomaterials and Biomedical Engineering, Univers)*; Zariffa, Jose *(Toronto Rehabilitation Institute)*

Detecting Falls and Estimation of Daily Habits with Depth Images using Machine Learning Algorithms . 2163-2166
Msaad, Soumaya* *(Univ Rennes, Inserm, LTSI - UMR 1099)*; Cormier, Geoffroy *(NeoTec-Vision)*; Carrault, Guy *(Université de Rennes 1)*

Orthogonal Region Selection Network for Laryngeal Closure Detection in Laryngoscopy Videos 2167-2172
Wang, Yangyang *(University of Missouri-Columbia)*; Hamad, Ali *(University of Missouri-Columbia)*; Lever, Teresa *(University of Missouri)*; Bunyak, Filiz* *(University of Missouri Columbia)*

Theme 02. X-Ray Imaging and Applications (Oral Session)

Automated Bolus Detection in Videofluoroscopic Images of Swallowing using Mask-Rcnn 2173-2177
Caliskan, Handenur *(University of Pittsburgh)*; Mahoney, Amanda *(University of Pittsburgh)*; Coyle, James *(University of Pittsburgh)*; Sejdic, Ervin* *(University of Pittsburgh)*

Wavelet Transform and Texton based Analysis for Detection of Benign and Malignant Masses 2178-2181
Bhowmick, Chiranjib* *(Indian Institute of Technology, Kharagpur)*; Dutta, P.K. *(School of Medical Science and Technology, IIT Kharagpur, India)*; Mahadevappa, Manjunatha *(Indian Institute of Technology Kharagpur)*

End-to-End Deep Diagnosis of X-Ray Images 2182-2185
Urinbayev, Kudaibergen *(Nazarbayev University)*; Orazbek, Yerassyl *(Nazarbayev University)*; Nurambek, Yernur *(Nazarbayev University)*; Mirzakhmetov, Almas *(Nazarbayev University)*; Varol, Huseyin Atakan* *(Nazarbayev University)*

Classifying Pneumonia among Chest X-Rays using Transfer Learning 2186-2189
Irfan, Abdullah *(University of Waterloo)*; Adivishnu, Akash *(University of Waterloo)*; Sze-To, Ho Yin* *(University of Waterloo)*; Dehkharghanian, Taher *(University of Ontario Institute of Technology)*; Rahnamayan, Shahryar *(University of Ontario Institute of Technology (UOIT))*; Tizhoosh, Hamid Reza *(University of Waterloo)*

Adaptive Multi-Scale Image Enhancement for Digital Radiography 2190-2193
Sinsuebphon, Nattawut* *(National Science and Technology Development Agency)*; Techavipoo, Udomchai *(NECTEC)*; Koonsanit, Kitti *(National Electronics and Computer Technology Center, Thailand)*; Prompalit, Sakunrat *(National Science and Technology Development Agency)*; Thongvigitmanee, Saowapak *(National Science and Technology Development Agency)*

Detection of Trabecular Landmarks for Osteoporosis Prescreening in Dental Panoramic Radiographs .. 2194-2197
Ren, Jiaxiang* *(Stony Brook University)*; Fan, Heng *(Stony Brook University)*; Yang, Jie *(Temple University)*; Ling, Haibin *(Temple University)*

Theme 03. Biomaterials (Oral Session)

Preparation of Size-Controlled Giant Vesicles under Physiological Condition 2198-2201
Peng, Zugui* *(Tokyo Institute of Technology)*; Kanno, Shoichiro *(Tokyo Institute of Technology)*; Shimba, Kenta *(The Univ. of Tokyo)*; Miyamoto, Yoshitaka *(Nagoya Univ.)*; Yagi, Tohru *(Tokyo Institute of Technology)*

3D Printed Microneedle Array for Electroporation 2202-2205
Moussi, Khalil* *(King Abdullah University of Science and Technology)*; Kavaldzhiev, Mincho *(King Abdullah University of Science and Technology)*; Perez, Jose *(King Abdullah University of Science and Technology)*; Alsharif, Nouf *(King Abdullah University of Science and Technology)*; Merzaban, Jasmeen *(King Abdullah University of Science and Technology)*; Kosel, Juergen *(King Abdullah University of Science and Technology)*

Hydroxyapatite Extraction from Fish Scales of Tilapia 2206-2208
Ayala, Barajas, Daniela *(Universidad Autónoma Metropolitana)*; González-Vélez, Virginia *(Universidad Autónoma Metropolitana)*; Vélez, Tirado, Marisela *(Instituto de Catálisis y Petroleoquímica)*; Aguilar, Pliego, Julia* *(Universidad Autónoma Metropolitana)*

A Field-Deployable and Low-Cost PCR (FLC-PCR) Thermocycler for the Rapid Detection of Environmental E. Coli 2209-2212
Ferguson, James *(Fort Lewis College)*; Duran, Jesse *(Fort Lewis College)*; Killinen, Wesley *(Fort Lewis College)*; Wagner, Jason *(Fort Lewis College)*; Kulesza, Caroline *(Fort Lewis College)*; Chatterley, Christie *(Fort Lewis College)*; Li, Yiyan* *(Fort Lewis College)*

Accurate Estimation of Refractive Indices of Organic Microparticles in Dual-Beam Optical Trap 2213-2216
Dong, Aotuo *(Norfolk State University)*; Islam, Md. Shariful *(Norfolk State University)*; Albin, Sacharia *(Norfolk State University)*; Deo, Makarand* *(Norfolk State University)*

Synthesis and Screening of Novel Peptides on Human Pancreatic Islets for Type 1 Diabetes Therapies 2217-2220
Porter, James M.* *(McGill University)*; Guerassimoff, Lea *(PSL Paris Tech)*; Castiello, F. Rafael *(McGill University)*; Tabrizian, Maryam *(McGill University)*

Theme 03. Bionanotechnology (Oral Session)

Single Cell Level Dielectrophoretic Responses and Dielectrophoretic Deformations of Monocytes to Quantify Population Heterogeneity 2221-2226
Sengul, Esra *(Sabanci University)*; Kara, Osman *(Zonguldak Bulent Ecevit University)*; Yildizhan, Yagmur *(KU Leuven)*; Martinez-Duarte, Rodrigo *(Clemson University)*; Elitas, Meltem* *(Sabanci University)*

Variable Tumor Microenvironment-on-a-Chip with Temporal Angiogenic Switching System by Diffusion Control 2227-2230
Cho, Sunghyun *(Korea Institute of Science and Technology)*; Choi, Hyungseok *(Seoul National University)*; Yang, JungEun *(Ewha Womans University)*; Suh, Seungbeum* *(Korea Institute of Science & Technology)*

Continuous Enrichment and Separation of Nanoparticles via Acoustic Streaming 2231-2234
Yang, Yang* *(Tianjin University)*; He, Meihang *(Tianjin University)*; Jin, Ke *(Tianjin University)*; Chen, Xuejiao *(Tianjin University)*; Duan, Xuexin *(Tianjin University)*

Electroporation Mechanisms: The Role of Lipid Orientation in the Kinetics of Pore Formation 2235-2238
Marracino, Paolo *(ICEmB)*; Caramazza, Laura* *(Center for Life Nano Science@Sapienza, Istituto Italiano di Tecn)*; Liberti, Micaela *(ICEmB at Sapienza University of Rome)*; Apollonio, Francesca *(ICEmB@La Sapienza Univ Rome)*

Theme 03. Cellular/Tissue Engineering (Oral Session)

Strain-Induced Differentiation of Mesenchymal Stem Cells 2239-2244
Moussi, Khalil* *(King Abdullah University of Science and Technology)*; Abusamra, Dina B. *(King Abdullah University of Science and Technology)*; Yassine, Omar *(King Abdullah University of Science and Technology)*; Merzaban, Jasmeen *(King Abdullah University of Science and Technology)*; Kosel, Juergen *(King Abdullah University of Science and Technology)*

Nanosecond Laser Stimulation in an Organized Grid Network of Human Astrocytes 2245-2248
Li, Si* *(University of Auckland)*; Graham, Euan S *(University of Auckland)*; Unsworth, Charles Peter *(University of Auckland)*

Railing Nanoparticles along Activated Tracks Towards Continuous-Flow Electrokinetic Enrichment from Blood Plasma 2249-2252
Kushigbor, Stanley Dickson Elinam *(The Hong Kong Univ. of Science and Technology)*; Tang, Zili *(The Hong Kong Univ. of Science and Technology)*; Yobas, Levent* *(The Hong Kong Univ. of Science and Technology)*

The Effect of Basic Microshapes on hNT Astrocytes Cytoplasmic Process Outgrowth 2253-2256
Li, Si* *(Univ. of Auckland)*; Graham, Euan S *(Univ. of Auckland)*; Unsworth, Charles Peter *(Univ. of Auckland)*

Automated Bioreactor System for the Cultivation of Autologous Tissue-Engineered Vascular Grafts 2257-2261
Stanislawski, Nils Hendrik* *(Leibniz University Hannover)*; Cholewa, Fabian *(Institute of Microelectronic Systems, Leibniz University Hannove)*; Heymann, Henrik *(Institute of Microelectronic Systems, Leibniz University Hannove)*; Kraus, Xenia *(Institute of Technical Chemistry, Leibniz University Hannover)*; Heene, Sebastian *(Institute of Technical Chemistry, Leibniz University Hannover)*; Witt, Martin *(Leibniz University Hannover)*; Thoms, Stefanie *(Institute of Technical Chemistry, Leibniz University Hannover)*; Blume, Cornelia *(Institute of Technical Chemistry, Leibniz University Hannover)*; Blume, Holger *(Leibniz Universitaet Hannover)*

A Miniature Mechanical Testing Device for Testing Hydrogel-Based Biomaterials in a Confocal Microscope 2262-2265
Creamer, Stephen Anthony* *(Auckland Bioengineering Institute, The University of Auckland)*; Lam Po Tang, Emily Jade *(Auckland Bioengineering Institute, The University of Auckland)*; Nielsen, Poul *(The University of Auckland)*; Taberner, Andrew *(The University of Auckland)*

Theme 04. Algorithms and Model Parameterization for Systems Medicine (Oral Session)

A Method for Deciphering Major Drivers of Bacterial Iron Stress Response in the Presence of Oxidative Stressors 2266-2269
Ajuzie, Daniel Chibueze* *(University of Houston)*; Arshad, Seyed *(University of Houston)*; Rasaputra, Komal *(University of Houston)*; May, Elebeoba *(University of Houston)*

A Mathematical Model for the Evaluation of Iron Transport across the Blood-Cerebrospinal Fluid Barrier in Neurodegenerative Diseases 2270-2273
Ficiarà, Eleonora* *(University of Torino)*; D'Agata, Federico *(University of Torino)*; Ansari, Shoeb *(University of Torino)*; Boschi, Silvia *(University of Torino)*; Rainero, Innocenzo *(University of Torino)*; Priano, Lorenzo *(University of Torino)*; Cattaldo, Stefania *(Istituto Auxologico Italiano, IRCCS)*; Abollino, Ornella *(University of Torino)*; Cavalli, Roberta *(University)*; Guiot, Caterina *(University)*

Parameterization of Respiratory Physiology and Pathophysiology for Real-Time Simulation 2274-2278
Webb, Jeffrey* *(Kitware)*; Bray, Aaron *(Kitware)*; Clipp, Rachel *(Kitware)*

Steady-State Tissue Oxygen Distributions Calculated by a Green's Function Method and a Finite Difference Method: A Comparison 2279-2282
Serajelahi, Baran* *(University of Western Ontario)*; Kharche, Sanjay *(University of Western Ontario)*; Goldman, Daniel *(University of Western Ontario)*

The Impact of the Uncertainty of Biological Tissue Thermal Parameters on the Estimated Maximum Temperature during TTFields Treatment 2283-2286
Gentilal, Nichal* *(IBEB, Faculdade de Ciências, Universidade de Lisboa)*; Miranda, Pedro Cavaleiro *(Faculdade de Ciências, Universidade de Lisboa)*

A Computational Model of Mitochondria Motility in Axons 2287-2290
Zhu, Jiaan *(University of Chinese Academy of Sciences)*; Lim, Jian Loong Jethro *(University of Southern California)*; Li, Bowen *(University of Southern California)*; Mergenthal, Adam *(University of Southern California)*; Rayes, Adnan *(University of Southern California)*; Tang, Hejun *(University of Southern California)*; Berger, Theodore *(USC)*; Bouteiller, Jean-Marie Charles* *(University of Southern California)*

Theme 04. Construction of Predictive Models for Medicine (Oral Session)

A Computational Study of Graphene as a Prospective Material for Microelectrodes in Retinal Prosthesis and Electric Crosstalk Analysis 2291-2294
Asghar, Sharique Ali *(Indian Institute of Technology, Kharagpur, India)*; Pal, Poulomi* *(Indian Institute of Technology, Kharagpur)*; Nazeer, Kashif *(Jahangirabad Institute of Technology, Barabanki, India)*; Mahadevappa, Manjunatha *(Indian Institute of Technology Kharagpur)*

Non-Invasive Prediction of Peak Systolic Pressure Drop across Coarctation of Aorta using Computational Fluid Dynamics 2295-2298
Aslan, Seda* *(University of Maryland)*; Mass, Paige *(Children's National)*; Loke, Yue-Hin *(Children's National Health System)*; Warburton, Linnea *(University of Maryland)*; Liu, Xiaolong *(University of Maryland, College Park)*; Hibino, Narutoshi *(University of Chicago)*; Olivieri, Laura J. *(Children's National Health System)*; Krieger, Axel *(Children's National Health System)*

Computational Framework to Evaluate the Hydrodynamics of Cell Scaffold Geometries 2299-2302
Puleri, Daniel F.* *(Duke University)*; Roychowdhury, Sayan *(Duke University)*; Ames, Jeff *(Duke University)*; Randles, Amanda *(Duke University)*

SK Channel Block and Adrenergic Stimulation Counteract Acetylcholine-Induced Arrhythmogenic Effects in Human Atria 2303-2306
Celotto, Chiara* *(University of Zaragoza)*; Sanchez, Carlos *(Defense University Centre, University of Zaragoza)*; Mountris, Konstantinos *(University of Zaragoza)*; Laguna, Pablo *(Zaragoza University and CIBER-BBN)*; Pueyo, Esther *(University of Zaragoza)*

Accurate Empirical Fractional-Order Electrical Models of Young and Old Dentines 2307-2310
Herencsar, Norbert* *(Brno University of Technology)*; Kartci, Aslihan *(Brno University of Technology)*; Cicekoglu, Oguzhan *(Bogazici University)*

Modeling Mouse Soleus Muscle Contraction 2311-2314
Palladino, Joseph* *(Trinity College)*

Theme 04. Data-Driven Modeling of Tissues and Organs (Oral Session)

Proarrhythmic Effects of Electrolyte Imbalance in Virtual Human Atrial and Ventricular Cardiomyocytes 2315-2318
Joseph, Jermiah* *(Lawson Health Research Institute)*; McIntyre, Christopher W. *(Dept. of Medical Biophysics, Western University)*; Kharche, Sanjay *(University of Western Ontario)*

Automatic Shape Optimization of Patient-Specific Tissue Engineered Vascular Grafts for Aortic Coarctation 2319-2323
Liu, Xiaolong* *(University of Maryland, College Park)*; Aslan, SEDA *(University of Maryland)*; Hess, Rachel *(University of Maryland College Park)*; Mass, Paige *(Children's National)*; Olivieri, Laura J. *(Children's National Health System)*; Loke, Yue-Hin *(Children's National Health System)*; Hibino, Narutoshi *(University of Chicago)*; Fuge, Mark *(University of Maryland - College Park)*; Krieger, Axel *(Children's National Health System)*

Electrical Stimulation in the Cochlea: Influence of Modiolar Microstructures on the Activation of Auditory Nerve Fibres 2324-2327
Bai, Siwei* *(Technical University of Munich)*; Croner, Albert *(Technical University of Munich)*; Enke, Jörg *(Technical University of Munich)*; Hemmert, Werner *(Technical University of Munich)*

A Transmission-Line-Based Cochlear Standing Wave Model to Elucidate Mechanism of Human Auditory System 2328-2331
Horii, Yasushi* *(Kansai Univ.)*; Tamaki, Airi *(Kansai Univ.)*; Hong, Wenjia *(Kansai Univ.)*; Kitamura, Toshiaki *(Kansai Univ.)*; Wasano, Koichiro *(National Hospital Organization Tokyo Medical Center)*

Identifying Sleep Biomarkers to Evaluate Cognition in HIV 2332-2336
Azimi, Hilda* *(University of Ottawa)*; Gunnarsdottir, Kristin M. *(Johns Hopkins University)*; Sarma, Sridevi V. *(Johns Hopkins University)*; Gamaldo, Alyssa *(Penn State University)*; Salas, Rachel *(Johns Hopkins University, School of Medicine)*; Gamaldo, Charlene *(Johns Hopkins University, School of Medicine)*

Development of a Test Bench for the Urodynamic Simulation of the Lower Urinary Tract 2337-2341
Yoo, In Seong *(Friedrich-Alexander-Universität Erlangen-Nürnberg)*; Preis, Alexander* *(Friedrich-Alexander-Universität Erlangen-Nürnberg)*; Franke, Jörg *(Friedrich-Alexander-University of Erlangen-Nuremberg)*

Flow Field Analysis in RF Ablation based on PIV Experiment 2342-2345
Liu, Hong-Xing *(College of Life Science and Bioengineering, Beijing Univ. o)*; Cheng, Yan-Yan *(College of Life Science and Bioengineering, Beijing Univ. o)*; Zhang, Meng *(College of Life Science and Bioengineering, Beijing Univ. o)*; Nan, Qun* *(College of Life Science and Bioengineering, Beijing Univ. o)*

Theme 04. Genomics, Transcriptomics, and Proteomics (Oral Session)

The Lung Cancer Associated MicroRNAs and Single Nucleotides Polymorphisms: A Mendelian Randomization Analysis 2346-2352
Huang, Ruixuan *(City University of Hong Kong)*; Cho, William C *(Queen Elizabeth Hospital)*; Sun, Yanni *(City University of Hong Kong)*; Chan, Kei Hang Katie* *(City University of Hong Kong / Brown University)*

In Silico Assessment of Genetic Variation in PITX2 Reveals the Molecular Mechanisms of Calcium-Mediated Cellular Triggered Activity in Atrial Fibrillation 2353-2356
Bai, Jieyun* *(Jinan University)*; Zhu, Yijie *(Jinan University)*; Lo, Andy *(The University of Auckland)*; Lu, Yaosheng *(Jinan University)*; Zhao, Jichao *(University of Auckland)*

A Minimal Stochastic Model of Transcriptional and Splicing Regulation 2357-2360
Giaretta, Alberto* *(University of Padova, Dept. of Information Engineering)*

Expanding the Vocabulary of a Protein: Application of Subword Algorithms to Protein Sequence Modelling 2361-2367
Lennox, Mark* *(Queen's University Belfast)*; Robertson, Neil Martin *(Queen's University Belfast)*; Devereux, Barry *(Queen's University Belfast)*

Misfolded Protein Propagation in an Integrated Computational Model of Structural Network and LRRK2 Gene Expression 2368-2371
Yan, Wuchao *(Harbin Institute of Technology at Shenzhen)*; Ye, Chenfei *(Peng Cheng Laboratory, Shenzhen, Guangdong, China)*; Wang, Tong *(Harbin Institute of Technology, Shenzhen)*; Sun, Junyan *(Dept. of Neurobiology, Neurology and Geriatrics, Xuanwu Hos)*; Wu, Tao *(Dept. of Neurobiology, Neurology and Geriatrics, Xuanwu Hos)*; Ma, Ting* *(Harbin Institute of Technology at Shenzhen)*

Plasmid Copy Number Variation of a Modular Vector Set in Shewanella Oneidensis MR-1 2372-2375
Hajimorad, Meghdad* *(California State Univ. - Chico)*; Gralnick, Jeffrey *(Univ. of Minnesota - Twin Cities)*

Theme 04. Informatics Modeling of Tissue, Organ and Body (Oral Session)

Computational Reconstruction of 3D Stomach Geometry using Magnetic Field Source Localization 2376-2379
Avci, Recep* *(The University of Auckland)*; Paskaranandavadivel, Niranchan *(The University of Auckland)*; Eichler, Chad Ephraim *(Auckland Bioengineering Institute, The University of Auckland)*; Lam, Byron Y. C. *(University of Auckland)*; Angeli, Timothy Robert *(Auckland Bioengineering Institute, University of Auckland)*; Bradshaw, Alan *(Vanderbilt University)*; Cheng, Leo K *(The University of Auckland)*

A Visual Distortion Model for Early Detection of Macular Disorders 2380-2383
Parveen Fatima, Zainab *(York University)*; Ghafar-Zadeh, Ebrahim* *(York University)*

A Novel Method for Time-Dependent Numerical Modeling of Gastric Motility Directly from Magnetic Resonance Imaging 2384-2387
Hosseini, Saeed *(Auckland Bioengineering Institute, University of Auckland, New Z)*; Avci, Recep *(The University of Auckland)*; Paskaranandavadivel, Niranchan *(The University of Auckland)*; Palmada Kankanamalage, Nadun *(The University of Auckland)*; Suresh, Vinod *(University of Auckland)*; Cheng, Leo K* *(The University of Auckland)*

Effects of Anatomical Variations on Body Surface Gastric Mapping 2388-2391
Ruenruaysab, Kanyarak *(The University of Auckland)*; Calder, Stefan *(Auckland Bioengineering Institute, University of Auckland)*; Hayes, Thomas *(The University of Auckland)*; O'Grady, Gregory *(University of Auckland)*; Gharibans, Armen *(The University of Auckland)*; Du, Peng* *(The University of Auckland)*

Timing Prediction Changes the Signatures of Alpha-Band Functional and Effective Connectivity 2392-2395
Meng, Qiangfan* *(Tianjin University)*; Meng, Jiayuan *(Tianjin University)*; Xu, Minpeng *(Tianjin University)*; Liu, Shuang *(Tianjin University)*; Chen, Long *(Tianjin University)*; Ming, Dong *(Tianjin University)*

Registration-Based Construction of a Whole-Body Human Phantom Library for Anthropometric Modeling .. 2396-2399
Sun, Xiaobang* *(University of Jyväskylä)*; Wang, Hongkai *(Dalian University of Technology)*; Ristaniemi, Tapani *(University of Jyväskylä)*

Theme 04. Machine Learning for Physiology and Diseases (Oral Session)

Generation of High-Resolution Lung Computed Tomography Images using Generative Adversarial Networks 2400-2403
Hsieh, Kuan Yu *(National Chiao Tung University)*; Tsai, Han-Chun *(National Chiao Tung University)*; Chen, Guan-Yu* *(National Chiao Tung University)*

Artificial Neural Network Enabling Clinically Meaningful Biological Image Data Generation 2404-2407
Ha, Junhyoung *(Korea Institute of Science and Technology)*; Kim, Soonkyum *(Korea Institute of Science and Technology)*; Baik, YaeJun *(Ewha Womans University)*; Lee, Dohee *(Center for Medical Robotics, Korea Institute of Science and Tech)*; Lee, Woosub *(Korea Institute of Science and Technology (KIST))*; Suh, Seungbeum* *(Korea Institute of Science & Technology)*

A Deep Learning Oriented Method for Automated 3D Reconstruction of Carotid Arterial Trees from MR Imaging 2408-2411
Vasilis, Tsakanikas *(University of Ioannina)*; Siogkas, Panagiotis* *(FORTH-IMBB)*; Mantzaris, Michalis *(Unit of Medical Technology and Intelligent Information Systems,)*; Potsika, Vassiliki *(Unit of Medical Technology and Intelligent Information Systems,)*; Kigka, Vassiliki *(University of Ioannina)*; Exarchos, Themis P. *(Unit of Medical Tech & Intelligent Info)*; Koncar, Igor *(Clinic for Vascular and Endovascular Surgery, Serbian Clinical C)*; Marija, Jovanović *(Dept. of Vascular and Endovascular Surgery, Faculty of Media)*; Aleksandra, Vujcic *(Dept. of Vascular and Endovascular Surgery, Faculty of Medicine)*; Stefan, Ducic *(Dept. of Vascular and Endovascular Surgery, Faculty of Medicine)*; Fotiadis, Dimitrios I. *(University of Ioannina)*; Pelisek, Jaroslav *(Dept. for Vascular and Endovascular Surgery, Klinikum recht)*

An Online Deep Convolutional Polyp Lesion Prediction Over Narrow Band Imaging (NBI) 2412-2415
Sierra, Franklin* *(Biomedical Imaging, Vision and Learning Lab. (BivL2ab). Un)*; Gutiérrez, Yesid *(Biomedical Imaging, Vision and Learning Lab. (BivL2ab). Un)*; Martinez, Fabio *(Univ. Industrial de Santander)*

Development and Evaluation of Machine Learning Models for Recovery Prediction after Treatment for Traumatic Brain Injury 2416-2420
Radabaugh, Hannah L.* *(Dept. of Neurological Surgery, Miami Project to Cure Paraly)*; Bonnell, Jerry *(University of Miami)*; Dietrich, Dalton *(University of Miami)*; Bramlett, Helen M. *(Dept. of Neurological Surgery, Miami Project to Cure Paraly)*; Schwartz, Odelia *(Dept. of Computer Science, University of Miami)*; Sarkar, Dilip *(Dept. of Computer Science, University of Miami)*

Learning Conflicts for C-Arm Kinematic Modeling using Artificial Intelligence 2421-2424
Ledesma, Sergio* *(University of Guanajuato, University of Ottawa)*; Guerrero-Turrubiates, Jesus *(University of Ottawa)*; Gonzalez-Reyna, Sheila *(University of Ottawa)*; Almanza-Ojeda, Dora-Luz *(University of Guanajuato)*; Fallavollita, Pascal *(University of Ottawa)*

Theme 04. Modeling and Simulation for Medicine (Oral Session)

Detection of Specific Templates in Calcium Spiking in HeLa Cells using Hierarchical DBSCAN: Clustering and Visualization of Cell-Drug Interaction at Multiple Doses 2425-2428
Chel, Soumtia *(NA)*; Gare, Suman *(Indian Institute of Technology Hyderabad)*; Giri, Lopamudra* *(Indian Institute of Technology Hyderabad)*

Automated Assessment of Neonatal Endotracheal Intubation Measured by a Virtual Reality Simulation System 2429-2433
Xiao, Xiao* *(The George Washington University)*; Zhao, Shang *(George Washington University)*; Zhang, Xiaoke *(George Washington University)*; Soghier, Lamia *(Children's National Medical Center)*; Hahn, James *(George Washington University)*

Elucidating the Relationship between Arrhythmia and Ischemic Heterogeneity: An in Silico Study 2434-2437
Kharche, Sanjay* *(University of Western Ontario)*; Desai, Kairavi *(Dept. of Medical Biophysics, Western University)*; McIntyre, Christopher W. *(Dept. of Medical Biophysics, Western University)*

A Tidal Lung Simulation to Quantify Lung Heterogeneity with the Inspired Sinewave Test 2438-2441
Tran, Minh* *(University of Oxford)*; Crockett, Douglas C. *(Nuffield Division of Anaesthetics, University of Oxford, UK.)*; Phan, Phi Anh *(Nuffield Division of Anaesthetics, University of Oxford, UK.)*; Payne, Stephen John *(University of Oxford)*; Farmery, Andrew D *(Nuffield Division of Anaesthetics, University of Oxford, UK.)*

Understanding Current Flow in Galvanic Vestibular Stimulation: A Computational Study 2442-2446
Thomas, Chris *(Soterix Medical, Inc.)*; Truong, Dennis Q. *(Soterix Medical)*; Clark, Torin *(University of Colorado)*; Datta, Abhishek* *(Soterix Medical, Inc.)*

Investigating the Effect of Aging on the Pharmacokinetics and Tumor Delivery of Nanomaterials using Mathematical Modeling 2447-2450
Dogra, Prashant *(Houston Methodist Research Institute)*; Butner, Joseph *(University of New Mexico)*; Ruiz Ramirez, Javier *(Houston Methodist Research Institute)*; Cristini, Vittorio *(University of New Mexico)*; Wang, Zhihui* *(Houston Methodist Research Institute)*

Theme 04. Models of Systems Biology and Systems Medicine (Oral Session)

Dynamical Analysis of a Multiscale Model of Hepatitis C Virus Infection using a Transformed ODEs Model 2451-2454
Elkaranshawy, Hesham* *(Alexandria University)*; Ezzat, Hossam *(Alexandria University)*; Ibrahim, Nermeen *(Alexandria University)*

Modeling Cancer Dynamics 2455-2458
Derbal, Youcef* *(Ryerson University)*

Electromagnetic Signaling and Quorum Sensing within Biofilms: Which Mechanism is the Most Probable Means of Communication? 2459-2462
Barani, Navid* *(University of Michigan)*; Sarabandi, Kamal *(University of Michigan)*

Genetic Algorithm for Fitting Cardiac Cell Biophysical Model Formulations 2463-2466
Akwaboah, Akwasi Darkwah* *(Norfolk State University)*; Yamlome, Pascal *(Norfolk State University, Norfolk)*; Cordeiro, Jonathan M. *(Masonic Medical Research Institute)*; Treat, Jacqueline A. *(Masonic Medical Research Institute)*; Deo, Makarand *(Norfolk State University)*

Using Padé Approximant Method to Solve the Mathematical Model of Tumor-Immune Interactions 2467-2470
Elkaranshawy, Hesham* *(Alexandria University)*; Makhlouf, Ahmed M. *(Alexandria University)*; Abouelseoud, Yasmine *(Alexandria University)*

A Human Papillomavirus Early Promoter Minimal Model: Viral Population and Stochasticity 2471-2474
Giaretta, Alberto* *(University of Padova, Dept. of Information Engineering)*

Theme 04. Multiscale Modeling and Simulation of Cells and Tissues (Oral Session)

A Computational Model of Functionally-Distinct Cervical Vagus Nerve Fibers 2475-2478
Lin, Qihang *(UNSW Sydney)*; Shivdasani, Mohit N. *(University of New South Wales)*; Tsai, David *(Columbia University)*; Chang, Yao-Chuan *(Feinstein Institute for Medical Research)*; Jayaprakash, Naveen *(Feinstein Institutes For Medical Research)*; Zanos, Stavros *(Feinstein Institute for Medical Research)*; Lovell, Nigel H. *(University of New South Wales)*; Dokos, Socrates *(University of New South Wales)*; Guo, Tianruo* *(University of New South Wales)*

Accelerating Estimation of a Multi-Input Multi-Output Model of the Hippocampus with a Parallel Computing Strategy 2479-2482
She, Xiwei* *(University of Southern California)*; Robinson, Brian *(University of Southern California)*; Berger, Theodore *(USC)*; Song, Dong *(University of Southern California)*

Continuum based Bioelectrical Simulations using Structurally Realistic Gastrointestinal Pacemaker Cell Networks 2483-2486
Avci, Recep* *(The University of Auckland)*; Paskaranandavadivel, Niranchan *(The University of Auckland)*; Du, Peng *(The University of Auckland)*; Vanderwinden, Jean-Marie *(Université libre de Bruxelles)*; Cheng, Leo K *(The University of Auckland)*

Improved Accuracy of Cardiac Tissue-Level Simulations by Considering Membrane Resistance as a Cellular-Level Optimization Objective 2487-2490
Pouranbarani, Elnaz* *(University of Calgary)*; Berg, Lucas Arantes *(University of Juiz de Fora)*; Oliveira, Rafael Sachetto *(University of São João del-Rei)*; Weber dos Santos, Rodrigo *(Universidade Federal de Juiz de Fora)*; Nygren, Anders *(University of Calgary)*

Parametric Exploration of Cellular Swelling in a Computational Model of Cortical Spreading Depression ... 2491-2495
Genocchi, Barbara *(Tampere University)*; Cunha, André* *(University of Oslo)*; Jain, Soumil *(University of California, San Diego, Bioengineering)*; Hyttinen, Jari *(Tampere University of Technology)*; Lenk, Kerstin *(Tampere University)*; Ellingsrud, Ada Johanne *(Simula Research Laboratory, Dept. of Scientific Computing,)*

Modelling Flow and Mixing in the Proximal Small Intestine 2496-2499
Palmada Kankanamalage, Nadun* *(The University of Auckland)*; Cater, John *(University of Auckland)*; Cheng, Leo K *(The University of Auckland)*; Suresh, Vinod *(University of Auckland)*

Theme 04. Systems Modeling of Sensor, Device, and Control (Oral Session)

Exceedingly Sensitive Restructured Electrodes Design for Pathogen Morphology Detection using Impedance Flow Cytometry 2500-2503
Farooq, Amina *(Rutgers the State University of New Jersey)*; Butt, Nauman Z. *(Lahore University of Management Sciences)*; Hassan, Umer* *(Rutgers the State University of New Jersey)*

Design of a Closed-Loop Gastric Pacemaker for Modulating Dysrhythmic Conduction Patterns via Extracellular Potentials 2504-2507
Wang, Luman* *(The University of Auckland)*; Malik, Avinash *(University of Auckland)*; Roop, Parthasarathi *(University of Auckland)*; Cheng, Leo K *(The University of Auckland)*; Paskaranandavadivel, Niranchan *(The University of Auckland)*; Ai, Weiwei *(University of Auckland)*

System-Level Analysis of Closed-Loop Anesthesia Control under Temporal Sensor Faults via UPPAAL-SMC 2508-2511
Alshalalfah, Abdel-Latif* *(PhD Candidate (Concordia University))*; Bany Hamad, Ghaith *(Postdoc Fellow)*; Ait Mohamed, Otmane *(Professor (Concordia University))*

Simulation-Based Analysis of Magnetogastrography Sensor Configurations for Characterizing Gastric Slow Wave Dysrhythmias 2512-2515
Eichler, Chad Ephraim *(Auckland Bioengineering Institute, The University of Auckland)*; Cheng, Leo K *(The University of Auckland)*; Du, Peng *(The University of Auckland)*; Calder, Stefan *(Auckland Bioengineering Institute, University of Auckland)*; Paskaranandavadivel, Niranchan *(The University of Auckland)*; Bradshaw, Alan *(Vanderbilt University)*; Avci, Recep* *(The University of Auckland)*

RF Heating Analysis of Implant Lead Wires under 3.0 Tesla Magnetic Resonance Imaging System 2516-2519
Wang, Bocheng *(Xi'an Jiaotong University)*; Li, Jin *(Xi'an Jiaotong University)*; Jin, Hua *(Lepu Medical Electronic Instruments Co., Ltd)*; Chen, Xiang* *(Xi'an Jiaotong University)*

Galvanotactic Phenomenon Induced by Non-Contact Electrostatic Field: Investigation in a Scratch Assay 2520-2523
Caramazza, Laura* *(Center for Life Nano Science@Sapienza, Istituto Italiano di Tecn)*; De Angelis, Annalisa *(ICEmB at DIET University of Rome Sapienza)*; Remondini, Daniel *(Physics and Astronomy Dept., University of Bologna, Bologna)*; Castellani, Gastone *(Dept. of Specialized, Diagnostic and Experimental Medicine,)*; Liberti, Micaela *(ICEmB at Sapienza University of Rome)*; Apollonio, Francesca *(ICEmB@La Sapienza Univ Rome)*; Zironi, Isabella *(Physics and Astronomy Dept., University of Bologna, Bologna)*

Theme 04. Translational Informatics for Health (Oral Session)

Localizing the Seizure Onset Zone from Single Pulse Electrical Stimulation Responses using Transfer Function Models 2524-2527
Kamali, Golnoosh* *(Johns Hopkins University)*; Smith, Rachel June *(Johns Hopkins University)*; Hays, Mark *(Johns Hopkins University)*; Coogan, Christopher *(Johns Hopkins University)*; Crone, Nathan E. *(Johns Hopkins University, School of Medicine)*; Sarma, Sridevi V. *(Johns Hopkins University)*; Kang, Joon Y. *(Johns Hopkins University, School of Medicine)*

State-Space Models of Evoked Potentials to Localize the Seizure Onset Zone 2528-2531
Smith, Rachel June* *(Johns Hopkins University)*; Kamali, Golnoosh *(Johns Hopkins University)*; Hays, Mark *(Johns Hopkins University)*; Coogan, Christopher *(Johns Hopkins University)*; Crone, Nathan E. *(Johns Hopkins University, School of Medicine)*; Sarma, Sridevi V. *(Johns Hopkins University)*; Kang, Joon Y. *(Johns Hopkins University, School of Medicine)*

Feasibility of Focal Brain Cooling for Partial Epilepsy with Secondary Generalization: A Computational Study 2532-2535
Soriano, Jaymar* *(University of the Philippines - Diliman)*; Kubo, Takatomi *(Nara Institute of Science and Technology)*; Ikeda, Kazushi *(Nara Institute of Science and Technology)*

The Influence of Angioplasty Balloon Sizing on Acute Post-Procedural Outcomes: A Finite Element Analysis 2536-2539
Al-Helou, Bernard* *(Univ Rennes, CHU Rennes, INSERM, LTSI – UMR 1099, F-35000 Rennes)*; Bel-Brunon, Aline *(Univ Lyon, INSA-Lyon, CNRS UMR5259, LaMCoS, F-69621, France.)*; Dupont, Claire *(Univ Rennes, CHU Rennes, INSERM, LTSI – UMR 1099, F-35000 Rennes)*; Ye, Wenfeng *(ANSYS, Villeurbanne F-69100, France)*; Silvestro, Claudio *(Medtronic, Aortic Peripheral & Venous (APV) Group, Santa Rosa, C)*; Michel, Rochette *(ANSYS France SAS)*; Lucas, Antoine *(CHU Rennes)*; Kaladji, Adrien *(Univ Rennes, CHU Rennes, INSERM, LTSI – UMR 1099, F-35000 Rennes)*; Haigron, Pascal *(Univ. of Rennes 1)*

Subject Independent Dementia Risk Prediction Models using Paralinguistic and Memory Test Features with Feature Warping 2540-2543
Sriskandaraja, Kaavya* *(The University of New South Wales (UNSW), Sydney)*; Ahmed, Beena *(University of New South Wales)*; Valenzuela, Michael *(Brain & Mind Centre, The University of Sydney)*

Tuning of an Artificial Pancreas Controller: An in Silico Methodology based on Clinically-Relevant Criteria 2544-2547
Olçomendy, Loïc* *(Univ. Bordeaux)*; Pirog, Antoine *(Univ. Bordeaux)*; Bornat, Yannick *(IMS Laboratory)*; Cieslak, Jérôme *(University of Bordeaux, IMS Lab., CNRS)*; Gucik-Derigny, David *(Univ. Bordeaux, CNRS, Bordeaux INP, IMS, UMR 5218)*; Henry, David *(University of Bordeaux)*; Catargi, Bogdan *(University of Bordeaux)*; Renaud, Sylvie *(Univ. Bordeaux, CNRS)*

Correlates of Attention in the Cingulate Cortex during Gambling in Humans 2548-2551
Taylor, Christopher *(Morgan State University)*; Greene, Patrick* *(Johns Hopkins University)*; D'Aleo, Raina *(Johns Hopkins University)*; Breault, Macauley S. *(Johns Hopkins University)*; Steinhardt, Cynthia *(Johns Hopkins University)*; Gonzalez-Martinez, Jorge *(Cleveland Clinic)*; Sarma, Sridevi V. *(Johns Hopkins University)*

Theme 05. Cardiac Physiology (Oral Session)

Patient-Specific Instrument with a Cutting Template for Mitral Valve Repair by Resection 2552-2556
Kruttschnitt, Michael* *(Technical University of Munich)*; Gruber, Maximilian *(Institute of Micro Technology and Medical Device Technology, Tec)*; Sodian, Ralf *(Dept. of Cardiac Surgery, Ludwig- Maximilians-University Mu)*; Lueth, Tim *(Technical University of Munich)*

Compensating for Changes in Heart Muscle Resting Heat Production in a Microcalorimeter 2557-2560
Garrett, Amy* *(The University of Auckland)*; Loiselle, Denis *(The University of Auckland)*; Han, June-Chiew *(The University of Auckland)*; Taberner, Andrew *(The University of Auckland)*

Theme 05. Cardiovascular Signal Complexity (Oral Session)

Optimized Non-Uniform Sampling of Blood Pressure Time Series from the Operating Room 2561-2564
Bresch, Erik* *(Philips)*; Derkx, Rene *(Philips Research)*; Paulussen, Igor *(Philips Research)*; Hornix, Eefje *(Philips Research)*; Davidoiu, Valentina *(Philips Research)*; Noordergraaf, Gerrit Jan *(St Elizabeth Hospital)*; Muehlsteff, Jens *(Philips)*

Wall Shear Stress Alterations at Left Atrium and Left Atrial Appendage Employing Abnormal Blood Velocity Profiles 2565-2568
Grigoriadis, Grigoris *(Univ. of Ioannina)*; Sakellarios, Antonis *(Forth-Biomedical Research Institute)*; Kosmidou, Ioanna *(Columbia Univ. Medical Center)*; Naka, Katerina *(Univ. of Ioannina)*; Ellis, Christopher *(Vanderbilt Univ. Medical Center)*; Michalis, Lampros *(Univ. of Ioannina)*; Fotiadis, Dimitrios I.* *(Univ. of Ioannina)*

Complexity and Nonlinearities of Short-Term Cardiovascular and Cerebrovascular Controls after Surgical Aortic Valve Replacement 2569-2572
Porta, Alberto* *(Universita' degli Studi di Milano)*; Fantinato, Angela *(IRCCS Policlinico San Donato, San Donato Milanese, Milan)*; Bari, Vlasta *(IRCCS Policlinico San Donato)*; Cairo, Beatrice *(Universita' degli Studi di Milano)*; De Maria, Beatrice *(IRCCS Fondazione Salvatore Maugeri, Milano)*; Bertoldo, Enrico Giuseppe *(IRCCS Policlinico San Donato, San Donato Milanese, Milan)*; Fiolo, Valentina *(IRCCS Policlinico San Donato, San Donato Milanese, Milan)*; Callus, Edward *(IRCCS Policlinico San Donato, San Donato Milanese, Milan)*; De Vincentiis, Carlo *(IRCCS Policlinico San Donato, San Donato Milanese, Milan)*; Volpe, Marianna *(IRCCS Policlinico San Donato, San Donato Milanese, Milan)*; Molfetta, Raffaella *(IRCCS Policlinico San Donato, San Donato Milanese, Milan)*; Ranucci, Marco *(Dept. of Cardiothoracic, Vascular Anesthesia and Intensive)*

An Empirical Mode Decomposition Approach to Assess the Strength of Heart Period-Systolic Arterial Pressure Variability Interactions 2573-2576
Bari, Vlasta* *(IRCCS Policlinico San Donato)*; Cairo, Beatrice *(Universita' degli Studi di Milano)*; De Maria, Beatrice *(IRCCS Fondazione Salvatore Maugeri, Milano)*; Tonon, Davide *(IRCCS Sacro Cuore Don Calabria Hospital, Negrar, Verona, Italy)*; Rossato, Gianluca *(Sacro Cuore Hospital, Negrar (VR))*; Faes, Luca *(University of Palermo)*; Porta, Alberto *(Universita' degli Studi di Milano)*

Intrinsic Complexity of Sympathetic and Parasympathetic Dynamics from HRV Series: A Preliminary Study on Postural Changes 2577-2580
Nardelli, Mimma *(University of Pisa)*; Citi, Luca *(University of Essex)*; Barbieri, Riccardo* *(Politecnico di Milano)*; Valenza, Gaetano *(University of Pisa)*

Modulatory Effects of Respiratory-Gated Auricular Vagal Nerve Stimulation on Cardiovagal Activity in Hypertension 2581-2584
Staley, Rachel *(Massachusetts General Hospital)*; Garcia, Ronald *(Massachusetts General Hospital)*; Stowell, Jessica *(Massachusetts General Hospital)*; Sclocco, Roberta *(Massachusetts General Hospital, Harvard Medical School)*; Fisher, Harrison *(Massachusetts General Hospital)*; Napadow, Vitaly *(Massachusetts General Hospital)*; Goldstein, Jill *(Massachusetts General Hospital)*; Barbieri, Riccardo* *(Politecnico di Milano)*

Theme 05. Cellular Electrophysiology and Coupling (Oral Session)

Effect of Percentage Reduction in Action Potential Duration of M-Cells on Re-Entry in Short QT Syndrome 2585-2588
Kirthi Priya, Ponnuraj* *(Tata Consultancy Services Limited)*; Jayaraman, Srinivasan *(INRS-EMT)*

In Vivo Hemodynamic Evaluation of an Implantable Left Ventricular Assist Device in a Long-Term Anti-Coagulation Regimen 2589-2593
Wang, Yaxin* *(Texas Heart Institute)*; Smith, Peter Alex *(Texas Heart Institute)*; Handy, Kelly *(Texas Heart Institute)*; Conger, Jeff L. *(Texas Heart Institute)*; Spangler, Taylor *(VDx Veterinary Diagnostics)*; Chen, Chen *(CH Biomedical Inc.,)*; Lin, Frank *(CH Biomedical Inc.,)*; Costas, Gil *(Texas Heart Institute)*; Elgalad, Abdelmotagaly *(Texas Heart Institute)*; Sampaio, Luiz C. *(Texas Heart Institute)*

Preliminary Results on Density Poincare Plot based Atrial Fibrillation Detection from Premature Atrial/Ventricular Contractions 2594-2597
Bashar, Syed Khairul* *(Univ. of Connecticut)*; Han, Dong *(Univ. of Connecticut)*; Zieneddin, Fearass *(Univ. of Connecticut)*; Ding, Eric *(Univ. of Massachusetts Medical School)*; Walkey, Allan *(Boston Univ.)*; McManus, David *(Univ. of Massachusetts Medical Center)*; Chon, Ki *(Univ. of Connecticut)*

Arterial-Ventricular Coupling Evaluation in Individuals with Stress-Evidenced Diastolic Dysfunction: A Pilot Study 2598-2601
Cymberknop, Leandro Javier* *(Universidad Tecnológica Nacional)*; Farro, Ignacio *(School of Medicine, Republic University)*; Americo, Carlos *(Cardiocentro, Asociación Española of Montevideo)*; Martinez, Fabian *(Cardiocentro, Asociación Española of Montevideo)*; Luberas, Natalia *(Cardiocentro, Asociación Española of Montevideo)*; Parma, Gabriel *(Cardiocentro, Asociación Española of Montevideo)*; Aramburu, Julia *(Cardiocentro, Asociación Española of Montevideo)*; Armentano, Ricardo Luis *(Republic University)*

Gaussian Process-Based Spatiotemporal Modeling of Electrical Wave Propagation in Human Atrium ... 2602-2605
Hu, Zhiyong *(Texas Tech Univ.)*; Du, Dongping *(Texas Tech Univ.)*; Du, Yuncheng* *(Clarkson Univ.)*

VIEgram – Analysis and Visualization of Intracardiac Electrograms on Patient-Specific 3D Atria Model . 2606-2609
Thakare, Sanket Yograj* *(University of Minnesota-Twin Cities)*; Mulpuru, Siva *(Mayo Clinic)*; Roukoz, Henri *(University of Minnesota)*; Tolkacheva, Elena *(University of Minnesota)*

Theme 05. ECG Recording and Analysis (Oral Session)

Continuous Electrocardiogram Monitoring in Zebrafish with Prolonged Mild Anesthesia 2610-2613
Le, Tai *(University of California, Irvine)*; Zhang, Jimmy *(UC-Irvine)*; Clark, Isaac *(University of California, Irvine)*; Xia, Xing *(University of California, Irvine)*; Schmiess-Heine, Lauren Schmiess-Heine *(University of California Irvine)*; Xu, Xiaolei *(Mayo Clinic)*; Nguyen, Anh H. *(University of California Irvine)*; Lau, Michael *(Sensoriis, Inc.)*; Cao, Hung* *(University of California, Irvine)*

Design and Construction of High-Frequency Cardiac Defibrillator for Small Animals 2614-2617
Chiou, Yu-An *(National Chiao Tung University)*; Cheng, Li-Kuan *(National Chiao Tung University)*; Lin, Shien-Fong* *(National Chiao Tung University)*

Heart Rate Variability and Multi-Site Pulse Rate Variability for the Assessment of Autonomic Responses to Whole-Body Cold Exposure 2618-2621
Mejía-Mejía, Elisa* *(City, Univ. of London)*; Budidha, Karthik *(City, Univ. of London)*; Ysehak Abay, Tomas *(City Univ. of London)*; May, James *(City, Univ. of London)*; Kyriacou, Panayiotis *(City Univ. London)*

Comparison between Embroidered and Gel Electrodes on ECG-Derived Respiration Rate 2622-2625
Bao, Xinqi* *(King's College London)*; Howard, Matthew *(King's College London)*; Niazi, Imran Khan *(HST, Aalborg Univ. and Center for Chiropractic Research (CfCR)*; Kamavuako, Ernest Nlandu *(King's College London)*

Hypoxia-Induced Effects on ECG Depolarization by Time Warping Analysis during Recurrent Obstructive Apnea 2626-2629
Romero, Daniel* *(Institute for Bioengineering of Catalonia)*; Jané, Raimon *(Institut de Bioenginyeria de Catalunya (IBEC))*

Theme 05. Heart Rate Estimation by Indirect Methods (Oral Session)

Time Domain and Frequency Fomain Heart Rate Variability Analysis on Gyrocardiograms 2630-2633
Siecinski, Szymon* *(Silesian University of Technology)*; Kostka, Pawel Stanislaw *(Silesian University of Technology)*; Tkacz, Ewaryst *(Silesian Univ of Tech, Faculty of Biomedical Engineering)*

Remote Heart Rate Estimation based on 3D Facial Landmarks 2634-2637
Maki, Yuichiro* *(Tokyo Institute of Technology)*; Monno, Yusuke *(Tokyo Institute of Technology)*; Tanaka, Masayuki *(National Institute of Advanced Industrial Science and Technology)*; Okutomi, Masatoshi *(Tokyo Institute of Technology)*

Analyzing Heart Rate Estimation from Vibrational Cardiography with Different Orientations 2638-2641
Aboulezz, Ezz* *(McGill University)*; Skoric, James *(McGill University)*; D'Mello, Yannick *(McGill University)*; Hakim, Siddiqui *(McGill University)*; Clairmonte, Nathan *(McGill University)*; Lortie, Michel *(MacDonald, Dettwiler and Associates Corporation)*; Plant, David *(McGill University)*

Effect of Ambient Lighting and Skin Tone on Estimation of Heart Rate and Pulse Transit Time from Video Plethysmography 2642-2645
Shirbani, Fatemeh *(Macquarie Univ., Faculty of Medicine and Health Sciences)*; Hui, Nicholas *(UNSW)*; Tan, Isabella *(Macquarie Univ.)*; Butlin, Mark *(Macquarie Univ.)*; Avolio, Alberto P* *(Macquarie Univ.)*

A Hybrid Radar-Camera Respiratory Monitoring System based on an Impulse-Radio Ultrawideband Radar . 2646-2649
Yang, Chenxi* *(Stevens Institute of Technology)*; Bruce, Brendan *(Autonomous Healthcare)*; Liu, Xiaofan *(Stevens Institute of Technology)*; Gholami, Behnood *(Autonomous Healthcare, Inc.)*; Tavassolian, Negar *(Stevens Institute of Technology)*

Comparison of ECG-Derived Respiration Estimation Methods on Healthy Subjects in Function of Recording Site and Subject Position and Gender 2650-2653
Solà-Soler, Jordi *(Institut de Bioenginyeria de Catalunya (IBEC))*; Giraldo, Beatriz* *(Institute for Bioengineering of Catalonia (IBEC))*

Theme 05. Modelling (Oral Session)

A Female-Specific Cardiovascular Lumped-Parameter Model 2654-2657
Comunale, Giulia* *(University of Padova)*; Susin, Francesca Maria *(University of Padova)*; Mynard, Jonathan *(Murdoch Children's Research Institute)*

Computational Modeling of Carotid Bruits 2658-2661
Venugopal, Prem* *(GE Research)*; Malcevic, Ivan *(GE Research)*; Pastouchenko, Nikolai *(GE Research)*; Seeley, Charles *(GE Research)*; Zhang, Xuefeng *(GE Research)*; DeMarco, Kevin *(Walter Reed National Military Medical Center)*; Foo, Thomas *(GE Research)*

Numerical and Experimental Approach to Characterize a BLDC Motor with Different Radial-Gap to Improve Hemocompatibility Performance 2662-2666
Wang, Yaxin* *(Texas Heart Institute)*; Karnik, Shweta *(University of Houston)*; Smith, P. Alex *(Texas Heart Institute at St. Luke's Hospital)*; Elgalad, Abdelmotagaly *(Texas Heart Institute)*; Frazier, O.H. *(Texas Heart Institute @ St. Luke's Hospital)*; Kurita, Nobuyuki *(Gunma University)*

R-Wave Amplitude Changes and Atypical Heart Rate Changes Accompanying Breath Hold during Low Breathing Rates 2667-2670
A. G., Ramakrishnan* *(Indian Institute of Science, Bangalore)*; A, Adarsh *(Indian Institute of Science, Bangalore)*

The Effect of the Degree and Location of Coronary Stenosis on the Hemodynamic Status of a Coronary Vessel 2671-2674
Siogkas, Panagiotis *(FORTH-IMBB)*; Kalykakis, George *(Dept. of Informatics, Ionian University, Corfu, Greece)*; Anagnostopoulos, Constantinos *(Biomedical Research Foundation, Academy of Athens)*; Exarchos, Themis P.* *(Unit of Medical Tech & Intelligent Info)*

Design and Implementation of in Silico Clinical Trial for Bioresorbable Vascular Scaffolds 2675-2678
Karanasiou, Georgia *(University of Ioannina,)*; Tsompou, Panagiota *(Unit of Medical Technology and Intelligent Information Systems,)*; Tachos, Nikolaos *(Unit of Medical Technology and Intelligent Information Systems,)*; Antonini, Luca *(Dept. of Chemistry, Materials and Chemical Engineering "Giu)*; Petrini, Lorenza *(Dept. of Civil and Environmental Engineering, Politecnico d)*; Pennati, Giancarlo *(Dept. of Chemistry, Materials and Chemical Engineering Depa)*; Gijsen, Frank *(Dept. of Cardiology, Erasmus MC, University Medical Center Rotte)*; Nezami, Farhad Rikhtegar *(Harvard-MIT Biomedical Engineering Center, Institute for Medical)*; Tzafiri, Ram *(Harvard-MIT Biomedical Engineering Center, Institute for Medical)*; Vaughan, Ted *(Biomechanics Research Centre, School of Engineering, College of)*; Martin, Fawdry *(Corporate Research and Global Technology and Services groups, Bo)*; Fotiadis, Dimitrios I.* *(University of Ioannina)*

Theme 05. Photoplethsmography (Oral Session)

Validation of Pulse Transit Time based Blood Pressure Estimation on Atrial Fibrillation Patients 2679-2682
Chen, Yang *(Harbin Institute of Tech., Shenzhen)*; Huang, Shoulin *(Harbin Institute of Tech.)*; Wang, Tong *(Harbin Institute of Tech., Shenzhen)*; Ma, Ting* *(Harbin Institute of Tech. at Shenzhen)*

Schrodinger Spectrum based PPG Features for the Estimation of the Arterial Blood Pressure 2683-2686
Li, Peihao *(King Abdullah University of Science and Technology (KAUST))*; Laleg, Taous-Meriem* *(King Abdullah University of Science and Technology (KAUST))*

Investigation of Morphological Variations of Photoplethysmography Signal in Human Epilepsy 2687-2690
Safavi, Seyedemahya* *(University of California Irvine)*; Valisharifabad, Ninaz *(University of California Irvine)*; Sabino, Robert Christopher *(University of California Irvine)*; Tran, Demi *(University of California Irvine)*; Lin, Jack J. *(University of California, Irvine)*; Lopour, Beth *(University of California, Irvine)*; Chou, Pai H. *(University of California, Irvine)*

Estimation of Arterial Blood Pressure Waveform from Photoplethysmogram Signal using Linear Transfer Function Approach 2691-2694
Dash, Ashutosh* *(Indian Institute of Technology, Kharagpur)*; Ghosh, Nirmalya *(Indian Institute of Technology (IIT), Kharagpur)*; Patra, Amit *(Indian Institute of Technology Kharagpur)*; Dutta Choudhury, Anirban *(Tata Consultancy Services Ltd.)*

Effect of Blood Volume Shift Simulated via Head-Up Tilt on Photoplethysmography Morphology 2695-2698
Aarotale, Parshuram N. *(School of Electrical and Computer Science Engineering, University)*; Blaber, Andrew Philip *(Simon Fraser University)*; Kouhyar, Tavakolian* *(University of North Dakota, Grand Forks, ND)*

Repeatability Study of Local Vascular Stiffness Measurement using Carotid Surface Acceleration Plethysmogram 2699-2702
R, Arathy *(Indian Institute of Technology Madras)*; P M, Nabeel *(Indian Institute of Technology Madras)*; Joseph, Jayaraj *(HTIC, Indian Institute of Technology Madras)*; V V, Abhidev *(Healthcare Technology Innovation Centre, IIT Madras)*; Sivaprakasam, Mohanasankar* *(Indian Institute of Technology Madras)*

Theme 05. Pulse Wave Velocity (Oral Session)

Understanding the Role of Longitudinal Arterial Wall Motion in Blood Circulation from the Perspective of a Piano String 2703-2706
Hao, Zhili* *(Old Dominion University)*

Demonstration of Pressure-Dependent Inter and Intra-Cycle Variations in Local Pulse Wave Velocity using Excised Bovine Carotid Artery 2707-2710
Manoj, Rahul *(Indian Institute of Technology Madras)*; P M, Nabeel *(Indian Institute of Technology Madras)*; V V, Abhidev *(Healthcare Technology Innovation Centre, IIT Madras)*; V, Raj Kiran *(IIT Madras)*; Joseph, Jayaraj *(HTIC, Indian Institute of Technology Madras)*; Sivaprakasam, Mohanasankar* *(Indian Institute of Technology Madras)*

Inductive Plethysmography for Aortic Pulse Wave Velocity 2711-2714
Fontecave-Jallon, Julie* *(Univ. Grenoble Alpes, CNRS, CHU Grenoble Alpes, Grenoble INP)*; Tanguy, Stephane *(Univ. Grenoble Alpes, TIMC - IMAG)*

Measuring Arterial Stiffness in a Head-Down Tilt Bed Rest Study: A Multisensor Approach 2715-2718
Orter, Stefan* *(Austrian Institute of Technology)*; Möstl, Stefan *(German Aerospace Center)*; Bachler, Martin *(AIT Austrian Institute of Technology)*; Hoffmann, Fabian *(German Aerospace Center)*; Kaniusas, Eugenijus *(Vienna University of Technology)*; Reisinger, Michaela *(Austrian Institute of Technology)*; Wassertheurer, Siegfried *(AIT Austrian Institute of Technology, Health & Environment Dept.)*; Tank, Jens *(German Aerospace Center)*; Hametner, Bernhard *(AIT Austrian Institute of Technology)*

Cuffless Blood Pressure Estimation using Features Extracted from Carotid Dual-Diameter Waveforms . 2719-2722
Ramakrishna, Prashanth *(New York University)*; P M, Nabeel *(Indian Institute of Technology Madras)*; V, Raj Kiran *(IIT Madras)*; Joseph, Jayaraj *(HTIC, Indian Institute of Technology Madras)*; Sivaprakasam, Mohanasankar* *(Indian Institute of Technology Madras)*

Blind Estimation of Central Blood Pressure using Least-Squares with Mean Matching and Box Constraints 2723-2727
Magbool, Ahmed *(King Abdullah University of Science and Technology (KAUST))*; Bahloul, Mohamed A. *(KAUST)*; Ballal, Tarig *(King Abdullah University of Science and Technology)*; Alnaffouri, Tareq *(King Abdullah University of Science and Technology)*; Laleg, Taous-Meriem* *(King Abdullah University of Science and Technology (KAUST))*

Theme 05. Respiration Estimation – Lung Sounds (Oral Session)

Identifying the Predominant Site of Upper Airway Collapse in Obstructive Sleep Apnoea Patients using Snore Signals 2728-2731
Sebastian, Arun* *(University of Sydney)*; Cistulli, Peter *(University of Sydney)*; Cohen, Gary *(Sleep Investigation Laboratory, Center for Sleep Health and Rese)*; de Chazal, Philip *(University of Sydney)*

Relationship of the Respiration Waveform to a Chest Worn Inertial Sensor 2732-2735
Skoric, James* *(McGill University)*; D'Mello, Yannick *(McGill University)*; Aboulezz, Ezz *(McGill University)*; Hakim, Siddiqui *(McGill University)*; Clairmonte, Nathan *(McGill University)*; Lortie, Michel *(MacDonald, Dettwiler and Associates Corporation)*; Plant, David *(McGill University)*

PPG Derived Respiratory Rate Estimation in Daily Living Conditions 2736-2739
Motin, Mohammod Abdul *(PhD Student, University of Melbourne)*; Karmakar, Chandan *(Deakin University)*; Kant Kumar, Dinesh* *(RMIT University)*; Palaniswami, Marimuthu *(The University of Melbourne)*

Performance Evaluation of Fixed Sample Entropy for Lung Sound Intensity Estimation 2740-2743
Lozano-García, Manuel* *(Institute for Bioengineering of Catalonia (IBEC), The Barcelona)*; Nuhić, Jasna *(Institute for Bioengineering of Catalonia (IBEC), The Barcelona)*; Moxham, John *(King's College London)*; F Rafferty, Gerrard *(King's College Hospital NHS Foundation Trust, King's Health Part)*; J Jolley, Caroline *(King's College Hospital NHS Foundation Trust, King's Health Part)*; Jané, Raimon *(Institut de Bioenginyeria de Catalunya (IBEC))*

Spatial Distribution of Normal Lung Sounds in Healthy Individuals under Varied Inspiratory Load and Flow Conditions 2744-2747
Lozano-García, Manuel *(Institute for Bioengineering of Catalonia (IBEC), The Barcelona)*; Davidson, Clare Muireann *(Institute for Bioengineering of Catalonia)*; Prieto Ramon, Carlos *(Institut de Bioenginyeria de Catalunya)*; Moxham, John *(King's College London)*; F Rafferty, Gerrard *(King's College Hospital NHS Foundation Trust, King's Health Part)*; J Jolley, Caroline *(King's College Hospital NHS Foundation Trust, King's Health Part)*; Jané, Raimon* *(Institut de Bioenginyeria de Catalunya (IBEC))*

Neural Respiratory Drive Estimation in Respiratory sEMG with Cardiac Arrhythmias 2748-2751
Estrada-Petrocelli, Luis* *(Institut de Bioenginyeria de Catalunya (IBEC). The Barcelona Ins)*; Torres, Abel *(Institute for Bioengineering of Catalonia (IBEC))*; Jané, Raimon *(Institut de Bioenginyeria de Catalunya (IBEC))*

Theme 05. Sepsis and Clinical Decisisions (Oral Session)

High-Throughput Vascular Screening by ARTSENS Pen during a Medical Camp for Early-Stage Detection of Chronic Kidney Disease 2752-2755
P M, Nabeel *(Indian Institute of Tech. Madras)*; Manoj, Rahul *(Indian Institute of Tech. Madras)*; V V, Abhidev *(Healthcare Tech. Innovation Centre, IIT Madras)*; Joseph, Jayaraj *(HTIC, Indian Institute of Tech. Madras)*; V, Raj Kiran *(IIT Madras)*; Sivaprakasam, Mohanasankar* *(Indian Institute of Technology Madras)*

Tachycardia Control in Septic Shock with Esmolol and Ivabradine: A Comparison on Heart Function 2756-2759
Carrara, Marta* *(Politecnico di Milano, Italy)*; Herpain, Antoine *(Université libre de Bruxelles)*; Ferrario, Manuela *(Politecnico di Milano)*

Prediction of Atherosclerotic Disease Progression Combining Computational Modelling with Machine Learning 2760-2763
Sakellarios, Antonis *(Forth-Biomedical Research Institute)*; Pezoulas, Vasileios C. *(University of Ioannina)*; Bourantas, Christos *(Dept. of Academic Cardiology, Castle Hill Hospital, Cottingham, HU)*; Naka, Katerina *(University of Ioannina)*; Michalis, Lampros *(University of Ioannina)*; Serruys, Patrick *(Imperial College London, London)*; Stone, Gregg *(Cardiovascular Research Foundation, New York)*; Garcia-Garcia, Hector *(MedStar Washington Hospital)*; Fotiadis, Dimitrios I.* *(University of Ioannina)*

Cardiorespiratory and Vascular Variability Analysis to Classify Patients with Ischemic and Dilated Cardiomyopathy 2764-2767
Rodriguez, Javier *(Institut de Bioenginyeria de Catalunya (IBEC))*; Schulz, Steffen *(University of Applied Sciences Jena)*; Voss, Andreas *(University of Applied Sciences Jena)*; Giraldo, Beatriz* *(Institute for Bioengineering of Catalonia (IBEC))*

Prediction of Septic Shock Onset in ICU by Instantaneous Monitoring of Vital Signs 2768-2771
Mollura, Maximiliano* *(Politecnico di Milano)*; Romano, Stefano *(Politecnico di Milano)*; Mantoan, Giulio *(Politecnico di Milano)*; Lehman, Li-wei *(Massachusetts Institute of Technology)*; Barbieri, Riccardo *(Politecnico di Milano)*

Validation of a 'Usual Care' Model for Vasopressor Initiation in a Cohort of Emergency Department Patients with Sepsis 2772-2775
Aydemir, Baturay *(Harvard Medical School)*; Prasad, Varesh *(Massachusetts Institute of Technology)*; Lynch, James *(Massachusetts Institute of Technology)*; Biebelberg, Brett *(Massachusetts General Hospital)*; Kehoe, Iain *(Massachusetts General Hospital)*; Reisner, Andrew *(Massachusetts General Hospital)*; Heldt, Thomas* *(Massachusetts Institute of Technology)*

Theme 05. Sleep Apnea (Oral Session)

Embedded System for Non-Obtrusive Sleep Apnea Detection 2776-2779
Gaiduk, Maksym* *(HTWG Konstanz)*; Orcioni, Simone *(Università Politecnica Delle Marche)*; Conti, Massimo *(Università Politecnica Delle Marche, Dipartimento di Ingegneria)*; Seepold, Ralf *(HTWG Konstanz)*; Penzel, Thomas *(Charite Universitätsmedizin Berlin)*; Martinez Madrid, Natividad *(Reutlingen University)*; Ortega, Juan Antonio *(Universidad de Sevilla)*

Distinguish Obstructive and Central Sleep Apnea by Portable Peripheral Arterial Tonometry 2780-2783
Penzel, Thomas* *(Charite Universitätsmedizin Berlin)*; Glos, Martin *(Charite-Universitaetsmedizin Berlin)*; Fietze, Ingo *(Charite-Universitaetsmedizin Berlin)*; Herberger, Sebastian *(Charite University Hospital Berlin)*; Pillar, Giora *(Technion Faculty of Medicine)*

Quantification of Nocturnal Blood Pressure Oscillations Induced by Sleep Disordered Breathing 2784-2787
Chuang, Yao-Shun *(The University of Texas at Arlington)*; Jani, Mahrshi *(University of Texas At Arlington)*; Soltan zadi, Armin *(University of Texas at Arlington)*; Alex, Raichel *(University of Texas Arlington)*; Zhang, Rong *(University of Texas Southwestern Medical Center at Dallas)*; Watenpaugh, Donald *(Sleep Consultants Inc.)*; Behbehani, Khosrow* *(University of Texas at Arlington)*

Is Cumulative Time of Oxygen Desaturation a Better Predictor of Cardiovascular Mortality than Apnoea Hypopnoea Index? 2788-2791
Sadr, Nadi* *(University of Sydney)*; Bin, Yu Sun *(University of Sydney)*; Sutherland, Kate *(University of Sydney)*; Cook, Kristina *(University of Sydney)*; Dissanayake, Hasthi *(University of Sydney)*; Cistulli, Peter *(University of Sydney)*; de Chazal, Philip *(University of Sydney)*

Effects of Ventilation-Perfusion Mismatch on Severity of Obstructive Sleep Apnea: A Modeling Study .. 2792-2795
Khoo, Michael* *(University of Southern California)*; Hu, Wen-Hsin *(University of Southern California)*; Amin, Raouf *(Dept. of Pulmonary Medicine, University of Cincinnati College)*

Automated Annotation of Polysomnogram Epochs for Apnoea and Non-Apnoea Arousals 2796-2799
de Chazal, Philip* *(University of Sydney)*; Sadr, Nadi *(University of Sydney)*

Theme 05. Vascular Assessment and Infarction (Oral Session)

A Composite Material based Neural Network for Tissue Mechanical Properties Estimation Toward Stage Assessment of Infarction 2800-2803
Dempsey, Sergio C. H.* *(Western University)*; Jafari, Parya *(Western University)*; So, Aaron *(Western University)*; Samani, Abbas *(Western University)*

The Effect of the Stenosis Location at a Coronary Arterial Bifurcation: A Parametric Study 2804-2807
Siogkas, Panagiotis* *(FORTH-IMBB)*; Lakkas, Lampros *(Michaelideion Cardiac Center, Dept. of Cardiology in Medical School)*; Sakellarios, Antonis *(Forth-Biomedical Research Institute)*; Michalis, Lampros *(University of Ioannina)*; Fotiadis, Dimitrios I. *(University of Ioannina)*

Prediction of the Development of Coronary Atherosclerotic Plaques using Computational Modeling in 3D Reconstructed Coronary Arteries 2808-2811
Pleouras, Dimitrios *(Dept. of Biomedical Research, FORTH-IMBB, GR 45110 Ioannina, Gre)*; Sakellarios, Antonis *(Forth-Biomedical Research Institute)*; Loukas, Vasileios *(FORTH - Biomedical Research Institute)*; Kyriakidis, Savvas *(Institute of Molecular Biology and Biotechnology, FORTH)*; Fotiadis, Dimitrios I.* *(Univ. of Ioannina)*

Site Specific Prediction of PCI Stenting based on Imaging and Biomechanics Data using Gradient Boosting Tree Ensembles 2812-2815
Kigka, Vassiliki *(University of Ioannina)*; Sakellarios, Antonis *(Forth-Biomedical Research Institute)*; Georga, Eleni I. *(University of Ioannina)*; Siogkas, Panagiotis *(FORTH-IMBB)*; Tsompou, Panagiota *(Unit of Medical Technology and Intelligent Information Systems,)*; Kyriakidis, Savvas *(Institute of Molecular Biology and Biotechnology, FORTH)*; RocchiccioLi, Silvia *(Institute of Clinical Physiology, National Research Council, Pis)*; Pelosi, Gualtiero *(Institute of Clinical Physiology, National Research Council, 561)*; Naka, Katerina *(University of Ioannina)*; Michalis, Lampros *(University of Ioannina)*; Fotiadis, Dimitrios I.* *(University of Ioannina)*

Intramural Glycosaminoglycans Distribution vs. Residual Stress in Porcine Ascending Aorta: A Computational Study 2816-2819
Ghadie, Noor* *(University of Ottawa)*; St-Pierre, Jean-Philippe *(University of Ottawa)*; Labrosse, Michel *(University of Ottawa)*

Classification of Aortic Stenosis Before and After Transcatheter Aortic Valve Replacement using Cardio-Mechanical Modalities 2820-2823
Yang, Chenxi* *(Stevens Institute of Technology)*; Ojha, Banish Deep *(Stevens Institute of Technology)*; Aranoff, Nicole *(Yeshiva University)*; Green, Philip *(Columbia University Medical Center)*; Tavassolian, Negar *(Stevens Institute of Technology)*

Theme 06. Brain Functional Imaging – I (Oral Session)

A Multiscale Consensus Method using Factor Analysis to Extract Modular Regions in the Functional Brain Network 2824-2828
Vangimalla, Reddy Rani* *(International Institute of Information Technology)*; Sreevalsan-Nair, Jaya *(International Institute of Information Technology, Bangalore)*

Metaheuristic Spatial Transformation (MST) for Accurate Detection of Attention Deficit Hyperactivity Disorder (ADHD) using Rs-fMRI 2829-2832
M S Aradhya, Abhay* *(Nanyang Technological University)*; Sundaram, Suresh *(Indian Institute of Science)*; Pratama, Mahardhika *(Nanyang Technological University)*

Time-Variant Epileptic Brain Functional Connectivity of Focal and Generalized Seizure in Chronic Temporal Lobe Epilepsy Rat 2833-2836
Yang, Yufang *(Qiushi Academy for Advanced Studies(QAAS), Zhengjiang University)*; Zhang, Fang *(Qiushi Academy for Advanced Studies(QAAS), Zhengjiang University)*; Zhu, Junming *(Second Affiliated Hospital, School of Medicine, ZhejiangUniversi)*; Wang, Yueming *(Zhejiang University)*; Xu, Kedi* *(Qiushi Academy for Advanced Studies, Zhejiang University, Hangzhou)*

An LMMSE-Based Estimation of Temporal Response Function in Auditory Attention Decoding 2837-2840
Kuruvila, Ivine* *(Friedrich-Alexander-Universität Erlangen-Nürnberg)*; Fischer, Eghart *(Sivantos GmbH Erlangen)*; Hoppe, Ulrich *(Friedrich-Alexander-Universität Erlangen-Nürnberg)*

Patient-Specific Robot-Assisted Stroke Rehabilitation Guided by EEG – A Feasibility Study 2841-2844
Butt, Maryam* *(University of Wollongong, Wollongong, NSW)*; Naghdy, Golshah *(University of Wollongong, Wollongong, NSW)*; Naghdy, Fazel *(University of Wollongong, Wollongong, NSW)*; Murray, Geoffrey *(University of Wollongong, Wollongong, NSW)*; Du, Haiping *(University of Wollongong, Wollongong, NSW)*

Decreased Theta Power Reflects Disruption in Postural Control Networks of Fragile X Premutation Carriers 2845-2848
O'Keeffe, Clodagh* *(Trinity College Dublin)*; Carro Domínguez, Manuel *(Trinity Centre for Bioengineering)*; O'Rourke, Eugene *(Trinity Centre of Bioengineering, Trinity College Dublin.)*; Lynch, Tim *(Mater Misericordiae Hospital, Dublin, Ireland)*; Reilly, Richard *(Trinity College Dublin)*

Theme 06. Brain Functional Imaging – II (Oral Session)

Quantifying Cognitive Load using EEG during Ambulation and Postural Tasks 2849-2852
Swerdloff, Margaret* *(Northwestern University)*; Hargrove, Levi *(Rehabilitation Institute of Chicago)*

EEG-Based Functional Connectivity Representation using Phase Locking Value for Brain Network based Applications 2853-2856
Gonuguntla, Venkateswarlu* *(Samsung Medical Center)*; Kim, Jae-Hun *(Samsung Medical Center)*

Movement Related Cortial Potentials in Parkinson's Disease Patients with Freezing of Gait 2857-2860
Karimi, Fatemeh *(University of Waterloo)*; Niu, Jiansheng *(University of Waterloo)*; Almeida, Quincy *(Wilfrid Laurier University)*; Jiang, Ning* *(University of Waterloo)*

Evoked Brain Responses in Odor Stimuli Evaluation – An EEG Event Related Potential Study 2861-2864
Abbasi, Nida Itrat *(National University of Singapore)*; Bezerianos, Anastasios *(National University of Singapore)*; Hamano, Junji *(Procter and Gamble)*; Chaudhury, Anumita *(Procter and Gamble)*; Thakor, Nitish *(National University of Singapore)*; Dragomir, Andrei* *(National University of Singapore)*

Classification of EEG Data based on the Spatio-Temporo-Rhythmic Characteristics of the Task-Discriminating Functional Sub-Networks 2865-2868
Haddad, Ali *(Rutgers University)*; Najafizadeh, Laleh* *(Rutgers University)*

Recognizing Pain in Motor Imagery EEG Recordings using Dynamic Functional Connectivity Graphs ... 2869-2872
Shamsi, Foroogh *(Rutgers Univ.)*; Haddad, Ali *(Rutgers Univ.)*; Najafizadeh, Laleh* *(Rutgers Univ.)*

Theme 06. Brain Functional Imaging – III (Oral Session)

40-Hz Rhythmic Visual Stimulation Facilitates Attention by Reshaping the Brain Functional Connectivity 2873-2876
You, Jia* *(Tianjin University)*; Xu, Minpeng *(Tianjin University)*; Li, Rong *(TianJin University)*; Wang, Zhongpeng *(Tianjin University)*; Liu, Shuang *(Tianjin University)*; Ming, Dong *(Tianjin University)*

The Effect of Static and Dynamic Visual Stimulations on Error-Evoked Brain Responses 2877-2880
Xu, Rui *(Tianjin University)*; Wang, Yaoyao* *(Tianjin University)*; Wang, Ningning *(Tianjin University)*; Shi, Xianle *(Tianjin University)*; Meng, Lin *(Tianjin University)*; Ming, Dong *(Tianjin University)*

Somatosensory Evoked Potentials Following Upper Limb Noninvasive Electrical Stimulation: A Case Study 2881-2884
Artoni, Fiorenzo* *(Ecole Polytechnique Federale de Lausanne)*; Tanguenza, Arianna *(Dept. of Electrical, Electronic, and Information Engineerin)*; D'Anna, Edoardo *(Bertarelli Foundation Chair in Translational Neuroengineering, C)*; Micera, Silvestro *(Scuola Superiore Sant'Anna)*

Test-Retest Reliability of Time-Domain EEG Features to Assess Cognitive Load using a Wireless Dry-Electrode System 2885-2888
Ortiz, Oscar* *(University of New Brunswick)*; Blustein, Dan *(Rhodes College)*; Kuruganti, Usha *(University of New Brunswick)*

Brainstem BOLD Response to Visual and Acoustic Stimuli 2889-2892
Han, Chungmin* *(University of Texas at Austin)*; Ress, David *(The University of Texas, Austin)*; Ramos Nunez, Aurora I. *(College of Coastal Georgia)*; de la Rosa, Natasha *(University of Massachusetts Amherst)*; Li, Sheng *(University of Texas Health Science Center at Houston)*; Sulzer, James *(University of Texas at Austin)*

Semi-Automated Brain Responses in Communication: A Magnetoencephalographic Hyperscanning Study 2893-2896
Takano, Kazuyoshi *(Hokkaido University)*; Watanabe, Hayato *(Hokkaido University)*; Yagyu, Kazuyori *(Hokkaido University)*; Shimojyo, Atsushi *(Hokkaido University)*; Boasen, Jared *(Hokkaido University)*; Murakami, Yui *(Hokkaido Bunkyo University)*; Shiraishi, Hideaki *(Hokkaido University)*; Yokosawa, Koichi* *(Hokkaido University)*; Saito, Takuya *(Hokkaido University)*

Theme 06. Brain Functional Imaging – IV (Oral Session)

Complexity Analysis on Functional-Near Infrared Spectroscopy Time Series: A Preliminary Study on Mental Arithmetics 2897-2900
Ghouse, Ameer *(Universita di Pisa)*; Nardelli, Mimma *(University of Pisa)*; Catrambone, Vincenzo* *(Università di Pisa)*; Valenza, Gaetano *(University of Pisa)*

Characterizing Functional Near Infrared Spectroscopy (fNIRS)-Based Connectivity as Cost-Effective Small World Network using Orthogonal Minimal Spanning Trees (OMSTs) 2901-2904
Yee Ling, Chan* *(Universiti Teknologi Petronas)*; Tang, Tong Boon *(Universiti Teknologi Petronas)*

Prefrontal Cortical Activation while doing Mindfulness Task: A Pilot Functional Near-Infrared Spectroscopy Study 2905-2908
Yu, Juanhong* *(Institute for Infocomm Research, Agency for Science, Technology and)*; Ang, Kai Keng *(Institute for Infocomm Research)*; Choo, Carol *(College of Healthcare Sciences, Division of Tropical Health and)*; Ho, Cyrus SH *(National University Hospital)*; Ho, Roger *(National University of Singapore)*; So, Rosa *(Institute for Infocomm Research)*

Quantification of Neural Activity in FMR1 Premutation Carriers during a Dynamic Sway Task using Source Localization 2909-2912
Gaul, Alan* *(Trinity College Dublin)*; O'Keeffe, Clodagh *(Trinity College Dublin)*; Carro Domínguez, Manuel *(Trinity Centre for Bioengineering)*; O'Rourke, Eugene *(Trinity Centre of Bioengineering, Trinity College Dublin.)*; Reilly, Richard *(Trinity College Dublin)*

Cortical Hemodynamic Response to Multi-Afferent Stimulation: An Optical Imaging Study 2913-2916
Bo, Bin *(Shanghai Jiao Tong Univ.)*; Li, Yao *(Shanghai Jiao Tong Univ.)*; Li, Wanlu *(Shanghai Jiao Tong Univ.)*; Wang, Yongting *(Shanghai Jiao Tong Univ.)*; Tong, Shanbao* *(Shanghai Jiao Tong Univ.)*

Detecting mTBI by Learning Spatio-Temporal Characteristics of Widefield Calcium Imaging Data using Deep Learning 2917-2920
Koochaki, Fatemeh *(Rutgers Univ.)*; Shamsi, Foroogh *(Rutgers Univ.)*; Najafizadeh, Laleh* *(Rutgers Univ.)*

Theme 06. Brain Physiology and Modeling (Oral Session)

Frequency Dependent Functional Brain Reorganization in Anesthesia is Specific to Drug Concentration ... 2921-2924
Conti, Allegra* *(University of Rome 'Tor Vergata')*; Akeju, Oluwaseun *(Massachusetts General Hospital)*; Chamadia, Shubham *(Dept. of Anesthesia, Critical Care, and Pain Medicine, Mass)*; Duggento, Andrea *(University of Rome "Tor Vergata")*; Guerrisi, Maria *(University of Rome "Tor Vergata")*; Barbieri, Riccardo *(Politecnico di Milano)*; Toschi, Nicola *(University of Rome "Tor Vergata", Faculty of Medicine)*

Novel Virtual Reality System for Auditory Tasks in Head-Fixed Mice 2925-2928
Gao, Sibo *(Rice University)*; Webb, James *(Baylor College of Medicine)*; Zakir, Mridha *(Baylor College of Medicine)*; Banta, Anton *(Rice University)*; Kemere, Caleb *(Rice University)*; McGinley, Matthew* *(Baylor College of Medicine)*

Predicting Response of Spontaneously Firing Afferents to Prosthetic Pulsatile Stimulation 2929-2933
Steinhardt, Cynthia* *(Johns Hopkins University)*; Fridman, Gene *(Johns Hopkins University)*

Simulating Bidirectional Peripheral Neural Interfaces in EIDORS 2934-2937
Eiber, Calvin D.* *(University of Melbourne)*; Keast, Janet *(University of Melbourne)*; Osborne, Peregrine *(Dept. of Anatomy and Neuroscience, University of Melbourne)*

Morphological Influence and Electric Field Direction's Influence on Activation of Cortical Neurons in Electrical Brain Stimulation: A Computational Study 2938-2941
Chung, Hyeyeon *(Gwangju Institute of Science and Technology)*; Im, Cheolki *(Gwangju Institute of Science and Technology)*; Seo, Hyeon *(Gwangju Institute of Science and Technology)*; Jun, Sung Chan* *(Gwangju Institute of Science and Technology)*

Virtual Reality Platform for Systematic Investigation of Multisensory Integration and Training of Closed-Loop Prosthetic Control 2942-2945
Phataraphruk, Kris *(Arizona State University)*; VanGilder, Paul *(Arizona State University)*; Buneo, Christopher* *(Arizona State University)*

Theme 06. Brain-Computer Interface – I (Oral Session)

Comparison of Steady-State Visual Evoked Potential (SSVEP) with LCD vs. LED Stimulation 2946-2949
Mu, Jing* *(The University of Melbourne)*; Grayden, David B. *(The University of Melbourne)*; Tan, Ying *(The University of Melbourne)*; Oetomo, Denny *(The University of Melbourne)*

A Multi-View CNN with Novel Variance Layer for Motor Imagery Brain Computer Interface 2950-2953
Mane, Ravikiran* *(Nanyang Technological University)*; Robinson, Neethu *(Nanyang Technological University)*; A. P., Vinod *(Indian Institute of Technology Palakkad)*; Lee, Seong-Whan *(Korea University)*; Guan, Cuntai *(Nanyang Technological University)*

Temporal Dynamics on Decoding Target Stimuli in Rapid Serial Visual Presentation using Magnetoencephalography 2954-2958
Zhang, Chuncheng* *(Institute of Automation, Chinese Academy of Sciences)*; Qiu, Shuang *(Institute of Automation, Chinese Academy of Science)*; Wang, Shengpei *(Research Center for Brain-inspired Intelligence and National Lab)*; Wei, Wei *(Institute of Automation, Chinese Academy of Science)*; He, Huiguang *(Institute of Automation, Chinese Academy of Sciences)*

Generalizability of EEG-Based Mental Attention Modeling using Different Cognitive Tasks 2959-2962
Phyo Wai, Aung Aung* *(Nanyang Technological University)*; Dou, Maokang *(Nanyang Technological University)*; Guan, Cuntai *(Nanyang Technological University)*

A Transfer Learning Framework for RSVP-Based Brain Computer Interface 2963-2968
Wei, Wei *(Institute of Automation, Chinese Academy of Science)*; Qiu, Shuang *(Institute of Automation, Chinese Academy of Science)*; Ma, Xuelin *(Institute of Automation, Chinese Academy of Sciences)*; Li, Dan *(Institute of Automation, Chinese Academy of Science)*; Zhang, Chuncheng *(Institute of Automation, Chinese Academy of Sciences)*; He, Huiguang* *(Institute of Automation, Chinese Academy of Sciences)*

Weighted Subject-Semi-Independent ERP-Based Brain-Computer Interface 2969-2972
An, Xingwei *(Tianjin University)*; Zhou, Xiangtong* *(Tianjin University)*; Zhong, Wenxiao *(Tianjin University)*; Ming, Dong *(Tianjin University)*; Liu, Shuang *(Tianjin University)*; Li, Xiaohong *(Tianjin University)*

Theme 06. Brain-Computer Interface – II (Oral Session)

Prediction of Event Related Potential Speller Performance using Resting-State EEG 2973-2976
Shin, Gi-Hwan *(Korea University)*; Lee, Minji *(Korea University)*; Kim, Hyeong-Jin *(Korea University)*; Lee, Seong-Whan* *(Korea University)*

Weighted Transfer Learning of Dynamic Time Warped Data for Motor Imagery based Brain Computer Interfaces 2977-2980
Giles, Joshua* *(The University of Sheffield)*; Ang, Kai Keng *(Institute for Infocomm Research)*; Mihaylova, Lyudmila *(University of Sheffield)*; Arvaneh, Mahnaz *(University of Sheffield)*

Non-Linear Online Low-Frequency EEG Decoding of Arm Movements during a Pursuit Tracking Task .. 2981-2985
Martínez-Cagigal, Víctor *(Biomedical Engineering Group, E.T.S.I. de Telecomunicación, Univ)*; Kobler, Reinmar Josef *(Graz University of Technology)*; Mondini, Valeria* *(Graz University of Technology)*; Hornero, Roberto *(University of Valladolid)*; Müller-Putz, Gernot *(Graz University of Technology)*

A CNN-Based Compare Network for Classification of SSVEPs in Human Walking 2986-2990
Wu, Chenyao *(Institute of Automation, Chinese Academy of Science, Beijing, China)*; Qiu, Shuang *(Institute of Automation, Chinese Academy of Science)*; Xing, Jiezhen *(Institute of Automation, Chinese Academy of Sciences)*; He, Huiguang* *(Institute of Automation, Chinese Academy of Sciences)*

Motor Imagery Classification of Finger Motions using Multiclass CSP 2991-2994
Kato, Masaki* *(Yamagata University)*; Kanoga, Suguru *(National Institute of Advanced Industrial Science and Technology)*; Hoshino, Takayuki *(Keio University)*; Fukami, Tadanori *(Yamagata University)*

A Generic Error-Related Potential Classifier Offers a Comparable Performance to a Personalized Classifier 2995-2998
Lopes Dias, Catarina* *(Graz University of Technology)*; Sburlea, Andreea Ioana *(Graz University of Technology)*; Müller-Putz, Gernot *(Graz University of Technology)*

Theme 06. Brain-Computer Interface – III (Oral Session)

Investigating Different Stress-Relief Methods using Electroencephalogram (EEG) 2999-3002
Zhang, Yuge* *(Hwa Chong Institution)*; Wang, Qin *(Hwa Chong Institution)*; Chin, Zheng Yang *(Institute for Infocomm Research)*; Ang, Kai Keng *(Institute for Infocomm Research)*

Study on the Effect of Nontarget Types on Name based Auditory Event-Related Potentials 3003-3006
Yang, Yuancheng* *(Tianjin University)*; An, Xingwei *(Tianjin University)*; Chen, Lu *(Tianjin University)*; Liu, Shuang *(Tianjin University)*; Zhao, Xin *(Tianjin University)*; Ming, Dong *(Tianjin University)*

Decoding Movement Direction from Cortical Microelectrode Recordings using an LSTM-Based Neural Network 3007-3010
Premchand, Brian* *(A*STAR, I2R)*; Toe, Kyaw Kyar *(Institute for Infocomm Research, A*STAR)*; Wang, Chuanchu *(Institute for Infocomm Research)*; Shaikh, Shoeb *(Nanyang Technological University)*; Libedinsky, Camilo *(A*STAR)*; Ang, Kai Keng *(Institute for Infocomm Research)*; So, Rosa *(Institute for Infocomm Research)*

A Generalized Model to Estimate Reaction Time Corresponding to Visual Stimulus using Single-Trial EEG 3011-3014
Chowdhury, Mohammad Samin Nur* *(Arizona State University)*; Dutta, Arindam *(Arizona State University)*; Robison, Matthew K. *(Arizona State University)*; Blais, Chris *(Arizona State University)*; Brewer, Gene *(Arizona State University)*; Bliss, Daniel W. *(Arizona State University)*

Decoding Grasp Motions from EEG Signals based on a Novel Data Augmentation Strategy 3015-3018
Cho, Jeong-Hyun *(Korea University)*; Jeong, Ji-Hoon *(Korea University)*; Lee, Seong-Whan* *(Korea University)*

Effects of Stimulus Spatial Resolution on SSVEP Responses under Overt and Covert Attention 3019-3022
Phyo Wai, Aung Aung* *(Nanyang Technological University)*; Lee, Jun Cong *(Nanyang Technological University)*; Yang, Tao *(Institute of Infocomm Research)*; So, Rosa *(Institute for Infocomm Research)*; Guan, Cuntai *(Nanyang Technological University)*

Theme 06. Brain-Computer Interface – IV (Oral Session)

Optimizing Time-Frequency Feature Extraction and Channel Selection through Gradient Backpropagation to Improve Action Decoding based on Subthalamic Local Field Potentials 3023-3026
Martineau, Thomas *(Imperial College London)*; He, Shenghong *(University of Oxford)*; Vaidyanathan, Ravi *(Imperial College London)*; Brown, Peter *(Director of the Medical Research Council Brain Network Dynamics)*; Tan, Huiling* *(University Research Lecturer in Nuffield Dept. of Clinical)*

EEG Analysis of a Coincident Timing Task for Motor Rehabilitation 3027-3030
Chaves de Melo, Gabriel *(University of Sao Paulo)*; Martes Sternlicht, Vitor *(University of Sao Paulo)*; Forner-Cordero, Arturo* *(Escola Politécnica da Universidade de Sao Paulo)*

Characteristics of High-Frequency SSVEPs Evoked by Visual Stimuli at Different Polar Angles 3031-3034
Ming, Gege *(Institute of Semiconductors)*; Wang, Yijun* *(Institute of Semiconductors, Chinese Academy of Sciences)*; Pei, Weihua *(Institute of Semiconductors, CAS)*; Chen, Hongda *(Institute of Semiconductors, CAS)*

Using Biosignals for Objective Measurement of Presence in Virtual Reality Environments 3035-3039
Athif, Mohamed* *(Boston University)*; Rathnayake, Lahiru Kavinda *(University of Moratuwa)*; Nagahapitiya, Dickmendra Bandara *(University of Moratuwa, Sri Lanka)*; Samarasinghe, Asanka Kosala *(University of Moratuwa)*; Samaratunga, Pawan Supul *(University of Moratuwa)*; Peiris, Roshan Lalintha *(Rochester Institute of Technology)*; De Silva, Anjula *(University of Moratuwa)*

Federated Transfer Learning for EEG Signal Classification 3040-3045
Ju, Ce* *(WeBank Co., Ltd.)*; Gao, Dashan *(Hong Kong University of Science and Technology)*; Mane, Ravikiran *(Nanyang Technological University)*; Tan, Ben *(WeBank, China)*; Liu, Yang *(Webank)*; Guan, Cuntai *(Nanyang Technological University)*

Orthogonalizing the Activity of Two Neural Units for 2D Cursor Movement Control 3046-3049
Zheng, Qi *(Qiushi Academy for Advanced Studies of Zhejiang University)*; Zhang, Yiwei *(Qiushi Academy for Advanced Studies of Zhejiang University)*; Wan, Zijun *(Zhejiang University)*; Malik, Wasim Q. *(Massachusetts Institute of Technology)*; Chen, Weidong* *(Zhejiang University)*; Zhang, Shaomin *(Zhejiang University)*

Theme 06. Brain-Computer Interface – V (Oral Session)

Four-Way Classification of EEG Responses to Virtual Robot Navigation 3050-3053
Wirth, Christopher* *(University of Sheffield)*; Toth, Jake *(University of Sheffield)*; Arvaneh, Mahnaz *(University of Sheffield)*

Comparison of Pupil Size and Visual Evoked Potentials under 1-6Hz Visual Stimulation 3054-3057
Jiang, Lu *(Institute of Semiconductors, Chinese Academy of Sciences)*; Li, Xiaoyang *(Tsinghua Univ.)*; Wang, Yijun* *(Institute of Semiconductors, Chinese Academy of Sciences)*; Pei, Weihua *(Institute of Semiconductors, CAS)*; Gao, Xiaorong *(Tsinghua Univ.)*; Chen, Hongda *(Institute of Semiconductors, CAS)*

Evaluation of Motor Imagery-Based BCI Methods in Neurorehabilitation of Parkinson's Disease Patients ... 3058-3061
Miladinović, Aleksandar* *(University of Trieste)*; Ajčević, Miloš *(University of Trieste)*; Busan, Pierpaolo *(University of Trieste)*; Jarmolowska, Joanna *(University of Trieste)*; Silveri, Giulia *(University of Trieste)*; Deodato, Manuela *(University of Trieste)*; Mezzarobba, Susanna *(University of Trieste)*; Battaglini, Piero Paolo *(University of Trieste)*; Accardo, Agostino *(University of Trieste)*

Prediction of Motor Imagery Performance based on Pre-Trial Spatio-Spectral Alertness Features 3062-3065
Torkamani-Azar, Mastaneh *(Sabanci University)*; Jafarifarmand, Aysa* *(Sabanci University)*; Cetin, Mujdat *(University of Rochester)*

Thermal Analysis of a Skull Implant in Brain-Computer Interfaces 3066-3069
Serrano-Amenos, Claudia* *(University of California, Irvine)*; Hu, Frank *(University of California, Irvine)*; Wang, Po T. *(University of California Irvine)*; Kellis, Spencer *(California Institute of Technology)*; Andersen, Richard *(California Institute of Technology)*; Liu, Charles Y. *(Keck Hospital of the University of Southern California)*; Heydari, Payam *(University of California Irvine)*; Do, An H. *(University of California Irvine)*; Nenadic, Zoran *(University of California Irvine)*

Theme 06. Brain-Computer Interface – VI (Oral Session)

Statistically Optimized Spatial Filtering in Decoding Steady-State Visual Evoked Potentials based on Task-Related Component Analysis 3070-3073
Chiang, Kuan-Jung* *(University of California San Diego)*; Nakanishi, Masaki *(University of California San Diego)*; Jung, Tzyy-Ping *(University of California San Diego)*

Classification of Auditory Attention Focuses during Speech Perception 3074-3077
Yu, Haiqing* *(Tianjin University)*; Xu, Minpeng *(Tianjin University)*; Meng, Jiayuan *(Tianjin University)*; Ma, Zhen *(Tianjin University)*; Ming, Dong *(Tianjin University)*

Estimating Neural Modulation via Adaptive Point Process Method in Brain-Machine Interface 3078-3081
Chen, Shuhang *(Hong Kong Univ. of Science and Technology)*; Zhang, Xiang *(The Hong Kong Univ. of Science and Technology)*; Shen, Xiang *(Hong Kong Univ. of Science and Technology)*; Huang, Yifan *(Hong Kong Univ. of Science and Technology)*; Wang, Yiwen* *(Hong Kong Univ. of Science and Technology)*

A Prototype of a Fully-Implantable Charge-Balanced Artificial Sensory Stimulator for Bi-Directional Brain-Computer-Interface (BD-BCI) 3082-3085
Sohn, Won Joon* *(University of California Irvine)*; Wang, Po T. *(University of California Irvine)*; Kellis, Spencer *(California Institute of Technology)*; Andersen, Richard *(California Institute of Technology)*; Liu, Charles Y. *(Keck Hospital of the University of Southern California)*; Heydari, Payam *(University of California Irvine)*; Nenadic, Zoran *(University of California Irvine)*; Do, An H. *(University of California Irvine)*

Covariant Cluster Transfer for Kernel Reinforcement Learning in Brain-Machine Interface 3086-3089
Zhang, Xiang *(The Hong Kong University of Science and Technology)*; Wang, Yiwen* *(Hong Kong University of Science and Technology)*

A Brain-Computer Interface based on High-Frequency Steady-State Asymmetric Visual Evoked Potential . 3090-3093
Yue, Liang* *(Tianjin University)*; Xiao, Xiaolin *(Tianjin University)*; Xu, Minpeng *(Tianjin University)*; Chen, Long *(Tianjin University)*; Ming, Dong *(Tianjin University)*; Wang, Yijun *(Institute of Semiconductors, Chinese Academy of Sciences)*; Jung, Tzyy-Ping *(University of California San Diego)*

Theme 06. EMG Processing – I (Oral Session)

Continuous Human Gait Tracking using sEMG Signals 3094-3097
Xiong, Dezhen *(Chinese Academy of Sciences (CAS))*; Zhang, Daohui *(Shenyang Institute of Automation, Chinese Academy of Sciences)*; Zhao, Xingang* *(the State Key Laboratory of Robotics, Shenyang Institute of Autom)*; Zhao, Yiwen *(Shenyang Institute of Automation (SIA), Chinese Academy of Scien)*

Robust Simultaneous and Proportional Myoelectric Control Scheme for Individuals with Transradial Amputations 3098-3101
Pradhan, Ashirbad* *(Univ. of Waterloo)*; Kuruganti, Usha *(Univ. of New Brunswick)*; Hill, Wendy *(Institute of Biomedical Engineering, UNB)*; Jiang, Ning *(Univ. of Waterloo)*; Chester, Victoria *(Univ. of New Brunswick)*

The Effects of Channel Number on Classification Performance for sEMG-Based Speech Recognition ... 3102-3105
Wang, Xiaochen *(The CAS Key Laboratory of Human-Machine Intelligence-Synergy System)*; Zhu, Mingxing *(ShenZhen Institutes of Advanced Technology Chinese Academy of Science)*; Cui, Han *(Shenzhen Institute of Advanced Technology, Chinese Academy of Science)*; Yang, Zijian *(Shenzhen Institutes of Advanced Technology, Chinese Academ)*; Wang, Xin *(Shenzhen Institutes of Advanced Technology, Chinese Academy of Science)*; Zhang, Haoshi *(Shenzhen Institutes of Advanced Technology)*; Wang, Cheng *(Shenzhen Institutes of Advanced Technology, Chinese Academy of Science)*; Deng, Hanjie *(The CAS Key Laboratory of Human-Machine Intelligence-Synergy System)*; Chen, Shixiong* *(Shenzhen Institutes of Advanced Technology)*; Li, Guanglin *(Shenzhen Institutes of Advanced Technology)*

Relevance of Spectral Peaks in Electromyographic Recordings during Force-Modulated Vibration Exercise 3106-3109
Xu, Yaodan *(ShanghaiTech)*; Xu, Lin* *(ShanghaiTech University)*; Long, Xi *(Eindhoven University of Technology and Philips Research)*; Mischi, Massimo *(Eindhoven University of Technology)*

Modeling Muscle Synergies as a Gaussian Process: Estimating Unmeasured Muscle Excitations using a Measured Subset 3110-3113
Gurchiek, Reed* *(University of Vermont)*; Ursiny, Anna *(University of Vermont)*; McGinnis, Ryan S. *(University of Vermont)*

Multidimensional Recurrence Quantification Analysis of Multi-Muscle Synergy in Elderly during Standing on Slopes 3114-3117
Li, Jinping *(Shandong University)*; Wei, Na *(Qilu Hospital, Shandong University)*; Yue, Shouwei *(Dept. of Physical Medicine and Rehabilitation, Qilu Hospita)*; Li, Ke* *(Shandong University)*

Theme 06. EMG Processing – II (Oral Session)

Does the Variance of Surface EMG Signals during Isometric Contractions Follow an Inverse Gamma Distribution? 3118-3121
Furui, Akira* *(Hiroshima University)*; Tsuji, Toshio *(Hiroshima University)*

Simplified Optimal Estimation of Time-Varying Electromyogram Standard Deviation (EMGσ) 3122-3125
Rajotte, Kiriaki* *(Worcester Polytechnic Institute)*; Wang, He *(Worcester Polytechnic Institute)*; Wang, Haopeng *(Worcester Polytechnic Institute)*; Dai, Chenyun *(Fudan University)*; Zhu, Ziling *(Worcester Polytechnic Institute)*; Huang, Xinming *(Worcester Polytechnic Institute)*; Clancy, Edward A. *(Worcester Polytechnic Institute)*

Real-Time Finger Force Prediction via Parallel Convolutional Neural Networks: A Preliminary Study 3126-3129
Xu, Feng *(University of North Carolina at Chapel Hill)*; Zheng, Yang *(UNC at Chapel Hill)*; Hu, Xiaogang* *(University of North Carolina-Chapel Hill)*

Dexterous Force Estimation during Finger Flexion and Extension using Motor Unit Discharge Information 3130-3133
Zheng, Yang *(UNC at Chapel Hill)*; Hu, Xiaogang* *(University of North Carolina-Chapel Hill)*

Estimating Individual and Combined Fingertip Forces from Forearm EMG during Constant-Pose, Force-Varying Tasks 3134-3137
Bardizbanian, Berj *(Worcester Polytechnic Institute)*; Keating, Jennifer *(Worcester Polytechnic Institute)*; Huang, Xinming *(Worcester Polytechnic Institute)*; Clancy, Edward A.* *(Worcester Polytechnic Institute)*

Muscle Fatigue Evaluation with EMG and Acceleration Data: A Case Study 3138-3141
Barsotti, Annalisa* *(Khalifa University)*; Khalaf, Kinda *(KUSTAR)*; Gan, Dongming *(Khalifa University of Science, Technology and Research)*

Theme 06. Human Performance – Gait (Oral Session)

Complementing Clinical Gait Assessments of Spinal Cord Injured Individuals using Wearable Movement Sensors 3142-3145
Werner, Charlotte* *(Spinal Cord Injury Center, Balgrist University Hospital)*; Schneider, Sophie *(University Hospital Balgrist)*; Gassert, Roger *(ETH Zurich)*; Curt, Armin *(Spinal Cord Injury Centre, Balgrist University Hospital)*; Demkó, László *(University Hospital Balgrist)*

3D Gait Tracking by Acoustic Doppler Effects 3146-3149
Chiang, Ting-Hui* *(Feng Chia University)*; Su, Yi-Juan *(National Chiao Tung University)*; Shiu, Huan-Ruei *(Gunitech Corp.)*; Tseng, Yu-Chee *(National Chiao Tung University)*

Effect of Varying Soft Actuator Band Positions of a Wearable Assist Device on Gait Simulation of Lower Limb Muscle Force 3150-3153
Yamamoto, Masataka* *(Hiroshima University)*; Nakatani, Tomoki *(Takarazuka Rehabilitation Hospital)*; Shimatani, Koji *(Prefectural University of Hiroshima)*; Hasegawa, Masaki *(Faculty of Health and Welfare, Prefectural University of Hiroshi)*; Kurita, Yuichi *(Hiroshima University)*

A Cluster-Based Model using Functional Methods Requires Less Operator Experience for Reliable Gait Analysis: A Preliminary Study of Intra and Inter-Assessor Reliability 3154-3157
Meng, Lin* *(Tianjin University)*; Millar, Lindsay *(University of Strathclyde)*; Childs, Craig *(University of Strathclyde)*; Buis, Arjan *(University of Strathclyde)*

Differentiating between Parkinson's Disease Patients and Controls using Variability in Muscle Activation during Walking 3158-3161
Manjeri Keloth, Sana* *(RMIT)*; Radcliffe, Pj *(RMIT University)*; Raghav, Sanjay *(RMIT University)*; Poosapadi Arjunan, Sridhar *(SRM Institute of Science and Technology)*; Kant Kumar, Dinesh *(RMIT University)*

The Effect of Discrete Visual Perturbations on Balance Control during Gait 3162-3165
Riem, Lara* *(Marquette)*; Schmit, Brian D. *(Marquette University)*; Beardsley, Scott *(Marquette University)*

Theme 06. Human Performance – I (Oral Session)

Characterizing Functional Upper Extremity Movement in Haptic Virtual Environments 3166-3169
Jackson, Kyle* *(George Mason University)*; Duric, Zoran *(George Mason University)*; Engdahl, Susannah *(George Mason University)*; Gerber, Lynn *(George Mason University)*

Olfactory-Induced Positive Affect and Autonomous Response as a Function of Hedonic and Intensity Attributes of Fragrances 3170-3173
Seet, Manuel *(NUS)*; Amin, Md. Rafiul *(University of Houston)*; Abbasi, Nida Itrat *(National University of Singapore)*; Hamano, Junji *(Procter and Gamble)*; Chaudhury, Anumita *(Procter and Gamble)*; Bezerianos, Anastasios *(National University of Singapore)*; Faghih, Rose T. *(University of Houston)*; Thakor, Nitish *(National University of Singapore)*; Dragomir, Andrei* *(National University of Singapore)*

Importance of Wrist Movement Direction in Performing Activities of Daily Living Efficiently 3174-3177
Moser, Nicholas *(Technical University of Munich)*; O'Malley, Marcia K.* *(Rice University)*; Erwin, Andrew *(Jet Propulsion Laboratory)*

Learning-Aided User Intent Estimation for Smart Rollators 3178-3183
Yeaser, Abdullah* *(University of Waterloo)*; Tung, James Yungjen *(University of Waterloo)*; Huissoon, Jan *(University of Waterloo)*; Hashemi, Ehsan *(University of Waterloo)*

Neurocoaching: Exploring the Relationship between Coach and Coachee by Means of Bioelectrical Signal Similarities 3184-3187
Gabrielli, Giorgio *(Università IULM)*; Bilucaglia, Marco* *(Behavior and Brain Lab - Università IULM)*; Zito, Margherita *(Università IULM)*; Laureanti, Rita *(Politecnico di Milano)*; Caponetto, Alessia *(Università IULM)*; Circi, Riccardo *(Behavior and Brain Lab - Università IULM)*; Fici, Alessandro *(Behavior and Brain Lab - Università IULM)*; Rivetti, Fiamma *(Behavior and Brain Lab - Università IULM)*; Valesi, Riccardo *(Behavior and Brain Lab - Università IULM)*; Galanto, Annarita *(Professional coach)*; Senoner, Georg *(Sysmacon S.a.s.)*; Russo, Vincenzo *(IULM University of Milan)*

Adaptive Brain-Computer Interface with Attention Alterations in Patients with Amyotrophic Lateral Sclerosis 3188-3191
Aliakbaryhosseinabadi, Susan* *(The Center for Sensory-Motor Interaction, Dept. of Health Science)*; Mrachacz-Kersting, Natalie *(Dept. of Information Technology, University of Applied Scie)*

Theme 06. Human Performance – II (Oral Session)

Development and Evaluation of a New Virtual Reality-Based Audio-Tactile Cueing-System to Guide Visuo-Spatial Attention 3192-3195
Knobel, Samuel Elia Johannes* *(ARTORG Center, Gerontechnology and Rehabilitation Group, University)*; Gyger, Nathan Thibault *(Gerontechnology and Rehabilitation Group, University of Bern)*; Nyffeler, Thomas *(Neurology and Neurorehabilitation Center, Luzerner Kantonsspital)*; Cazzoli, Dario *(University of Bern, ARTORG Center, GER Group)*; Müri, René *(Gerontechnology and Rehabilitation Group, University Hospital of)*; Nef, Tobias *(Gerontechnology and Rehabilitation, ARTORG Center for Bioemedical)*

Neural Correlates of Attention Lapses during Continuous Tasks 3196-3199
Zaky, Mohamed* *(New Zealand Brain Research Institute)*; Shoorangiz, Reza *(University of Canterbury)*; Poudel, Govinda *(The University of Sydney)*; Yang, Le *(University of Canterbury)*; Jones, Richard D. *(New Zealand Brain Research Institute)*

An fNIRS Study on the Effect of Music Style on Cognitive Activities 3200-3203
Zheng, Mingjian *(Southern University of science and technology)*; Lin, Han *(Nanjing Audit University)*; Chen, Fei* *(Southern University of Science and Technology)*

Dual-Task Gait Assessment and Machine Learning for Early-Detection of Cognitive Decline 3204-3207
Boettcher, Lillian N. *(Florida Atlantic University)*; Hssayeni, Murtadha *(Florida Atlantic University)*; Rosenfeld, Amie *(University of Miami)*; Tolea, Magdalena I. *(University of Miami)*; Galvin, James E. *(University of Miami)*; Ghoraani, Behnaz* *(Florida Atlantic University)*

Statistical Analysis of Brain Connectivity Estimators during Distracted Driving 3208-3211
Perera, A.G.T.Dulan* *(Swinburne University of Technology)*; Wang, Yu-Kai *(University of Technology Sydney)*; Lin, Chin-Teng *(National Chiao-Tung University)*; Zheng, Jinchuan *(Swinburne University of Technology)*; Nguyen, Hung T. *(Swinburne University of Technology)*; Chai, Rifai *(Swinburne University of Technology)*

Assessment of Driving Skills of a Mobility Scooter using Driving Operation Logs 3212-3215
Momma, Hiroshi *(Kyorin University)*; Suzurikawa, Jun* *(Research Institute of National Rehabilitation Center for Persons)*; Takeshima, Rie *(Teikyo University of Science)*; Sawada, Yuki *(Teikyo University of Science)*; Harada, Yusuke *(Kyorin University)*; Kondo, Tomoko *(Kyorin University Dept. of Occupational Therapy)*

Theme 06. Human Performance – III (Oral Session)

Task-Irrelevant Auditory Event-Related Potentials as Mental Workload Indicators: A Between-Task Comparison Study 3216-3219
Xu, Jinzhao *(Tianjin University)*; Ke, Yufeng* *(Tianjin University)*; Liu, Shuang *(Tianjin University)*; Song, Xizi *(Tianjin University)*; Xu, Cheng *(Science and Technology on Complex System Control and Intelligent)*; Zhou, Guchuan *(Science and Technology on Complex System Control and Intelligent)*; Ming, Dong *(Tianjin University)*

Investigating the Effect of Fatigue on Muscle Microvasculature Blood Flow during Intermittent Isometric Contraction 3220-3223
Nugent, Nicole* *(Rochester Institute of Technology)*; Majeski, Joseph *(University of Rochester)*; Choe, Regine *(University of Rochester)*; Rashedi, Ehsan *(Rochester Institute of Technology)*

Alterations in Cortical Activity Due to Robotic Gait Training in Traumatic Brain Injury 3224-3227
Karunakaran, Kiran* *(NJIT, Kessler Foundation)*; Nisenson, Danielle *(Montclair State University)*; Nolan, Karen J. *(Kessler Foundation)*

Generalizability of Hand-Object Interaction Detection in Egocentric Video across Populations with Hand Impairment 3228-3231
Tsai, Meng-Fen* *(University of Toronto)*; Wang, Rosalie H. *(University of Toronto)*; Zariffa, Jose *(Toronto Rehabilitation Institute)*

Altered Proprioceptive Feedback Influences Movement Kinematics in a Lifting Task 3232-3235
Pinardi, Mattia* *(Campus Bio-Medico University of Rome)*; Raiano, Luigi *(Unit of Biomedical Robotics and Biomicrosystems, Dept. of E)*; Formica, Domenico *(Campus Bio-Medico University)*; Di Pino, Giovanni *(Campus Biomedico University)*

Validation of a Convolutional Neural Network Model for Spike Transformation using a Generalized Linear Model 3236-3239
Moore, Bryan* *(University of Southern California)*; Berger, Theodore *(USC)*; Song, Dong *(University of Southern California)*

Theme 06. Human Performance – IV (Oral Session)

Lateralization and Model Transference in a Bilateral Cursor Task 3240-3243
Burns, Martin *(Stevens Institute of Technology)*; Stika, Julia *(Stevens Institute of Technology)*; Patel, Vrajeshri *(Stevens Institute of Technology)*; Pei, Dingyi *(Stevens Institute of Technology)*; Nataraj, Raviraj *(Case Western Reserve University)*; Vinjamuri, Ramana* *(Stevens Institute of Technology)*

A Virtual Reality Platform for Multisensory Integration Studies 3244-3247
Noccaro, Alessia *(Università Campus Bio-Medico di Roma)*; Pinardi, Mattia* *(Campus Bio-Medico University of Rome)*; Formica, Domenico *(Campus Bio-Medico University)*; Di Pino, Giovanni *(Campus Biomedico University)*

Manipulating The Body Representation: Assessment of a Novel Platform 3248-3251
Le Jeune, François* *(Università Campus Bio-Medico di Roma)*; D'Alonzo, Marco *(Università Campus Biomedico di Roma)*; Noccaro, Alessia *(Università Campus Bio-Medico di Roma)*; Raiano, Luigi *(Unit of Biomedical Robotics and Biomicrosystems, Dept. of E)*; Formica, Domenico *(Campus Bio-Medico University)*; Di Pino, Giovanni *(Campus Biomedico University)*

A Novel Wearable and Wireless Device to Investigate Perception in Interactive Scenarios 3252-3255
Schiatti, Lucia* *(Istituto Italiano di Tecnologia)*; Cappagli, Giulia *(Istituto Italiano di Tecnologia)*; Martolini, Chiara *(Istituto Italiano di Tecnologia)*; Maviglia, Antonio *(Electronic Design Laboratory, Istituto Italiano di Tecnologia)*; Signorini, Sabrina *(Center of Child Neuro-Ophthalmology, IRCCS Mondino Foundation)*; Gori, Monica *(Istituto Italiano di Tecnologia)*; Crepaldi, Marco *(Electronic Design Laboratory, Istituto Italiano di Tecnologia)*

Relationship between DTI Brain Connectivity and Functional Performance in Individuals with Traumatic Brain Injury 3256-3259
Alivar, Alaleh *(Kessler Foundation & Rurgers New Jersey Medical School)*; Glassen, Michael *(Kessler Foundation)*; Hoxha, Armand *(Kessler Foundation)*; Allexandre, Didier *(Kessler Foundation)*; Yue, Guang *(Kessler Foundation)*; Saleh, Soha* *(Kessler Foundation)*

An ERP Study on the Auditory Stream Segregation in Cochlear Implant Simulations: Effects of Frequency Separation and Time Interval 3260-3263
Xu, Danying *(Southern University of Science and Technology)*; Zhu, Shufeng *(Hangzhou Ren-ai Hearing Rehabilitation Research Centre)*; Zheng, Dingchang *(Coventry University)*; Chen, Fei* *(Southern University of Science and Technology)*

Theme 06. Motor Learning (Oral Session)

Comparison of Feedback Approaches to Improve Training in Partial Weight-Bearing 3264-3268
Smith, Ian* *(University of New Brunswick)*; Gill, Satinder *(Hunter Holmes McGuire VA Medical Center)*; Bateman, Scott *(University of New Brunswick)*; Scheme, Erik *(University of New Brunswick)*

Construction of Multiplex Muscle Network for Precision Pinch Force Control 3269-3272
Lv, Yadong *(Shandong University)*; Wei, Na *(Qilu Hospital, Shandong University)*; Li, Ke* *(Shandong University)*

Right Temporal Oscillations of Infants in Relation to Contingent Learning 3273-3276
Guo, Xiaoyu *(City University of Hong Kong)*; Zhang, Janet *(The Hong Kong Polytechnic University)*; Cheung, Roy T. H. *(The Hong Kong Polytechnic University)*; Chan, Rosa H. M.* *(City University of Hong Kong)*; Chen, Chao-Ying *(The Hong Kong Polytechnic University)*

Intramuscular EMG for Abstract Myoelectric Control: A Proof of Concept Study 3277-3280
Dupan, Sigrid* *(Newcastle University)*; Krasoulis, Agamemnon *(Newcastle University)*; Nazarpour, Kianoush *(Newcastle University)*

A Wearable Vibrotactile Biofeedback System Targeting Gait Symmetry of Lower-Limb Prosthetic Users 3281-3284
Escamilla-Nunez, Rafael* *(University of Toronto)*; Michelini, Alexandria *(University of Toronto)*; Andrysek, Jan *(University of Toronto)*

Theme 06. Motor Neuroprostheses – I (Oral Session)

A Muscle Synergy Framework for Cross-Limb Reconstruction of Hand Muscle Activity Distal to a Virtual Wrist-Level Disarticulation 3285-3288
Jacobs-Skolik, Spencer Lake* *(Northeastern University)*; Liang, Don *(Northeastern University)*; Brooks, Dana *(Northeastern University)*; Erdogmus, Deniz *(Northeastern University)*; Yarossi, Mathew *(Northeastern University)*; Tunik, Eugene *(Northeastern University)*

High Throughput Ultrasonic Multi-Implant Readout using a Machine-Learning Assisted CDMA Receiver 3289-3292
Faraji Alamouti, Sina* *(Univ. of California, Berkeley)*; Ghanbari, Mohammad Meraj *(Univ. of California, Berkeley)*; Ersumo, Nathan Tessema *(Univ. of California, Berkeley)*; Muller, Rikky *(Univ. of California at Berkeley)*

Comparing Spatially Distributed and Single Electrode Stimulation on Individuals with Spinal Cord Injury ... 3293-3296
De Macêdo Pinheiro, Lucas* *(University of Brasília)*; Cardoso de Sousa, Ana Carolina *(University of Brasília)*; Padilha Lanari Bó, Antônio *(The University of Queensland)*

Bilaterally Mirrored Movements Improve the Accuracy and Precision of Training Data for Supervised Learning of Neural or Myoelectric Prosthetic Control 3297-3301
George, Jacob A.* *(University of Utah)*; Tully, Troy Nelson *(University of Utah)*; Colgan, Paul *(University of Utah)*; Clark, Gregory *(University of Utah)*

EMG-Based Hand Gesture Classification with Long Short-Term Memory Deep Recurrent Neural Networks .. 3302-3305
Jabbari, Milad *(Newcastle University Upon Tyne)*; Khushaba, Rami N. *(University of Technology, Sydney (UTS))*; Nazarpour, Kianoush* *(Newcastle University)*

Robustness of Muscle Synergies under Variant Muscle Contraction Force during Forearm Movements 3306-3309
Deng, Hanjie *(The CAS Key Laboratory of Human-Machine Intelligence-Synergy System)*; Cheung, Vincent CK *(The Chinese University of Hong Kong)*; Geng, Yanjuan* *(Shenzhen Institutes of Advanced Technology)*; Asogbon, Mojisola Grace *(Shenzhen Institutes of Advanced Technology, Chinese Academy of Science)*; Samuel, Oluwarotimi Williams *(Shenzhen Institutes of Advanced Technology)*; Li, Guanglin *(Shenzhen Institutes of Advanced Technology)*

A Paediatric 3D-Printed Soft Robotic Hand Prosthesis for Children with Upper Limb Loss 3310-3313
Mohammadi, Alireza* *(The Univ. of Melbourne)*; Lavranos, Jim *(Caulfield Hospital)*; Tan, Ying *(The Univ. of Melbourne)*; Choong, Peter *(The Univ. of Melbourne)*; Oetomo, Denny *(The Univ. of Melbourne)*

Theme 06. Neural and Rehabilitation – I (Oral Session)

Cortical Characterization of Reverberation Time in Reverberant Speech 3314-3317
Luo, Chengpin *(Southern Univ. of Science and Technology)*; Pan, Changjie *(Southern Univ. of Science and Technology)*; Zheng, Dingchang *(Coventry Univ.)*; Chen, Fei* *(Southern Univ. of Science and Technology)*

The RT-Chair: A Novel Motion Simulator to Measure Vestibular Perception 3318-3322
Cuturi, Luigi F.* *(Istituto Italiano di Tecnologia)*; Torazza, Diego *(Istituto Italiano di Tecnologia)*; Campus, Claudio *(Istituto Italiano di Tecnologia)*; Merello, Andrea *(Istituto Italiano di Tecnologia)*; Lorini, Claudio *(Istituto Italiano di Tecnologia)*; Crepaldi, Marco *(Electronic Design Laboratory, Istituto Italiano di Tecnologia)*; Sandini, Giulio *(Istituto Italiano di Tecnologia)*; Gori, Monica *(Istituto Italiano di Tecnologia)*

The use of Handheld Marker to Calibrate a Field-Programmable Gate Array based Eye Tracker for Artificial Vision System 3323-3326
Caspi, Avi* *(Jerusalem College of Technology)*; Roy, Arup *(Second Sight Medical Products, Inc.)*; Barry, Michael P. *(Second Sight Medical Products, Inc.)*; Sadeghi, Roksana *(Johns Hopkins University)*; Kartha, Arathy *(Johns Hopkins University)*; Dagnelie, Gislin *(Johns Hopkins Univ)*

Crosswalk Guidance System for the Blind 3327-3330
Hojun Son, Hojun* *(University)*; Krishnagiri, Divya *(Ohio State University)*; Jeganathan, V.Swetha *(University of Michigan)*; Weiland, James *(University of Michigan)*

An Improved in Vitro Blood-Brain Barrier Model for Applications in Therapeutics' Delivery to Brain 3331-3334
Kuo, Chung-Fan *(University of Houston)*; Majd, Sheereen* *(University of Houston)*

Classification of Electroencephalogram in a Mouse Model of Traumatic Brain Injury using Machine Learning Approaches 3335-3338
Vishwanath, Manoj *(University of California, Irvine)*; Jafarlou, Salar *(University of Texas at Dallas)*; Shin, Ikhwan *(University of California, Irvine)*; Dutt, Nikil *(UC Irvine)*; Rahmani, Amir M. *(Dept. of Computer Science, University of California Irvine,)*; Lim, Miranda *(VA Portland Health Care System, Oregon Health & Science University)*; Cao, Hung* *(University of California, Irvine)*

Theme 06. Neural and Rehabilitation – II (Oral Session)

Assessment of EMG Benchmark Data for Gesture Recognition using the NinaPro Database 3339-3342
Chang, Jason* *(University of New Brunswick)*; Phinyomark, Angkoon *(University of New Brunswick)*; Scheme, Erik *(University of New Brunswick)*

Investigation of Brain-Heart Network during Sleep 3343-3346
Yang, Juan *(Sun Yat-Sen University)*; Pan, Yu *(Sun Yat-sen University)*; Luo, Yu-Xi* *(Sun Yat-Sen University)*

Contributions of Vision in Human Postural Control: A Virtual Reality-Based Study 3347-3350
Mohebbi, Abolfazl* *(Polytechnique Montreal)*; Amiri, Pouya *(PhD Candidate, Dept. of Biomedical Engineering, McGill Univ)*; Kearney, Robert Edward *(McGill University)*

Reinforcement Learning based Decoding using Internal Reward for Time Delayed Task in Brain Machine Interfaces 3351-3354
Shen, Xiang *(Hong Kong Univ. of Science and Technology)*; Zhang, Xiang *(The Hong Kong Univ. of Science and Technology)*; Chen, Shuhang *(Hong Kong Univ. of Science and Technology)*; Huang, Yifan *(Hong Kong Univ. of Science and Technology)*; Wang, Yiwen* *(Hong Kong Univ. of Science and Technology)*

Intracortical Microstimulation Feedback Improves Grasp Force Accuracy in a Human using a Brain-Computer Interface 3355-3358
Quick, Kristin* *(University of Pittsburgh)*; Weiss, Jeffrey *(University of Pittsburgh)*; Clemente, Francesco *(Scuola Superiore Sant'Anna)*; Gaunt, Robert *(University of Pittsburgh)*; Collinger, Jennifer *(University of Pittsburgh)*

Enhancing Performance of SSVEP-Based BCI by Unsupervised Learning Information from Test Trials . 3359-3362
Wang, Lijie* *(Tianjin University)*; Xu, Minpeng *(Tianjin University)*; Mei, Jie *(Tianjin University)*; Han, Jin *(Tianjin University)*; Wang, Yijun *(Institute of Semiconductors, Chinese Academy of Sciences)*; Jung, Tzyy-Ping *(University of California San Diego)*; Ming, Dong *(Tianjin University)*

Theme 06. Neural Interfaces – I (Oral Session)

Prediction of Memory Retrieval Performance using Ear-EEG Signals 3363-3366
Kalafatovich Espinoza, Jenifer *(Korea Univ.)*; Lee, Minji *(Korea Univ.)*; Lee, Seong-Whan* *(Korea Univ.)*

Artefact-Free Recording of Local Field Potentials with Simultaneous Stimulation for Closed-Loop Deep-Brain Stimulation 3367-3370
Debarros, Jean* *(University of Oxford)*; Gaignon, Lea *(ISEN, France)*; He, Shenghong *(University of Oxford)*; Pogosyan, Alek *(University of Oxford)*; Benjaber, Moaad *(University of Oxford)*; Denison, Timothy *(University of Oxford)*; Brown, Peter *(Director of the Medical Research Council Brain Network Dynamics)*; Tan, Huiling *(University Research Lecturer in Nuffield Dept. of Clinical)*

Effects of Fractal Electrode Geometry on Charge Injection Capacity of TiN Microelectrodes 3371-3374
Park, Hyunsu *(Purdue University)*; Maples, Amanda *(Purdue University)*; Lee, Hyowon* *(Purdue University)*

A Compact Free-Floating Device for Passive Charge-Balanced Neural Stimulation using PEDOT/CNT Microelectrodes 3375-3378
Khalifa, Adam* *(Massachusetts General Hospital)*; Liu, Yuxin *(Stanford University)*; Bao, Zhenan *(Stanford University)*; Etienne-Cummings, Ralph *(Johns Hopkins University)*

One-Step Implantation of a 3D Neural Microelectrode Array 3379-3383
Yim, Sehyuk* *(Korea Institute of Science and Technology)*; Jeong, Jinwoo *(Sungkyunkwan University)*; Ihn, Yong Seok *(Korea Institute of Science and Technology)*; Hwang, Donghyun *(Korea Institute of Science and Technology)*; Yang, Sungwook *(Korea Institute of Science and Technology)*; Oh, Sang-Rok *(Korea Institute of Science and Technology)*; Kim, Keehoon *(Korea Institute of Science and Technology)*

Vagus Nerve Stimulation Unequally Disturbs Circadian Variation of Cardiac Rhythms in Male and Female Rats 3384-3387
Groff, Jordan *(FDA)*; Vasudevan, Srikanth *(Food and Drug Administration)*; Yaghouby, Farid* *(FDA)*

Theme 06. Neural Interfaces – II (Oral Session)

Customized Thinning of Silicon-Based Neural Probes down to 2 µm 3388-3392
Otte, Elisabeth* *(University of Freiburg)*; Cziumplik, Valerian *(University of Freiburg)*; Ruther, Patrick *(University of Freiburg)*; Paul, Oliver *(University of Freiburg)*

Responsiveness of Retinal Ganglion Cells through Frequency Modulation of Electrical Stimulation: A Computational Modeling Study 3393-3398
Paknahad, Javad* *(University of Southern California)*; Loizos, Kyle *(University of Southern California)*; Humayun, Mark *(University of Southern California)*; Lazzi, Gianluca *(University of Southern California)*

PDMS-Parylene Adhesion Improvement via Ceramic Interlayers to Strengthen the Encapsulation of Active Neural Implants 3399-3402
Bakhshaee, Nasim* *(Delft University of Technology (TU Delft))*; Dekker, Ronald *(TU Delft)*; Serdijn, Wouter A. *(Delft University of Technology)*; Giagka, Vasiliki *(Bioelectronics, TU Delft)*

A Miniature Wireless Silicon-on-Insulator Image Sensor for Brain Fluorescence Imaging 3403-3406
Zhang, Jie* *(MIT)*; Khalifa, Adam *(Massachusetts General Hospital)*; Spetalnick, Sam *(Johns Hopkins University)*; Alemohammad, Milad *(Johns Hopkins University)*; Rattray, John *(Johns Hopkins University)*; Thakur, Chetan Singh *(Indian Institute of Science, Bangalore)*; Eisape, Adebayo *(Johns Hopkins University)*; Etienne-Cummings, Ralph *(Johns Hopkins University)*

Selective Wireless Stimulation of Rat Sciatic Nerve 3407-3410
Frederick, Rebecca* *(The University of Texas at Dallas)*; Troyk, Philip *(Illinois Institute of Technology)*; Cogan, Stuart *(EIC Laboratories, Inc.)*

A High-Resolution Ultrasonically Powered and Controlled Optogenetic Stimulator with a Novel Fully Analog Time to Current Converter 3411-3414
Rashidi, Amin* *(Aarhus University)*; Hosseini, Seyedsina *(Aarhus University)*; Laursen, Kjeld *(Aarhus University)*; Moradi, Farshad *(Integrated Circuits and Electronics Laboratory, Dept. of En)*

Theme 06. Neural Interfaces – III (Oral Session)

Integrated Pico-Tesla Resolution Magnetoresistive Sensors for Miniaturised Magnetomyography 3415-3419
Zuo, Siming *(University of Glasgow)*; Nazarpour, Kianoush *(Newcastle University)*; Böhnert, Tim *(International Iberian Nanotechnology Laboratory)*; Paz, Elvira *(INL - International Iberian Nanotechnology Laboratory)*; Freitas, Paulo *(INL - International Iberian Nanotechnology Laboratory)*; Ferreira, Ricardo *(International Iberian Nanotechnology Laboratory)*; Heidari, Hadi* *(University of Glasgow)*

Towards a Portable Magnetoencephalography based Brain Computer Interface with Optically-Pumped Magnetometers 3420-3423
Paek, Andrew* *(University of Houston)*; Kilicarslan, Atilla *(University of Houston)*; Korenko, Branislav *(University of Colorado)*; Gerginov, Vladislav *(University of Colorado)*; Knappe, Svenja *(University of Colorado)*; Contreras-Vidal, José *(University of Houston)*

MAPSYNE: Miniaturized Micropipette System Combined with High-Density Microelectrode Arrays for Automated Manipulation of Neuronal Networks In-Vitro 3424-3427
Ricci, Chiara *(MaxWell Biosystems AG)*; Frey, Urs *(MaxWell Biosystems)*; Obien, Marie Engelene* *(MaxWell Biosystems)*

Model-Guided Design of Microelectrodes for HFO Recording 3428-3431
Al Harrach, Mariam* *(Université de Rennes 1)*; Mousavi, Hajar *(Mines Saint-Etienne, Dept. of Bioelectronics)*; Ismailova, Esma *(Mines Saint-Etienne, Dept. of Bioelectronics)*; Dieuset, Gabriel *(LTSI, Inserm UMR 1099, Rennes, France; University Rennes 1, Fran)*; Wendling, Fabrice *(INSERM - Université de Rennes 1)*

Evaluating Microelectrode Arrays in Peripheral Nerve using Micro Computed Tomography 3432-3435
Frederick, Rebecca* *(The University of Texas at Dallas)*; Margolis, Ryan *(University of Texas at Dallas)*; Hoyt, Kenneth *(University of Texas at Dallas)*; Cogan, Stuart *(EIC Laboratories, Inc.)*

Towards CMOS Bulk Sensing for In-Situ Evaluation of ALD Coatings for Millimeter Sized Implants 3436-3439
Nanbakhsh, Kambiz* *(Delft University of Technology)*; Ritasalo, Riina *(Picosun Oy)*; Serdijn, Wouter A. *(Delft University of Technology)*; Giagka, Vasiliki *(Bioelectronics, TU Delft)*

Theme 06. Neural Machine Learning (Oral Session)

Classifying Cross-Frequency Coupling Pattern in Epileptogenic Tissues by Convolutional Neural Network 3440-3443
Wang, Zeyu *(Shenyang University of Technology)*; Li, Chunsheng* *(Shenyang University of Technology)*

Impact of Encapsulation Tissue Growth on Selective Recording in Nerve Cuff Electrodes: A Simulation Study 3444-3447
Sammut, Stephen* *(University of Toronto)*; Koh, Ryan *(Toronto Rehabilitation Institute)*; Zariffa, Jose *(Toronto Rehabilitation Institute)*

Wearable EMG-Based Gesture Recognition Systems during Activities of Daily Living: An Exploratory Study 3448-3451
Chang, Jason* *(University of New Brunswick)*; Phinyomark, Angkoon *(University of New Brunswick)*; Bateman, Scott *(University of New Brunswick)*; Scheme, Erik *(University of New Brunswick)*

End-to-End Automatic Sleep Stage Classification using Spectral-Temporal Sleep Features 3452-3455
Kim, Hyeong-Jin *(Korea University)*; Lee, Minji *(Korea University)*; Lee, Seong-Whan* *(Korea University)*

Decoding Auditory Attention from Single-Trial EEG for a High-Efficiency Brain-Computer Interface 3456-3459
An, Wenkang* *(Carnegie Mellon University)*; Pei, Alexander *(Carnegie Mellon University)*; Noyce, Abigail *(Carnegie Mellon University)*; Shinn-Cunningham, Barbara *(Boston University)*

Electrophysiological Correlates of Brain Health Help Diagnose Epilepsy and Lateralize Seizure Focus . 3460-3464
Varatharajah, Yogatheesan* *(University of Illinois at Urbana Champaign)*; Berry, Brent Michael *(Mayo Clinic)*; Joseph, Boney *(Mayo Clinic)*; Balzekas, Irena *(Mayo Clinic)*; Kremen, Vaclav *(Czech Technical University in Prague)*; Brinkmann, Benjamin *(Mayo Foundation)*; Worrell, Gregory A. *(Mayo Clinic)*; Iyer, Ravishankar *(University of Illinois at Urbana-Champaign)*

Theme 06. Neural Signal Processing – I (Oral Session)

Motor Unit Filter Prelearning Strategies for Decomposition of Compound Muscle Action Potentials in High-Density Surface Electromyograms 3465-3468
Holobar, Ales* *(University of Maribor, Faculty of Electrical Engineering and Computer)*; Frančič, Alja *(University of Maribor)*

Time-Frequency Analysis of Electroencephalogram Signals in a Cognitive Decision-Making Task 3469-3472
Wang, Cheng *(Shenzhen Institutes of Advanced Technology, Chinese Academy of Science)*; Zhu, Mingxing *(ShenZhen Institutes of Advanced Technology Chinese Academy of Science)*; Wang, Xin *(Shenzhen Institutes of Advanced Technology, Chinese Academy of Science)*; Wang, Xiaochen *(The CAS Key Laboratory of Human-Machine Intelligence-Synergy System)*; Zhang, Haoshi *(Shenzhen Institutes of Advanced Technology)*; Deng, Hanjie *(The CAS Key Laboratory of Human-Machine Intelligence-Synergy System)*; Cui, Han *(Shenzhen Institute of Advanced Technology, Chinese Academy of Science)*; Chen, Shixiong* *(Shenzhen Institutes of Advanced Technology)*; Li, Guanglin *(Shenzhen Institutes of Advanced Technology)*

Intraindividual Characterization of the Sleep Spindle Variability in Healthy Subjects 3473-3476
Gomez-Pilar, Javier *(University of Valladolid, CIF: Q4718001C)*; Northoff, Georg *(Institute of Mental Health Research, University of Ottawa, Ottawa)*; Vaquerizo-Villar, Fernando *(Biomedical Engineering Group, University of Valladolid, CIF Q471)*; Poza, Jesus *(University of Valladolid)*; Gutierrez, Gonzalo Cesar *(University of Valladolid)*; Hornero, Roberto* *(University of Valladolid)*

The Effects of the Presence of Multiple Conduction Velocities in the Analysis of Electrically-Evoked Compound Action Potentials (eCAPs) 3477-3480
Taylor, John* *(University of Bath)*; Sadrafshari, Shamin *(University of Bath)*; Donaldson, Nicholas de Neufville *(University College London)*; Granger, Nicolas *(Royal Veterinary College)*; Prager, Jonathan *(Royal Veterinary College)*; Metcalfe, Benjamin William *(University of Bath)*

EEG Spectro-Temporal Amplitude Modulation as a Measurement of Cortical Hemodynamics: An EEG-fNIRS Study 3481-3484
Trambaiolli, Lucas* *(Harvard Medical School)*; Cassani, Raymundo *(Institut National de la Recherche Scientifique)*; Falk, Tiago *(Institut National de la Recherche Scientifique)*

Characterization of Microelectrode Recordings for the Subthalamic Nucleus Identification in Parkinson's Disease 3485-3488
Coelli, Stefania* *(Dept. of Electronics, Information and Bioengineering, Polit)*; Levi, Vincenzo *(Politecnico di Milano)*; Del Vecchio Del Vecchio, Jasmin *(Politecnico di Milano)*; Mailland, Enrico *(ASST Santi Paolo e Carlo Ospedale San Carlo Borromeo, Milano)*; Rinaldo, Sara *(IRCCS Istituto Neurologico Carlo Besta, Milano)*; Eleopra, Roberto *(Fondazione IRCCS Istituto Neurologico Carlo Besta, Milano)*; Bianchi, Anna Maria *(Politecnico di Milano)*

Theme 06. Neural Signal Processing – II (Oral Session)

Hardware and Power-Efficient Compression Technique based on Discrete Tchebichef Transform for Neural Recording Microsystems 3489-3492
Farsiani, Sirous *(K. N. Toosi University of Technology)*; Sodagar, Amir M.* *(York University)*

Pre-Whitening and Null Projection as an Artifact Suppression Method for Electrocorticography Stimulation in Bi-Directional Brain Computer Interfaces 3493-3496
Lim, Jeffrey* *(University of California, Irvine)*; Wang, Po T. *(University of California Irvine)*; Shaw, Susan J. *(University of Southern California)*; Armacost, Michelle *(Rancho Los Amigos National Rehabilitation Center)*; Gong, Hui *(University of Southern California)*; Liu, Charles Y. *(Keck Hospital of the University of Southern California)*; Do, An H. *(University of California Irvine)*; Heydari, Payam *(University of California Irvine)*; Nenadic, Zoran *(University of California Irvine)*

Automatic Myoelectric Control Site Detection using Candid Covariance-Free Incremental Principal Component Analysis 3497-3500
Stuttaford, Simon* *(Newcastle University)*; Krasoulis, Agamemnon *(Newcastle University)*; Dupan, Sigrid *(Newcastle University)*; Nazarpour, Kianoush *(Newcastle University)*; Dyson, Matthew *(Newcastle University)*

Torque Estimation using Neural Drive for a Concentric Contraction 3501-3504
Leahy, Logan* *(Massachusetts Institute of Technology)*; Bohannon, Addison *(U. S. Army Research Laboratory)*; Rangavajhala, Sirisha *(Draper)*; Tweedell, Andrew *(U. S. Army Research Laboratory)*; Hogan, Neville *(Massachusetts Institute of Technology)*; Bradford, J. Cortney *(U. S. Army Research Laboratory)*

Deep Canonical Correlation Analysis for Decoding the Auditory Brain 3505-3508
Katthi, Jaswanth Reddy* *(Indian Institute of Science, Bengaluru)*; Ganapathy, Sriram *(Indian Institute of Science, Banglore)*; Kothinti, Sandeep *(John Hopkins University, MD, Baltimore)*; Slaney, Malcolm *(Google)*

Temporal Dependency in Automatic Sleep Scoring via Deep Learning based Architectures: An Empirical Study 3509-3512
Fiorillo, Luigi* *(University of Bern)*; Wand, Michael *(SUPSI, IDSIA - Istituto Dalle Molle di Studi sull'Intelligenza A)*; Marino, Italo *(Bioengineering Dept., Politecnico di Milano)*; Favaro, Paolo *(Institute of Informatics, University of Bern)*; Faraci, Francesca *(1973)*

Theme 06. Neural Stimulation – I (Oral Session)

Spontaneous Feedforward Connectivity in Electrically Stimulated Retinal Degeneration Mice 3513-3516
Agadagba, Stephen Kugbere* *(City University of Hong Kong, HKSAR)*; Chan, Leanne LH *(City University of Hong Kong)*

Effects of Electrode Configurations and Injected Current Intensity on the Electrical Field of Transcranial Direct Current Stimulation: A Simulation Study 3517-3520
Mackenbach, Caroline *(Delft University of Technology)*; Tian, Runfeng *(Northwestern University)*; Yang, Yuan* *(Northwestern University)*

Local Field Potential Phase Modulates Neural Responses to Intracortical Electrical Stimulation 3521-3524
Allison-Walker, Tim* *(Monash University)*; Hagan, Maureen *(Monash University)*; Price, Nicholas Seow Chiang *(Monash University)*; Wong, Yan Tat *(Monash University)*

Three-Dimensional Map of Lumbar Spinal Cord Motor Function for Intraspinal Microstimulation in Rats 3525-3528
Tao, Chunling *(Nantong University)*; Shen, Xiaoyan* *(Nantong University)*; Ma, Lei *(Nantong University)*; Li, Zhiling *(Nantong University)*; Shen, Jiahuan *(Nantong University)*

Differential Responses to High-Frequency Electrical Stimulation in Brisk-Transient and Delta Retinal Ganglion Cells 3529-3532
Hadjinicolaou, Alex E.* *(Massachusetts General Hospital / Harvard Medical School)*; Werginz, Paul *(Vienna University of Technology)*; Lee, Jae-Ik *(Massachusetts General Hospital)*; Fried, Shelley *(Massachusetts General Hospital / Harvard Medical School)*

Response Profiles of Retinal Ganglion Cells to Sinusoidal Electric Stimulation Vary for Low vs. High Frequencies 3533-3536
Lee, Jae-Ik* *(Massachusetts General Hospital)*; Hadjinicolaou, Alex E. *(Massachusetts General Hospital / Harvard Medical School)*; Fried, Shelley *(Massachusetts General Hospital / Harvard Medical School)*

Theme 06. Neural Stimulation – II (Oral Session)

Temporally Interfering TMS: Focal and Dynamic Stimulation Location 3537-3543
Memarian Sorkhabi, Majid* *(University of Oxford)*; Wendt, Karen *(University of Oxford)*; Denison, Timothy *(University of Oxford)*

A Microfluidic System Integrated with Shape Memory Alloy Valves for a Safe Direct Current Delivery System 3544-3548
Cheng, Chaojun* *(Johns Hopkins University)*; Aplin, Felix *(Johns Hopkins University)*; Fridman, Gene *(Johns Hopkins University)*

Changes of Resting-State EEG Microstates Induced by Low-Frequency Repetitive Transcranial Magnetic Stimulation 3549-3552
Qiu, Shuang* *(Institute of Automation, Chinese Academy of Science)*; Wang, Shengpei *(Research Center for Brain-inspired Intelligence and National Lab)*; Yi, Weibo *(Beijing Machine and Equipment Institute)*; Zhang, Chuncheng *(Institute of Automation, Chinese Academy of Sciences)*; He, Huiguang *(Institute of Automation, Chinese Academy of Sciences)*

Effects of HD-tDCS Combined with Working Memory Training on Event-Related Potentials 3553-3556
Dong, Linlin *(Tianjin University)*; Ke, Yufeng* *(Tianjin University)*; Liu, Shuang *(Tianjin University)*; Song, Xizi *(Tianjin University)*; Ming, Dong *(Tianjin University)*

Cerebral Blood Microcirculation Measurement in APP/PS1 Double Transgenic Mice at the Preclinical Stage of Alzheimer's Disease: Preliminary Data on the Early Intervention of Anodal Transcranial Direct Current Stimulation 3557-3560
Luo, Yinpei *(Chonqqing University)*; Zhang, Li *(Chongqing University)*; Wu, Xiaoying *(Chongqing University)*; Hou, Wensheng *(Bioengineering Inst of Chongqing Univ)*; Chen, Lin *(Chongqing University)*; Tian, Xuelong *(Dept. of Bioengineering, Chongqing University)*; Wen, Huizhong* *(Army medical University)*

Effect of Long-Term Transcranial Direct Current Stimulation on Glx and GABA: A Pilot Study 3561-3564
Guan, Haonan *(Zhejiang University)*; Zheng, Yanyu *(Zhejiang University)*; Wang, Minmin *(Zhejiang University)*; Zhang, Yi *(Zhejiang University)*; Wang, Min *(Zhejiang University)*; Chen, Weidong* *(Zhejiang University)*; Zhang, Shaomin *(Zhejiang University)*

Theme 06. Neural Stimulation – III (Oral Session)

Validation of Numerical Simulation for Transcranial Direct Current Stimulation with Spherical Phantom ... 3565-3568
Wang, Minmin *(Zhejiang Univ.)*; Zheng, Yanyu *(Zhejiang Univ.)*; Guan, Haonan *(Zhejiang Univ.)*; Zhang, Jianmin *(Second Affiliated Hospital, School of Medicine, Zhejiang Univers)*; Zhang, Shaomin* *(Zhejiang Univ.)*

Referred Sensation Areas in a Bilateral Toes Amputee 3569-3572
Lontis, Eugen Romulus* *(Aalborg University)*; Yoshida, Ken *(Indiana University-Purdue University Indianapolis)*; Jensen, Winnie *(Center for Sensory-Motor Interaction)*

Modulation of Corticospinal Excitability by Two Different Somatosensory Stimulation Patterns; A Pilot Study 3573-3576
Faghani Jadidi, Armita* *(Dept. of Health Science and Technology, Aalborg University)*; Zarei, Ali Asghar *(Center for Neuroplasticity and Pain (CNAP), Aalborg University)*; Lontis, Eugen Romulus *(Aalborg University)*; Jensen, Winnie *(Center for Sensory-Motor Interaction)*

Effects of Transcutaneous Electric Nerve Stimulation on Upper Extremity Proprioceptive Function 3577-3580
Levitsky, Andrew *(Arizona State University)*; Klein, Josh *(Arizona State University)*; Artemiadis, Panagiotis *(University of Delaware)*; Buneo, Christopher* *(Arizona State University)*

Short-Wave Infrared Neural Stimulation Drives Graded Sciatic Nerve Activation across a Continuum of Wavelengths 3581-3585
Coventry, Brandon *(Purdue University)*; Sick, Justin *(Purdue University)*; Talavage, Thomas *(Purdue University)*; Stantz, Keith *(Purdue University)*; Bartlett, Edward* *(Purdue University)*

Effect of Closed-Loop Direct Electrical Stimulation during Sleep Spindles in Humans 3586-3589
Krempp, Constantin* *(Massachusetts General Hospital)*; Paulk, Angelique C *(Massachusetts General Hospital)*; Truccolo, Wilson *(Brown University)*; Cash, Sydney *(Massachusetts General Hospital)*; Zelmann, Rina *(Massachusetts General Hospital)*

Theme 06. Neural Stimulation – IV (Oral Session)

Phase-Dependent Stimulation for Modulating Phase-Amplitude Coupling: A Computational Modeling Approach 3590-3593
Salimpour, Yousef* *(Johns Hopkins School of Medicine)*; Nayak, Anish *(Johns Hopkins University)*; Naydanova, Elizaveta *(Johns Hopkins University)*; Kim, Min Jae *(Johns Hopkins University)*; Hwang, Brian Y. *(Johns Hopkins School of Medicine, Dept. of Neurosurgery)*; Mills, Kelly *(Johns Hopkins University)*; Kudela, Pawel *(Johns Hopkins University)*; Anderson, William S. *(Johns Hopkins School of Medicine, Dept. of Neurosurgery)*

Effect of HD-tDCS Combined with Working Memory Training on Brain Network 3594-3597
Liu, Mingliang *(Tianjin University)*; Ke, Yufeng* *(Tianjin University)*; Liu, Shuang *(Tianjin University)*; Song, Xizi *(Tianjin University)*; Ming, Dong *(Tianjin University)*

Towards Controlling Functionally-Distinct Retinal Ganglion Cells in Degenerate Retina 3598-3601
Muralidharan, Madhuvanthi* *(GSBME UNSW)*; Guo, Tianruo *(University of New South Wales)*; Shivdasani, Mohit N. *(University of New South Wales)*; Tsai, David *(Columbia University)*; Fried, Shelley *(Massachusetts General Hospital / Harvard Medical School)*; Cameron, Morven *(University of Western Sydney)*; Morley, John William *(University of Western Sydney)*; Dokos, Socrates *(University of New South Wales)*; Lovell, Nigel H. *(University of New South Wales)*

Closed-Loop DBS Triggered by Real-Time Movement and Tremor Decoding based on Thalamic LFPs for Essential Tremor 3602-3605
He, Shenghong* *(University of Oxford)*; Debarros, Jean *(University of Oxford)*; Khawaldeh, Saed *(University of Oxford)*; Pogosyan, Alek *(University of Oxford)*; Mostofi, Abteen *(University of London)*; Baig, Fahd *(University of Oxford)*; Pereira, Erlick *(Neurosurgery and Consultant Neurosurgeon St George's University)*; Brown, Peter *(Director of the Medical Research Council Brain Network Dynamics)*; Tan, Huiling *(University Research Lecturer in Nuffield Dept. of Clinical)*

Parametric Evaluation of Deep Brain Stimulation Parameter Configurations for Parkinson's Disease using a Conformal Wearable and Wireless Inertial Sensor System and Machine Learning 3606-3611
Mastroianni, Timothy* *(Independent)*; LeMoyne, Robert *(Northern Arizona University)*

Demonstration of Kinematic-Based Closed-Loop Deep Brain Stimulation for Mitigating Freezing of Gait in People with Parkinson's Disease 3612-3616
O'Day, Johanna* *(Stanford University)*; Kehnemouyi, Yasmine *(Stanford University)*; Petrucci, Matthew *(Stanford University)*; Anderson, Ross *(Stanford University)*; Herron, Jeffrey *(University of Washington)*; MSE, Helen Bronte-Stewart *(Stanford University)*

Theme 06. Neural Stimulation – V (Oral Session)

A Closed-Loop Deep Brain Stimulation Approach for Mitigating Burst Durations in People with Parkinson's Disease 3617-3620
Petrucci, Matthew* *(Stanford University)*; Anderson, Ross *(Stanford University)*; O'Day, Johanna *(Stanford University)*; Kehnemouyi, Yasmine *(Stanford University)*; Herron, Jeffrey *(University of Washington)*; MSE, Helen Bronte-Stewart *(Stanford University)*

Rebound Effect in Deep Brain Stimulation for Essential Tremor and Symptom Severity Estimation from Neural Data 3621-3624
Cooper, Sarah *(Univ. of Washington)*; Ferleger, Benjamin* *(Univ. of Washington)*; Ko, Andrew *(Univ. of Washington)*; Herron, Jeffrey *(Univ. of Washington)*; Chizeck, Howard *(Univ. of Washington)*

Amygdala Stimulation Leads to Functional Network Connectivity State Transitions in the Hippocampus 3625-3628
Eslampanah Sendi, Mohammad Sadegh *(Georgia Institute of Technology)*; Kanta, Vasiliki *(Emory Univ.)*; Inman, Cory *(corysinman@gmail.com)*; Manns, Joseph *(Emory Univ.)*; Hamann, Stephan *(Emory Univ.)*; Gross, Robert *(Emory Univ.)*; Willie, Jon *(Emory Univ.)*; Mahmoudi, Babak* *(Emory Univ.)*

Effect of Biophysical Model Complexity on Predictions of Volume of Tissue Activated (VTA) during Deep Brain Stimulation 3629-3633
Jiang, Fuchang* *(Northwestern University)*; Thanh Nguyen, Bach *(Northwestern University, Dept. of Radiology, Feinberg School)*; Elahi, Behzad *(Northwestern University, Dept. of Physical Therapy and Huma)*; Pilitsis, Julie *(Albany Medical College)*; Rad, Laleh Golestani *(Northwestern University)*

Novel Recessed Electrode Geometries to Minimize Tissue Damage with Directional Selectivity in Deep Brain Stimulation 3634-3637
Radhakrishnan, Shruthi *(The College of New Jersey)*; Ondar, Kyle *(The College of New Jersey)*; Wei, Xuefeng* *(The College of New Jersey)*

Evaluation of Frequency-Dependent Effects of Deep Brain Stimulation in a Cortex-Basal Ganglia-Thalamus Network Model of Parkinson's Disease 3638-3641
Romano, Marcelo* *(University of Campinas)*; Moioli, Renan *(Federal University of Rio Grande do Norte)*; Elias, Leonardo *(University of Campinas)*

Theme 06. Neurological Disorders – I (Oral Session)

Detecting and Quantifying Ataxia-Related Motor Impairments in Rodents using Markerless Motion Tracking with Deep Neural Networks 3642-3648
Lang, Jana *(Hertie Institute for Clinical Brain Research)*; Haas, Eva *(University of Tübingen)*; Huebener-Schmid, Jeannette *(University of Tübingen)*; Anderson, Collin *(University of Utah)*; Pulst, Stefan *(University of Utah)*; Giese, Martin *(Hertie Institute for Clinical Brain Research)*; Ilg, Winfried* *(Hertie Institute for Clinical Brain Research)*

The Effect of Transcranial Alternating Current Stimulation (tACS) on Cognitive Function in Older Adults with Dementia 3649-3653
Kehler, Lonnie* *(University of Manitoba)*; de Oliveira Francisco, Cristina *(University of Manitoba)*; Uehara, Maria *(University of Manitoba)*; Moussavi, Zahra *(University of Manitoba)*

Differentiating Motor Coordination and Position Sense in Children with Cerebral Palsy and Typically Developing Populations through Robotic Assessments 3654-3657
Dobri, Stephan C.D.* *(Dept. of Mechanical and Materials Engineering, Queen's Univ)*; Samdup, Dawa *(Dept. of Pediatrics, Queen's University, Kingston, Ontario,)*; Scott, Stephen H. *(Queen's University)*; Davies, Theresa Claire *(Queen's University)*

Quantification of Parkinson's Disease Motor Symptoms: A Wireless Motion Sensing Approach 3658-3661
Kim, Min Jae *(Johns Hopkins University)*; Naydanova, Elizaveta *(Johns Hopkins University)*; Hwang, Brian Y. *(Johns Hopkins School of Medicine, Dept. of Neurosurgery)*; Mills, Kelly *(Johns Hopkins University)*; Anderson, William S. *(Johns Hopkins School of Medicine, Dept. of Neurosurgery)*; Salimpour, Yousef* *(Johns Hopkins School of Medicine)*

Facial Electromyography Mapping in Healthy and Bell's Palsy Subjects: A High-Density Surface EMG Study 3662-3665
Cui, Han *(Shenzhen Institute of Advanced Technology, Chinese Academy of Science)*; Zhong, Weizheng *(Shenzhen Traditional Chinese Medicine Hospital)*; Zhu, Mingxing *(ShenZhen Institutes of Advanced Technology Chinese Academy of Science)*; Jiang, Naifu *(Shenzhen Institutes of Advanced Technology, Chinese Academy of Science)*; Huang, Xingxian *(Shenzhen Traditional Chinese Medicine hospital)*; Lan, Kai *(Shenzhen Traditional Chinese Medicine Hospital)*; Hu, Liyu *(Guangzhou University of Traditional Chinese Medicine)*; Chen, Shixiong *(Shenzhen Institutes of Advanced Technology)*; Yang, Zhuoxin *(Shenzhen Traditional Chinese Medicine Hospital)*; Yu, Haibo *(Shenzhen Traditional Chinese Medicine Hospital)*; Li, Guanglin* *(Shenzhen Institutes of Advanced Technology)*

Estimation of Parkinson's Disease Severity from Voice Features of Vowels and Consonant 3666-3669
Puzhavakkathu Madom Viswanathan, Rekha *(RMIT)*; Poosapadi Arjunan, Sridhar* *(SRM Institute of Science and Technology)*; Raghav, Sanjay *(RMIT University)*; Kempster, Peter *(Monash Health)*; Kant Kumar, Dinesh *(RMIT University)*

Theme 06. Neurological Disorders – II (Oral Session)

Unilateral Spatial Neglect Rehabilitation Supported by a Digital Solution: Two Case-Studies 3670-3675
Trombini, Marco* *(Università degli studi di Genova)*; Vestito, Lucilla *(Ospedale Policlinico San Martino IRCCS)*; Morando, Matteo *(Università degli Studi di Genova)*; Mori, Laura *(Università degli Studi di Genova)*; Trompetto, Carlo *(Università degli Studi di Genova)*; Bandini, Fabio *(Ospedale San Paolo)*; Dellepiane, Silvana *(Università degli Studi di Genova)*

Three-Dimensional Pattern Features in Finger Tapping Test for Patients with Parkinson's Disease 3676-3679
Li, Junjie *(Zhejiang University)*; Zhu, Huaiyu *(Zhejiang University)*; Pan, Yun* *(Zhejiang University)*; Wang, Haotian *(Zhejiang University)*; Cen, Zhidong *(Zhejiang University)*; Yang, Dehao *(Zhejiang University)*; Luo, Wei *(Zhejiang University)*

A Classification Approach to Recognize the Firing of Spinal Motoneurons in Amyotrophic Lateral Sclerosis 3680-3683
Abdelaal, Amr Y. *(Computer and Systems Eng., Ain Shams Univ.)*; Mousa, Mohamed H. *(Dept. of Biomedical, Industrial, and Human Factors Engineer)*; Gamal, Mai *(Faculty of Media Engineering and Technology, German University i)*; Khalil, Mahmoud I. *(Ain Shams University)*; Elbasiouny, Sherif M. *(Dept. of Neuroscience, Cell Biology, and Physiology, Boonsh)*; Eldawlatly, Seif* *(Ain Shams University)*

Parkinsonian Tremor Signal Decomposition: Segregating Effects of Deep Brain Stimulation and Medication 3684-3687
Gavas, Rahul *(TCS Research and Innovation, Tata Consultancy Services Ltd.)*; Mazumder, Oishee* *(Tata Consultancy Services)*; Sinha, Aniruddha *(Tata Consultancy Services Ltd.)*

Towards Understanding Spatio-Temporal Parkinsonian Patterns from Salient Regions of a 3D Convolutional Network 3688-3691
Guayacan, Luis Carlos* *(Biomedical Imaging, Vision and Learning Lab. (BivL2ab). Un)*; Rangel, Edgar *(Biomedical Imaging, Vision and Learning Lab. (BivL2ab). Un)*; Martinez, Fabio *(Univ. Industrial de Santander)*

Towards Automatic Localization and Anatomical Labeling of Intracranial Depth Electrodes in Brain Images ..... N/A
Huynh, Chester *(Johns Hopkins University)*; Li, Adam* *(Neuromedical Control Systems Laboratory)*; Gonzalez-Martinez, Jorge *(Cleveland Clinic)*; Sarma, Sridevi V. *(Johns Hopkins University)*

Theme 06. Neurological Disorders – III (Oral Session)

Network Fragility for Seizure Genesis in an Acute in Vivo Model of Epilepsy 3695-3698
Ehrens, Daniel *(Johns Hopkins University)*; Li, Adam* *(Neuromedical Control Systems Laboratory)*; Aeed, Fadi *(Rappaport Faculty of Medicine and Research Institute, Technion -)*; Schiller, Yitzhak *(Rappaport Faculty of Medicine and Research Institute, Techion -)*; Sarma, Sridevi V. *(Johns Hopkins University)*

Application of Global Coherence Measure to Characterize Coordinated Neural Activity during Frontal and Temporal Lobe Epilepsy 3699-3702
Abbaszadeh, Behrooz* *(University of Ottawa)*; Saadati Fard, Reza *(Isfahan University of Technology)*; Yagoub, Mustapha *(University of Ottawa)*

Deep Learning for Interictal Epileptiform Spike Detection from Scalp EEG Frequency Sub Bands 3703-3706
Thangavel, Prasanth* *(Nanyang Technological University)*; Thomas, John *(Nanyang Technological University)*; Rajamanickam, Yuvaraj *(Nanyang Technological University)*; Jing, Jin *(Massachusetts General Hospital)*; Westover, Brandon *(MGH / Harvard Medical School)*; Rathakrishnan, Rahul *(National University Hospital)*; Chaudhary, Rima *(Fortis Mulund)*; Srivastava, Rohit *(Indian institute of Technology Bombay)*; Cash, Sydney *(Massachusetts General Hospital)*; Tan Yee, Leng *(National Neuroscience Institute)*; Saini, Vinay *(Indian Institute of Technology, Bombay)*; Dauwels, Justin *(NTU)*

Resting-State Global EEG Connectivity Predicts Depression and Anxiety Severity 3707-3710
Trambaiolli, Lucas* *(Harvard Medical School)*; Biazoli, Claudinei *(Universidade Federal do ABC)*

Analysis and Classification of Sleep Stages based on Common Frequency Pattern from a Single-Channel EEG Signal 3711-3714
Huang, Shoulin *(Harbin Institute of Technology)*; Zhu, Junhua *(Harbin Institute of Technology at Shenzhen)*; Chen, Yang *(Harbin Institute of Technology, Shenzhen)*; Wang, Tong *(Harbin Institute of Technology, Shenzhen)*; Ma, Ting* *(Harbin Institute of Technology at Shenzhen)*

Detection of Mild Traumatic Brain Injury via Topological Graph Embedding and 2D Convolutional Neural Networks 3715-3718
Salsabilian, Shiva *(Rutgers University)*; Najafizadeh, Laleh* *(Rutgers University)*

Theme 06. Neurological Disorders – Stroke (Oral Session)

Estimating Quality of Reaching Movement using a Wrist-Worn Inertial Sensor 3719-3722
Oubre, Brandon *(Univ. of Massachusetts Amherst)*; Daneault, Jean-Francois *(Rutgers Univ.)*; Jung, Hee-Tae *(Univ. of Massachusetts Amherst)*; Joon Woo, Park *(Daegu Univ.)*; Ryu, Taekyeong *(Heeyeon Hospital)*; Kim, Yangsoo *(Heeyeon Hospital)*; Lee, Sunghoon Ivan* *(Univ. of Massachusetts Amherst)*

Dielectric Profile of Blood Clots to Inform Ischemic Stroke Treatments 3723-3726
Santorelli, Adam* *(National University of Ireland Galway)*; Fitzgerald, Sean *(National University of Ireland Galway)*; Douglas, Andrew *(National University of Ireland Galway)*; Doyle, Karen *(National University of Ireland Galway)*; O'Halloran, Martin *(National University of Ireland, Galway)*

Neurovascular Coupling Impairment in Acute Ischemic Stroke by Optogenetics and Optical Brain Imaging 3727-3730
Bo, Bin *(Shanghai Jiao Tong Univ.)*; Li, Yao *(Shanghai Jiao Tong Univ.)*; Li, Wanlu *(Shanghai Jiao Tong Univ.)*; Wang, Yongting *(Shanghai Jiao Tong Univ.)*; Tong, Shanbao* *(Shanghai Jiao Tong Univ.)*

Investigating Muscle Synergies Changes after Rehabilitation Robotics Training on Stroke Survivors: A Pilot Study 3731-3734
Camardella, Cristian* *(Scuola Superiore Sant'Anna)*; Tse, King Chun *(Chinese University of Hong Kong)*; Frisoli, Antonio *(SSSUP)*; Tong, Kai Yu, Raymond *(The Chinese University of Hong Kong)*

Analyzing Distance Measures for Upper Limb Activity Measurement in Hemiparetic Stroke Patients 3735-3738
Datta, Shreyasi* *(University of Melbourne)*; Karmakar, Chandan *(Deakin University)*; Yan, Bernard *(The Royal Melbourne Hospital)*; Palaniswami, Marimuthu *(The University of Melbourne)*

Quantifying the Peak Amplitude Distributions of Electromyogram in Bicep Brachii Muscle after Stroke . 3739-3742
Afzal, Taimoor* *(Shirley Ryan AbilityLab)*; Lai, Andrew *(AppLoans)*; Hu, Xiaogang *(Univ. of North Carolina-Chapel Hill)*; Rymer, William Zev *(Northwest. & Rehab Inst of Chicago)*; Suresh, Nina L *(Shirley Ryan Ability Lab)*

Theme 06. Neuromuscular Systems – I (Oral Session)

A Method for Quantifying Trunk Motor Control during Reaching in Individuals Post Hemiparetic Stroke ... 3743-3746
Suvada, Kathleen* *(Northwestern University)*; Deol, Jasjit *(Northwestern University)*; Dewald, Julius P. A. *(Northwestern University)*; Acosta, Anamaria *(Northwestern University)*

A Simplified Method for Online Extraction of Skin Conductance Features: A Pilot Study on an Immersive Virtual-Reality-Based Motor Task ... 3747-3750
Caldas, Oscar I.* *(Universidad Militar Nueva Granada)*; Aviles Sanchez, Oscar Fernando *(Universidad Militar Nueva Granada)*; Rodriguez-Guerrero, Carlos *(Vrije Universitiet Brussel)*

A Computational Internal Model to Quantify the Effect of Sensorimotor Augmentation on Motor Output ... 3751-3754
Dollahon, Devon *(Texas A&M University)*; Ryu, Seok Chang *(Ewha Womans University)*; Park, Hangue* *(Texas A&M University)*

Feasibility of Data-Driven EMG Signal Generation using a Deep Generative Model ... 3755-3758
Campbell, Evan* *(University of New Brunswick, Institute of Biomedical Engineering)*; Cameron, James *(University of New Brunswick)*; Scheme, Erik *(University of New Brunswick)*

Recurrent Neural Network for Contaminant Type Detector in Surface Electromyography Signals ... 3759-3762
Machado, Juliano *(Instituto Federal Sul-Riograndense (IFSul))*; Tosin, Maurício C* *(UFRGS)*; Bagesteiro, Leia *(SFSU)*; Balbinot, Alexandre *(Federal University of Rio Grande do Sul (UFRGS))*

Brunnstrom Stage Automatic Evaluation for Stroke Patients by using Multi-Channel SEMG ... 3763-3766
Wang, Fengyan *(Shenyang Institute of Automation, Chinese Academy of Sciences)*; Zhang, Daohui *(Shenyang Institute of Automation, Chinese Academy of Sciences)*; Hu, shaokang *(Shenyang Institute of Automation Chinese Academy of Sciences)*; Zhu, Bo *(Shenyang Institute of Automation, Chinese Academy of Sciences)*; Han, Fei *(Shenyang Institute of Automation, Chinese Academy of Sciences)*; Zhao, Xingang* *(Shenyang Institute of Automation, Chinese Academy of Sciences)*

Theme 06. Neuromuscular Systems – II (Oral Session)

Elbow Movement Estimation based on EMG with NARX Neural Networks ... 3767-3770
Suplino, Lucas de Oliveira *(University of Sao Paulo)*; Chaves de Melo, Gabriel *(University of Sao Paulo)*; Umemura, Guilherme Silva *(University of São Paulo)*; Forner-Cordero, Arturo* *(Escola Politécnica da Universidade de Sao Paulo)*

Muscle Network Alterations in Post-Stroke ... 3771-3774
Houston, Michael *(University of Houston)*; Li, Rihui *(Year)*; Roh, Jinsook *(University of Houston)*; Zhang, Yingchun* *(University of Houston)*

Bilateral Symmetry in Ankle-Muscle Activation in Transtibial Amputees ... 3775-3778
Verma, Nikhil* *(University of Pittsburgh)*; Levy, Isaiah *(University of Pittsburgh Medical Center)*; Sarma, Devapratim *(University of Pittsburgh)*; Paulus, Paige *(University of Pittsburgh)*; Petersen, Bailey *(University of Pittsburgh)*; Weber, Douglas *(University of Pittsburgh)*

A Haptic-Based Perception-Empathy Biofeedback System with Vibration Transition: Verifying the Attention Amount ... 3779-3782
Ling, Jiayi* *(Waseda University)*; Hong, Jing-Chen *(Waseda University)*; Hayashi, Yuki *(Waseda University)*; Yasuda, Kazuhiro *(Waseda University)*; Kitaji, Yu *(Tokyo General Hospital)*; Harashima, Hiroaki *(Tokyo General Hospital)*; Iwata, Hiroyasu *(Waseda University)*

Regression of Hand Movements from sEMG Data with Recurrent Neural Networks ... 3783-3787
Koch, Philipp* *(University of Lübeck)*; Dreier, Mark *(Universität zu Lübeck)*; Larsen, Anna *(University of Lübeck)*; Parbs, Tim J. *(University of Lübeck)*; Maaß, Marco *(University of Lübeck)*; Phan, Huy *(Queen Mary University of London)*; Mertins, Alfred *(University of Lübeck)*

Dynamic Analysis of Muscle Coordination at Different Force Levels during Grip and Pinch with Multiplex Recurrence Network ... 3788-3791
Zhang, Na *(Shandong University)*; Wei, Na *(Qilu Hospital, Shandong University)*; Li, Ke* *(Shandong University)*

Theme 06. Neuromuscular Systems – III (Oral Session)

Comparing Different Methods of Gait Speed Estimation using Wearable Sensors in Individuals with Varying Levels of Mobility Impairments 3792-3798
Nunez, Erick *(NJIT)*; Parhar, Sanjit *(Robert Wood Johnson Medical School)*; Iwata, Isao *(Robert Wood Johnson Medical School)*; Setoguchi, Soko *(Robert Wood Johnson Medical School)*; Chen, Haoqian *(Rutgers University)*; Daneault, Jean-Francois* *(Rutgers University)*

Use of Sonomyographic Sensing to Estimate Knee Angular Velocity during Varying Modes of Ambulation . 3799-3802
Rabe, Kaitlin *(The University of Texas at Dallas)*; Jahanandish, Hasan *(University of Texas at Dallas)*; Hoyt, Kenneth *(University of Texas at Dallas)*; Fey, Nicholas* *(The University of Texas at Dallas)*

Gait Analysis of a Post Induced Traumatic Spinal Cord Injury Porcine Model 3803-3806
Benasson, Ilan* *(Ecole de Technologie Superieure)*; Wagnac, Eric *(Ecole de Technologie Superieure)*; Diotalevi, Lucien *(École de Technologie Supérieure)*; Moore, Daniel *(Ecole de Technologie Superieure)*; Mac-Thiong, Jean-Marc *(Dept. of surgery, Faculty of Medicine, University of Montre)*; Petit, Yvan *(École de Technologie Supérieure)*

Contributions of Joint Mechanics and Neural Control to the Generation of Torque during Movement 3807-3810
Ludvig, Daniel* *(Northwestern University)*; Whitmore, Mariah *(Northwestern University)*; Perreault, Eric *(Northwestern University)*

Sensory Integration Training Improves Balance in Older Individuals 3811-3814
Thompson, Lara* *(University of the District of Columbia)*; Savadkoohi, Marzieh *(University of the District of Columbia)*; Velluto de Paiva, Gabriel *(University of the District of Columbia)*; Brusamolin, Joao Augusto Renno *(University of the District of Columbia)*; Guise, Jelani *(University of the District of Columbia)*; Suh, Pius *(University of the District of Columbia)*; Sanchez Guerrero, Pablo *(University of the District of Columbia)*

Intermuscular Coupling and Postural Control in Unilateral Transfemoral Amputees – A Pilot Study 3815-3818
Pasluosta, Cristian Federico* *(University of Freiburg)*; Lauck, Torben *(Laboratory of Biomedical Microtechnology, Dept. of Microsystems)*; Krauskopf, Thomas *(Laboratory of Biomedical Microtechnology, Dept. of Microsystems)*; Klein, Lukas *(Medical Center, Faculty of Medicine, University of Freiburg)*; Mueller, Marc *(Sanitätshaus Pfänder)*; Herget, Georg W *(Dept. of Orthopedics and Trauma Surgery, Medical Center, Fa)*; Stieglitz, Thomas *(University of Freiburg)*

Theme 06. Neurorehabilitation – I (Oral Session)

System Design and Experimental Research of Neural Signal Blocking based on Spike Trapping Principle 3819-3822
Zhang, Jianjun *(Hebei University of Technology)*; Feng Yunhua, 冯云华 *(Southeast University)*; He, Junfeng *(Southeast University)*; Lü, Xiaoying* *(Southeast University)*; Wang, Zhigong *(Southeast University)*

Effects of Functional Electrical Stimulation on Neuromuscular Function after Targeted Muscle Reinnervation Surgery in Rats 3823-3826
Wang, Ping *(The Zhuhai Campus of the Zunyi Medical University)*; Li, Yuan-Heng *(The Zhuhai Campus of the Zunyi Medical University)*; Zhang, Zijun *(Zhuhai Campus of Zunyi Medical University)*; Lin, Yifeng *(Zhuhai Campus of Zunyi Medical University)*; Jiang, ZhenDong *(Zhuhai Campus of Zunyi Medical University)*; Ding, Xiaofang *(Zhuhai Campus of Zunyi Medical University)*; Yang, Lin* *(Zhuhai Campus, Zunyi Medical University)*

Assessment of Disease Progression in Friedreich Ataxia using an Instrumented Self Feeding Activity 3827-3830
Nguyen, Khoa D.* *(Deakin University)*; Corben, Louise Anne *(Murdoch Children's Research Institute)*; Pathirana, Pubudu N *(Deakin University)*; Horne, Malcolm *(Florey Institute of Neuroscience and Mental Health)*; Delatycki, Martin *(Murdoch Children's Research Institute)*; Szmulewicz, David *(Victorian Eye and Ear Hospital)*

Characterizing Multiple Patterns of Motor Intent using Spatial-Temporal Information for Intuitively Active Motor Training in Stroke Survivors 3831-3834
Samuel, Oluwarotimi Williams *(Shenzhen Institutes of Advanced Technology)*; Asogbon, Mojisola Grace *(Shenzhen Institutes of Advanced Technology, Chinese Academy of Science)*; Geng, Yanjuan *(Shenzhen Institutes of Advanced Technology)*; Rusydi, Muhammad Ilhamdi *(Universitas Andalas)*; Chen, Shixiong *(Shenzhen Institutes of Advanced Technology)*; Fang, Peng *(Shenzhen Institutes of Advanced Technology, Chinese Academy of Science)*; Li, Guanglin* *(Shenzhen Institutes of Advanced Technology)*

Selection of Spatial, Temporal and Frequency Features to Detect Direction Changes during Gait 3835-3838
Soriano-Segura, Paula *(Brain-Machine Interface Systems Lab, Miguel Hernández University)*; Ianez, Eduardo *(Universidad Miguel Hernandez de Elche)*; Quiles, Vicente* *(Universidad Miguel Hernandez de Elche)*; Ferrero, Laura *(Universidad Miguel Hernandez de Elche)*; Ortiz, Mario *(Universidad Miguel Hernández)*; Azorin, Jose M. *(Universidad Miguel Hernandez de Elche)*

A Novel Mechatronic System for Evaluating Elbow Muscular Spasticity Relying on Tonic Stretch Reflex Threshold Estimation 3839-3843
Averta, Giuseppe* *(Univ. of Pisa)*; Abbinante, Massimiliano *(Centro di Ricerca "Enrico Piaggio", Univ. di Pisa, Pisa, I)*; Orsini, Piero Mario *(Centro di Ricerca "Enrico Piaggio", Univ. di Pisa, Pisa, I)*; Felici, Federica *(Istituto Italiano di Tecnologia)*; Lippi, Paolo *(Univ. of Florence, Florence, Italy)*; Bicchi, Antonio *(Univ. of Pisa)*; Catalano, Manuel Giuseppe *(Fondazione Istituto Italiano di Tecnologia)*; Bianchi, Matteo *(Univ. of Pisa)*

Theme 06. Neurorehabilitation – II (Oral Session)

Sensory Feedback in Upper Limb Amputees Impacts Cortical Activity as Revealed by Multiscale Connectivity Analysis 3844-3847
Bose, Rohit* *(National University of Singapore)*; Ding, Keqin *(Johns Hopkins University)*; Seet, Manuel *(NUS)*; Osborn, Luke *(Johns Hopkins University)*; Bezerianos, Anastasios *(National University of Singapore)*; Thakor, Nitish *(National University of Singapore)*; Dragomir, Andrei *(National University of Singapore)*

Shoulder Flexion Pre-Movement Recognition Through Subject-Specific Brain Regions to Command an Upper Limb Exoskeleton 3848-3851
Prieur-Coloma, Yunier* *(Center of Medical Biophsysics)*; Delisle-Rodriguez, Denis *(Federal University of Espirito Santo, UFES)*; Mayeta-Revilla, Leondry *(University of Oriente, Cuba)*; Gurve, Dharmendra *(Ryerson University)*; Reinoso-Leblanch, Ramón Amado *(Biophysics and Medical Physics Centre (Centro de Biofísica Médic)*; Lopez Delis, Alberto *(Center of Medical Biophysics)*; Bastos, Teodiano *(Universidade Federal do Espírito Santo)*; Krishnan, Sridhar *(Ryerson University)*; da Rocha, Adson F. *(University of Brasilia)*

A Compact Battery-Powered rTMS Prototype 3852-3855
Leung, Vincent* *(Qualcomm Institute)*; Stambaugh, Mark *(University of California, San Diego)*; Abbasi, Shaghayegh *(University of San Diego)*; Asbeck, Peter *(University of California San Diego)*; Gough, David *(University of California, San Diego)*; Makale, Milan *(University of California, San Diego)*; Murphy, Kevin *(University of California, San Diego)*

Therapeutic Effects of an Anti-Gravity Treadmill (AlterG) Training on Neuromuscular Abnormalities Associated with Spasticity in Children with Cerebral Palsy 3856-3859
Noroozi, Shamim *(Islamic Azad University of Science and Research Branch, Tehran,I)*; Mehrabi, Rana *(University)*; Lotfian, Mahboube *(Tehran University of Medical Sciences)*; Nowshiravan Rahatabad, Fereidoun *(Dept. of Biomedical Engineering, Science and Research Branc)*; Shahrokhi, Amin *(Noorafshar Hospital, Tehran, Iran)*; Irani, Ashkan *(Dept. of Occupational Therapy, Faculty of Rehabilitation, S)*; Mirbagheri, Mehdi* *(Northwestern University/TUMS)*

Therapeutic Effects of Robotic Rehabilitation on Neural and Muscular Abnormalities Associated with the Spastic Ankle in Stroke Survivors 3860-3863
Lotfian, Mahboube *(Tehran University of Medical Sciences)*; Noroozi, Shamim *(Islamic Azad University of Science and Research Branch, Tehran,I)*; Dadashi, Farnoosh *(Tehran University of Medical Sciences)*; Kharazi, Mohamad Reza *(Dept. of Training and Movement Sciences, Humboldt-Universit)*; Mirbagheri, Mehdi* *(Northwestern University/TUMS)*

Understanding AAC Usage and Needs through a Web Survey with Device Users and Families 3864-3868
Narain, Jaya* *(Massachusetts Institute of Technology)*; Maes, Pattie *(MIT Media Lab)*

Theme 06. Sensory Neuroprostheses – I (Oral Session)

An Experimental Protocol for Evaluating Pulse Width Modulation Ranges of Evoked Tactile Sensory Feedback in Amputees 3869-3872
Yang, Fei* *(Shanghai Jiao Tong University)*; Hao, Manzhao *(School of Biomedical Engineering, Shanghai Jiao Tong University)*; Zhang, Jie *(Shanghai Jiao Tong University)*; Chou, Chih-Hong *(Shanghai Jiao Tong University)*; Lan, Ning *(Shanghai Jiao Tong University)*

Selective Recording of Urinary Bladder Fullness from the Extradural Sacral Roots 3873-3876
Metcalfe, Benjamin William* *(University of Bath)*; Granger, Nicolas *(Royal Veterinary College)*; Prager, Jonathan *(Royal Veterinary College)*; Sadrafshari, Shamin *(University of Bath)*; Grego, Timea *(University College London)*; Taylor, John *(University of Bath)*; Donaldson, Nicholas de Neufville *(University College London)*

Assessment of the Difference Limens for Frequency, Monosyllable Articulation and Word Intelligibility by Distantly-Presented Bone-Conducted Ultrasound 3877-3880
Doi, Koichiro* *(Chiba University)*; Otsuka, Sho *(Chiba University)*; Nakagawa, Seiji *(Chiba University)*

Effect of Interlateral Time and Intensity Differences of Distantly-Presented Bone-Conducted Ultrasound on Lateralization 3881-3884
Ishikawa, Hiromu* *(Chiba University)*; Otsuka, Sho *(Chiba University)*; Nakagawa, Seiji *(Chiba University)*

Temporal Modulation of Transcutaneous Electrical Nerve Stimulation Influences Sensory Perception ... 3885-3888
Dupan, Sigrid* *(Newcastle University)*; McNeill, Zachary *(Newcastle University)*; Brunton, Emma Kate *(Newcastle University)*; Nazarpour, Kianoush *(Newcastle University)*

EEG-Based Classification of Imaginary Mandarin Tones 3889-3892
Zhang, Xin-Yu *(Shenzhen University)*; Hua, Li *(Shenzhen University)*; Chen, Fei* *(Southern University of Science and Technology)*

Theme 06. Sensory Neuroprostheses – II (Oral Session)

Intensity Discriminability of Electrocutaneous and Intraneural Stimulation Pulse Frequency in Intact Individuals and Amputees 3893-3896
George, Jacob A.* *(University of Utah)*; Brinton, Mark *(Elizabethtown College)*; Colgan, Paul *(University of Utah)*; Colvin, Garrison *(Elson S Floyd College of Medicine)*; Bensmaia, Sliman, J *(University of Chicago)*; Clark, Gregory *(University of Utah)*

Low-Cost, Microcontroller-Based, Two-Channel Piezoelectric Bender Device for Somatosensory Experiments 3897-3900
Yan, Lucy* *(University of Auckland)*; Hallum, Luke E. *(University of New South Wales)*

Cortical Connectivity and Spectral Perturbations Underlying TENS Stimulation of Hand Nerves: A Case Study 3901-3904
Alibou, Nabil *(EPFL)*; Artoni, Fiorenzo* *(Ecole Polytechnique Federale de Lausanne)*; D'Anna, Edoardo *(Bertarelli Foundation Chair in Translational Neuroengineering, C)*; Micera, Silvestro *(Scuola Superiore Sant'Anna)*

Transcutaneous Electrical Stimulation Influences the Time-Frequency Map of Cortical Activity – A Pilot Study 3905-3908
Zarei, Ali Asghar* *(Center for Neuroplasticity and Pain (CNAP), Aalborg University)*; Faghani Jadidi, Armita *(Dept. of Health Science and Technology, Aalborg University)*; Lontis, Eugen Romulus *(Aalborg University)*; Jensen, Winnie *(Center for Sensory-Motor Interaction)*

Stiffness Perception using Transcutaneous Electrical Stimulation during Active and Passive Prosthetic Control 3909-3912
Vargas, Luis *(Joint Dept. of Biomedical Engineering at University of Nort)*; Huang, He (Helen) *(North Carolina State University and University of North Carolina)*; Zhu, Yong *(North Carolina State University)*; Hu, Xiaogang* *(University of North Carolina-Chapel Hill)*

Audio-Visual Thumble (AVT): A Low-Vision Rehabilitation Device using Multisensory Feedbacks 3913-3916
Ahmad, Hafsah* *(Italian Institute of Technology)*; Tonelli, Alessia *(Italian Institute of Technology)*; Crepaldi, Marco *(Electronic Design Laboratory, Istituto Italiano di Tecnologia)*; Martolini, Chiara *(Istituto Italiano di Tecnologia)*; Capris, Elisabetta *(Istituto David Chiossone)*; Gori, Monica *(Istituto Italiano di Tecnologia)*

Theme 07. Activity Assessment (Oral Session)

Machine Learning-Based Physical Activity Tracking with a View to Frailty Analysis 3917-3920
Abbas, Manuel* *(Université de Rennes 1 - LTSI INSERM U1099)*; Somme, Dominique *(CHU - UFR Médecine - Université de Rennes 1)*; Le Bouquin Jeannes, Regine *(Université de Rennes 1 - LTSI INSERM U1099)*

Estimation Model for Lower Extremity Strength using Gait Movement Measured with Inertial Sensor Considering Differences of Sex and Environment 3921-3926
Shiotani, Maho* *(Panasonic Corporation)*; Hiyama, Takahiro *(Panasonic Corporation)*; Sato, Yoshikuni *(Panasonic Corporation)*; Ozawa, Jun *(Panasonic Corporation)*; Kobayashi, Yoshiyuki *(National Institute of Advanced Industrial Science and Technology)*

Sensor Selection for Activity Classification at Smart Home Environments 3927-3930
Bolleddula, Nithish *(Univ. of San Francisco)*; Hung, Geoffrey *(Univ. of San Francisco)*; Ma, Daren *(Univ. of San Francisco)*; Noorian, Hoda *(Univ. of San Francisco)*; Woodbridge, Diane* *(Univ. of San Francisco)*

Walking-in-Place Characteristics-Based Geriatric Assessment using Deep Convolutional Neural Networks 3931-3935
Jung, Dawoon *(Center for Imaging Media Research, Korea Institute of Science an)*; Nguyen, Mau Dung *(Korean Institute of Science and Technology)*; Park, Mina *(Korean Institute of Science and Technology)*; Kim, Miji *(Dept. of Biomedical Science and Technology, College of Medi)*; Won, Chang Won *(Dept. of Family Medicine, College of Medicine, Kyung Hee Un)*; Kim, Jinwook *(Korean Institute of Science and Technology)*; Mun, Kyung-Ryoul* *(Korea Institute of Science and Technology)*

Assessment of Objectively Measured Physical Activity as an Independent Estimator of Functional Status in Clinical Trials 3936-3939
Buendia, Ruben* *(AstraZeneca)*; Lea, Halsey *(BioPharmaceuticals R&D AI & Analytics, Data Science & AI, AstraZ)*; Zhang, Bo *(BioPharmaceuticals R&D AI & Analytics, Data Science & AI, AstraZ)*; Havsol, Jesper *(BioPharmaceuticals R&D AI & Analytics, Data Science & AI, AstraZ)*; Khan, Faisal M. *(AstraZeneca)*; Sillén, Henrik *(BioPharmaceuticals Digital Health R&D, AstraZeneca)*; Dennis, Glynn *(BioPharmaceuticals R&D AI & Analytics, Data Science & AI, AstraZ)*

Improving Energy Expenditure Estimation through Activity Classification and Walking Speed Estimation using a Smartwatch 3940-3944
Aziz, Omar *(Simon Fraser University)*; Zihajehzadeh, Shaghayegh *(Form)*; Park, Aerin *(Cornell University)*; Tae, Chul-Gyu *(Bigmotion Technologies)*; Park, Edward J.* *(Simon Fraser University)*

Theme 07. Bio-Electric Sensors (Oral Session)

Multi-Source Multi-Frequency Bio-Impedance Measurement Method for Localized Pulse Wave Monitoring .. 3945-3948
Ibrahim, Bassem* *(Texas A&M University)*; Talukder, Arghamitra *(Texas A&M University, College Station)*; Jafari, Roozbeh *(Texas A&M University)*

Three-Dimensional Force Measurements Applied by Infant during Nipple Sucking 3949-3952
Nishi, Eri* *(Setsunan University)*; Hiraoka, Katsuyuki *(JEX Co., Ltd.)*; Okuda, Ryousuke *(Setsunan University)*; Niikawa, Takuya *(Osaka Electro-Communication University)*; Rikoh, Katsuhisa *(JEX Co., Ltd.)*

Design and Application of an Inflatable Cuff to Aid High-Resolution Intestinal Slow Wave Recordings .. 3953-3956
Miller, Kiara J W *(University of Auckland)*; Cheng, Leo K *(The University of Auckland)*; Angeli, Timothy Robert *(Auckland Bioengineering Institute, University of Auckland)*; Avci, Recep *(The University of Auckland)*; Paskaranandavadivel, Niranchan* *(The University of Auckland)*

A Spatially-Dense Microfabricated Photolithographic Electrode Array for Gastrointestinal Slow Wave Recordings 3957-3960
Nagahawatte, Nipuni *(The University of Auckland)*; Cheng, Leo K *(The University of Auckland)*; Paskaranandavadivel, Niranchan *(The University of Auckland)*; Angeli, Timothy Robert *(Auckland Bioengineering Institute, University of Auckland)*; Avci, Recep* *(The University of Auckland)*

Design of Bio-Impedance Electrode Topologies for Specific Depth Sensing in Skin Layer 3961-3964
Park, Moonseong *(Samsung Advanced Institute of Technology)*; Eom, Kunsun *(Samsung Electronics)*; Jung, Myoung Hoon *(Samsung Advanced Institute of Technology)*; Park, Yun Sang *(Samsung Electronics Co., Ltd.)*; Lee, June-Young *(Samsung Advanced Institute of Technology)*; Nam, Sung Hyun* *(Samsung Advanced Institute of Technology, Samsung Electronics)*

Enhanced Torque Estimation Method from Multi-Channel Surface Electromyography Compensating Electrode Location Variation 3965-3968
Kyeong, Seulki *(KAIST)*; Kim, Jung* *(Korea Advanced Institute of Science and Technology)*

Theme 07. Bioimpedance Sensors (Oral Session)

Swollen Lower Limbs in Patients with Negative Pitting Test Leg Oedema: Prediction of Water Displacement Changes by Anthropometry and BioImpedance Spectroscopy 3969-3972
Montalibet, Amalric* *(INL UMR-5270 - INSA Lyon)*; Rastel, Didier *(Vascular Physician)*; Chaigneau, Cyril *(Sigvaris)*; Grenier, Etienne *(Sigvaris)*; McAdams, Eric *(INSA Lyon)*

Hydrophilic Conductive Sponge Sensors for Fast Setup, Low Impedance Bio-Potential Measurements 3973-3976
Krishnan, Ashwati* *(Carnegie Mellon University)*; Rozylowicz, Kalee *(Carnegie Mellon University)*; Kelly, Shawn *(Carnegie Mellon University)*; Grover, Pulkit *(Carnegie Mellon University)*

Bioimpedance Sensing Surgical Drill – Computational Modelling and Experimental Validation 3977-3980
Devaraj, Harshavardhan* *(Dartmouth College)*; Murphy, Ethan *(Dartmouth College)*; Halter, Ryan *(Dartmouth College)*

Band Electrodes Reduce Simulated Calf Bioimpedance Measurement Errors due to Muscle Anisotropy ... 3981-3984
Delano, Maggie K.* *(Swarthmore College)*

Wearable Bioimpedance for Continuous and Context-Aware Clinical Monitoring 3985-3988
Dutt, Abhilash G* *(ETH-Zurich)*; Verling, Michaela *(ETH Zurich)*; Karlen, Walter *(ETH Zurich)*

A Wrist-Worn Respiration Monitoring Device using Bio-Impedance 3989-3993
Sel, Kaan* *(Texas A&M University)*; Brown, Alexander *(Texas A&M University)*; Jang, Hongwoo *(The University of Texas at Austin)*; Krumholz, Harlan *(Yale University School of Medicine)*; Lu, Nanshu *(University of Texas at Austin)*; Jafari, Roozbeh *(Texas A&M University)*

Theme 07. Bioinstrumentation (Oral Session)

Dual Functions of Ghz Frequency Acoustic Resonator System for Biosamples Capture and Sensing 3994-3997
Liu, Chang *(Tianjin University, College of Precision Instruments and Opto-el)*; Pang, Wei *(Tianjin University, College of Precision Instruments and Opto-el)*; Duan, Xuexin *(Tianjin University)*; Wang, Yanyan* *(Tianjin University, College of Precision Instruments and Opto-el)*

A Low-Power and Low-Noise Multi-Purpose Chopper Amplifier with High CMRR and PSRR 3998-4001
Habibzadeh Tonekabony Shad, Erwin* *(Norwegian Univ. of Science and Technology)*; Molinas, Marta *(Norwegian Univ. of Science and Technology)*; Ytterdal, Trond *(Norwegian Univ. of Science and Technology)*

A Wearable Bio-Signal Processing System with Ultra-Low-Power SoC and Collaborative Neural Network Classifier for Low Dimensional Data Communication 4002-4007
Wei, Yijie* *(Northwestern University)*; Cao, Qiankai *(Northwestern University)*; Hargrove, Levi *(Rehabilitation Institute of Chicago)*; Gu, Jie *(Northwestern University)*

Using Low-Power, Low-Cost IoT Processors in Clinical Biosignal Research: An In-Depth Feasibility Check 4008-4011
Kartsch Morinigo, Victor Javier *(University of Bologna)*; Artoni, Fiorenzo* *(Ecole Polytechnique Federale de Lausanne)*; Benatti, Simone *(University of Bologna)*; Micera, Silvestro *(Scuola Superiore Sant'Anna)*; Benini, Luca *(University of Bologna)*

A 10 nV/rt Hz Noise Level 32-Channel Neural Impedance Sensing ASIC for Local Activation Imaging on Nerve Section 4012-4015
Kim, Jong Pal *(Samsung Advanced Institute of Technology)*; Lee, Wonseok* *(Samsung Advanced Institute of Technology)*; Suh, Junyeub *(Samsung Advanced Institute of Technology)*; Lee, Hyungwoo *(Samsung Advanced Institute of Technology)*; LEE, KYU IL *(Samsung Advanced Institute of Technology, Samsung Electronics Co)*; Ahn, Ho Young *(SAIT (Samsung Advanced Institute of Technology))*; Seo, Minjae *(Samsung Electronics)*; Ryu, Seungtak *(KAIST)*; Aristovich, Kirill *(University College London)*; Holder, David *(University College London)*; Kim, Sang Joon *(Samsung Electronics)*

Design and Applicability of a Mechanical Impedance Sensor for Vein Penetration Detection 4016-4019
Grown-Haeberli, Serena *(Massachusetts Institute of Technology)*; Montague-Alamin, Healey Ann *(Massachusetts Institute of Technology)*; Slocum, Alexander *(MIT)*; Hanumara, Nevan* *(Massachusetts Institute of Technology)*; Ramirez, Aaron *(Massachusetts Institute of Technology)*; Connor, Jay *(Mount Auburn Hospital)*; Hom, Gim *(Massachusetts Institute of Technology)*; Pott, Peter Paul *(University of Stuttgart)*; Stewart, Kent *(University of Canterbury)*

Theme 07. Biomechanics (Oral Session)

SensRing, a Novel Wearable Ring-Shaped Device for Objective Analysis of Reach-to-Grasp Movements .. 4020-4023
Rovini, Erika* *(Scuola Superiore Sant'Anna)*; Galperti, Guenda *(Scuola Superiore Sant'Anna, The BioRobotics Institute)*; Fiorini, Laura *(Scuola Superiore Sant'Anna)*; Mancioppi, Gianmaria *(Scuola Superiore Sant'Anna)*; Manera, Valeria *(Université Nice Sophia Antipolis)*; Cavallo, Filippo *(Scuola Superiore Sant'Anna)*

Towards Understanding Complex Human Dexterous Manipulation Strategies: Kinematics of Gaiting-Based Object Rotations 4024-4029
Hong, Jimin *(Yale University)*; Dollar, Aaron* *(Yale University)*

Garment Integrated Spinal Posture Detection using Wearable Magnetic Sensors 4030-4033
Wielgos, Sam *(University of St. Thomas)*; Dolezalek, Emily *(University of St. Thomas)*; Min, Cheol-Hong* *(University of St. Thomas)*

Selection of Plantar-Pressure and Ankle-Acceleration Features for Freezing of Gait Detection in Parkinson's Disease using Minimum-Redundancy Maximum-Relevance 4034-4037
Pardoel, Scott* *(University of Waterloo)*; Shalin, Gaurav *(University of Waterloo)*; Nantel, Julie *(University of Ottawa)*; Lemaire, Edward *(The Ottawa Hospital Rehab Centre)*; Kofman, Jonathan *(University of Waterloo)*

A Low-Cost Portable Measurement System for a Clinical Test of Balance 4038-4041
Luna Jaramillo, Juan Marcos* *(Pontificia Universidad Católica del Perú)*; Sal y Rosas, Damian *(Universidad Nacional de Ingeniería)*; Elias, Dante *(Pontifical Catholic University of Peru)*

A Novel Approach Towards Early Detection of Obliteration in Lumbar Lordosis 4042-4045
Krishnappa, Veena Divya* *(Rastreeya Vidyalaya College of Engineering, Bengaluru)*; Shree, Vidhya *(RV College of engineering)*; Mukherjee, Devanshu *(RVCE)*; Roy, Somali *(RV College of Engineering)*; P M, Rajasree *(R.V. College of Engineering, Bengaluru)*; S Raghavan, Venkat *(RV College of Engineering, Bengaluru)*; Devaraj, Deepashree *(RV College of Engineering, Bengaluru)*; Chodavarapu, Renu Madhavi *(RV College of Engineering, Bengaluru)*; Lakshman, Vasanth Raj *(Dept. of Orthopedics, BGS GIMS Hospitals, Bengaluru)*; KN, Subramanya *(RV College of Engineering, Bengaluru)*

Theme 07. Brain-Computer Interfaces (Oral Session)

CereBridge: An Efficient, FPGA-Based Real-Time Processing Platform for True Mobile Brain-Computer Interfaces 4046-4050
Wahalla, Marc-Nils* *(Leibniz Universität Hannover)*; Payá Vayá, Guillermo *(Institute of Microelectronic Systems, Leibniz Universität Hannov)*; Blume, Holger *(Leibniz Universitaet Hannover)*

Discrimination of Two-Class Motor Imagery in a fNIRS based Brain Computer Interface 4051-4054
Moslehi, Amir H.* *(Queen's University)*; Bagheri, Mina *(Queen's University)*; Ludwig, Anne-Marie *(Queen's University)*; Davies, Claire *(Queen's University)*

Validating a LEGO-Like EEG Headset for a Simultaneous Recording of Wet and Dry-Electrode Systems during Treadmill Walking 4055-4058
Yang, Shang-You *(National Sun Yat-sen University)*; Lin, Yuan-Pin* *(National Sun Yat-sen University)*

Theme 07. Cardiac Monitoring (Oral Session)

Flexible Electrodes based Smart Mattress for Non-Contact Cardiac Signals Measurement 4059-4062
Peng, Shun *(Fudan University)*; Xu, Ke *(School of Information Science and Technology, Fudan University)*; Jiang, Xinyu *(Fudan University)*; Chen, Wei* *(Fudan University)*

Heart Rate Detection with Accelerometric Sensors under the Mattress 4063-4066
Conti, Massimo* *(Università Politecnica Delle Marche, Dipartimento di Ingegneria)*; Carlo, Aironi *(Università Politecnica Delle Marche)*; Orcioni, Simone *(Università Politecnica Delle Marche)*; Seepold, Ralf *(HTWG Konstanz)*; Gaiduk, Maksym *(HTWG Konstanz)*; Martinez Madrid, Natividad *(Reutlingen University)*

Assessment of Left Ventricular Diastolic Function using Phonocardiogram Signals: A Comparison with Echocardiography 4067-4070
Saraf, Kanav* *(University of California Los Angeles)*; Baek, Christopher Inhwan *(Sensydia Corporation)*; Wasko, Michael *(Sensydia Corporation)*; Zhang, Xu *(University of California, Los Angeles)*; Zheng, Yi *(Sensydia Corporation)*; Borgstrom, Per Henrik *(Sensydia Corporation)*; Mahajan, Aman *(University of Pittsburgh)*; Kaiser, William *(University of California, Los Angeles)*

Digital Image Processing Features of Smartwatch Photoplethysmography for Cardiac Arrhythmia Detection 4071-4074
Han, Dong* *(University of Connecticut)*; Bashar, Syed Khairul *(University of Connecticut)*; Zieneddin, Fearass *(University of Connecticut)*; Ding, Eric *(University of Massachusetts Medical School)*; Whitcomb, Cody *(University of Massachusetts Medical School)*; McManus, David *(University of Massachusetts Medical Center)*; Chon, Ki *(University of Connecticut)*

Cardiac Function Monitoring for Patients Undergoing Cancer Treatments using Wearable Seismocardiography: A Proof-of-Concept Study 4075-4078
Shandhi, Md. Mobashir Hasan* *(Georgia Institute of Technology)*; Aras, Mandar *(UCSF)*; Wynn, Sarra *(UCSF)*; Fan, Joanna *(University of California, San Francisco)*; Heller, James Alexander *(Northwestern University)*; Etemadi, Mozziyar *(Northwestern University)*; Klein, Liviu *(University of California, San Francisco)*; Inan, Omer *(Georgia Institute of Technology)*

A Smart Mandibular Advancement Device for Intraoral Cardiorespiratory Monitoring 4079-4084
Nabavi, Seyedfakhreddin* *(McGill University)*; Debbarma, Shibam *(McGill University)*; Bhadra, Sharmistha *(McGill University)*

Theme 07. Chemo/Bio Sensing (Oral Session)

Development of a Microfluidic Collection System to Measure Electrolyte Variations in Sweat during Exercise 4085-4088
Steijlen, Annemarijn* *(Delft University of Technology)*; Bastemeijer, Jeroen *(Delft University of Technology)*; Groen, Pim *(Delft University of Technology)*; Jansen, Kaspar *(Delft University of Technology)*; French, Patrick J. *(TU Delft)*; Bossche, Andre *(Delft University of Technology)*

Hydrogel-Fractal Piezoelectric Bilayer Transducer for Wireless Biochemical Sensing 4089-4092
Islam, Sayemul *(Temple University)*; Park, Moonchul *(Temple University)*; Song, Seunghyun *(Sookmyung Women's University)*; Kim, Albert* *(Temple University)*

Ultrasonic Hydrogel Biochemical Sensor System 4093-4096
Byun, Eun Jeong *(Sookmyung Women's University)*; Nam, Juhong *(Sookmyung Women's University)*; Shim, Hyunji *(Sookmyung Women's University)*; Kim, Esther *(Sookmyung Women's University)*; Kim, Albert *(Temple University)*; Song, Seunghyun* *(Sookmyung Women's University)*

A Low-Cost and Enzyme-Free Glucose Paper Sensor 4097-4100
Chen, Zheyuan* *(Texas A&M University)*; Chi, Ting-Yen *(Texas A&M University)*; Dincel, Onder *(Texas A&M University)*; Tong, Lin *(FIU)*; Kameoka, Jun *(Texas A&M University)*

The EcoChip 2: An Autonomous Sensor Platform for Multimodal Bio-Environmental Monitoring of the Northern Habitat 4101-4104
Das, Partha Sarati *(Kwangwoon University)*; Gagnon-Turcotte, Gabriel *(Université Laval)*; Ouazaa, Karim *(Université Laval)*; Bouzid, K.* *(Laval University)*; Hosseini, Seyedeh Nazila *(Université Laval)*; Bharucha, Eric *(Université Laval)*; Tremblay, D. *(Laval University)*; Moineau, S. *(Laval University)*; Messaddeq, Younès *(Centre d'Optique, Photonique et Laser (COPL), Université Laval,)*; Corbeil, J. *(Laval University)*; Gosselin, Benoit *(Laval University)*

Theme 07. Contactless Sensing (Oral Session)

Multi-Frequency Detection of a Dielectric Object using Flexible Contactless RF Sensors for Tissue Diagnosis 4105-4108
Pasquier, Alexiane* *(Centre de Nanosciences et de Nanotechnologies, CNRS, Univ. Paris)*; Le Diraison, Yohan *(SATIE, CNRS, Université de Cergy-Pontoise)*; Serfaty, Stéphane *(SATIE, CNRS, Université de Cergy-Pontoise)*; Joubert, Pierre-Yves *(Centre de Nanosciences et de Nanotechnologies, CNRS, Univ. Paris)*

Identification of Muscle Morphology with Noncontact Capacitive Sensing: Preliminary Study 4109-4113
Zheng, Enhao* *(Institute of Automation, Chinese Academy of Sciences)*; Wan, Jiacheng *(School of Information Engineering, China University of Geoscience)*; Xu, Dongfang *(Peking University)*; Wang, Qining *(Peking University)*; Qiao, Hong *(Institute of Automation, Chinese Academy of Sciences)*

A Non-Contact Spirometer with Time-of-Flight Sensor for Assessment of Pulmonary Function 4114-4117
Sakamoto, Hirokazu* *(The University of Electro-Communications)*; Sun, Guanghao *(The University of Electro-Communications)*; Takamoto, Hiroki *(Tokyo Metropolitan University)*; Matsui, Takemi *(Tokyo Metropolitan University)*; Kirimoto, Tetsuo *(The University of Electro-Communications)*

Automatic Non-Contact Monitoring of the Respiratory Rate of Neonates using a Structured Light Camera 4118-4121
Gleichauf, Johanna* *(Technische Hochschule Nürnberg Georg Simon Ohm)*; Niebler, Christine *(Technische Hochschule Nürnberg Georg Simon Ohm)*; Koelpin, Alexander *(Chair for Electronics and Sensor Systems, Brandenburg University)*

A Novel Sensor-Array System for Contactless Electrocardiogram Acquisition 4122-4125
Weeks, Joshua* *(SIG.NUM Preemptive Healthcare Inc)*; Elsaadany, Mahmoud *(École de Technologie Supérieure)*; Lessard-Tremblay, Mathieu *(SigNum Preemptive Healthcare Inc.)*; Saidi, Abdelbery *(Sig-Num)*; Targino Lins, Lucas *(École de Technologie Supérieure)*; Liamini, Mokhtar *(École de Technologie Supérieure)*; Gagnon, Ghyslain *(Ecole de Technologie Supérieure)*

Theme 07. Electromyography Sensors (Oral Session)

An Anti Stimulation Artifacts and M-waves Surface Electromyography Detector with a Short Blanking Time 4126-4129
Bi, ZhengYang *(State Key Lab of Bioelectronics, Southeast University)*; Xie, Chenxi *(Southeast University)*; Zhou, Yuxuan *(School of Basic Medical Science, Nanjing Medical University)*; Wang, Haipeng *(Sanjiang University)*; Lü, Xiaoying* *(Southeast University)*; Wang, Zhigong *(Southeast University)*

Design of a Flexible High-Density Surface Electromyography Sensor 4130-4133
Feng, Jirou *(Korea Advanced Institute of Science and Technology)*; Chang, Handdeut *(Incheon National University)*; Jeong, Hwayeong *(KAIST)*; Kim, Jung* *(Korea Advanced Institute of Science and Technology)*

Quantitative Muscle Fatigue Estimation with High SNR Flexible Skin Electrode 4134-4137
Yun, Inyeol* *(Pohang University of Science and Technology)*; Jeung, Jinpyeo *(Pohang University of Science and Technology)*; Chung, Yoonyoung *(Pohang University of Science and Technology)*

Design of a Real Time Portable Low-Cost Multi-Channel Surface Electromyography System to Aid Neuromuscular Disorder and Post Stroke Rehabilitation Patients 4138-4142
K, Vinay* *(IIIT Bangalore)*; Vazhiyal, Vikas *(NIMHANS)*; Rao, Madhav *(IIITBangalore)*

Stretchable Screen-Printed PEDOTPSS Electrodes for Upper-Arm Surface Electromyography 4143-4146
Spanu, Andrea* *(University of Cagliari, Dept. of Electric and Electronic En)*; Bonfiglio, Annalisa *(University of Cagliari)*; Pani, Danilo *(University of Cagliari)*

Non-Contact Measurements of Blink-Associated Electrooculogram using In-Pillow Cloth Electrodes: Potential Application as a Communication Aid 4147-4150
Ishigami, Hiroshi* *(Tokyo Denki University)*; Tanaka, Shogo *(Tokyo Denki University)*; Ueno, Akinori *(Tokyo Denki University)*

Theme 07. Health Monitoring Applications (Oral Session)

An Infrared Array Sensor-Based Method for Localizing and Counting People for Health Care and Monitoring 4151-4155
Bouazizi, Mondher* *(Keio University, Faculty of Science and Technology)*; Ohtsuki, Tomoaki *(Keio University)*

On-Body Sensor Position Identification with a Simple, Robust and Accurate Method, Validated in Patients with Parkinson's Disease 4156-4159
Kostikis, Nikolaos *(University of Macedonia, Greece)*; Rigas, Georgios *(University of Ioannina)*; Tachos, Nikolaos *(Unit of Medical Technology and Intelligent Information Systems,)*; Konitsiotis, Spiros *(Medical School, University of Ioannina)*; Fotiadis, Dimitrios I.* *(University of Ioannina)*

Considerations for Wearable Sensors to Monitor Physical Performance during Spaceflight Intravehicular Activities 4160-4164
Bellisle, Rachel* *(Massachusetts Institute of Technology)*; Bjune, Caroline *(Charles Stark Draper Laboratory)*; Newman, Dava *(Massachusetts Institute of Technology)*

Visualizing Worklog based on Human Working Activity Recognition using Unsupervised Activity Pattern Encoding 4165-4168
Minusa, Shunsuke* *(Hitachi, Ltd. Research & Development Group)*; Tanaka, Takeshi *(Hitachi, Ltd. Research & Development Group)*; Kuriyama, Hiroyuki *(Hitachi Ltd. Research & Development Group)*

Investigation on the Human Body as a Monopole Antenna for Energy Harvesting 4169-4174
Mao, Jingna* *(Chinese Academy of Sciences)*; Zhang, Zhiwei *(Institute of Automation, Chinese Academy of Sciences)*

Fall-Risk Classification in Amputees using Smartphone Sensor based Features in Turns 4175-4178
Daines, Kyle J.F.* *(Ottawa Hospital Research Institute, University of Ottawa)*; Baddour, Natalie *(University of Ottawa)*; Burger, Helena *(University Rehabilitation Institute)*; Bavec, Andrej *(University Rehabilitation Institute, Republic of Slovenia)*; Lemaire, Edward *(The Ottawa Hospital Rehab Centre)*

Theme 07. Image Monitoring (Oral Session)

Multi-Channel Facial Photoplethysmography Sensing 4179-4182
Ruth, Parker* *(University of Washington)*; Cao, Jerry *(University of Washington)*; Li, Millicent *(University of Washington)*; Sunshine, Jacob *(University of Washington)*; Wang, Edward *(University of California, San Diego)*; Patel, Shwetak *(University of Washington)*

Non-Contact Robust Respiration Detection by using Radar-Depth Camera Sensor Fusion 4183-4186
Zhao, Heng* *(University of California, Davis)*; Gao, Xiaomeng *(Cardiac Motion LLC)*; Jiang, Xiaonan *(University of California, Davis)*; Hong, Hong *(Nanjing University of Science and Technology)*; Liu, Xiaoguang *(University of California, Davis)*

Comparison of Visible and Infrared Video Plethysmography Captured from Different Regions of the Human Face 4187-4190
Sugita, Norihiro* *(Tohoku University)*; Tomoya, Matsuzaki *(Tohoku University)*; Yoshizawa, Makoto *(Tohoku University)*; Ichiji, Kei *(Tohoku University Graduate School of Medicine)*; Yamaki, Shunsuke *(Tohoku University)*; Homma, Noriyasu *(Tohoku University Graduate School of Medicine)*

Real-Time Food Intake Monitoring using Wearable Egocentric Camera 4191-4195
Hossain, Delwar* *(The University of Alabama)*; Imtiaz, Masudul Haider *(University of Alabama)*; Ghosh, Tonmoy *(Bangladesh University of Engineering and Technology)*; Bhaskar, Viprav *(The University of Alabama)*; Sazonov, Edward *(University of Alabama)*

Theme 07. Implantable Sensors (Oral Session)

A 6.78-MHz Robust WPT System with Inductive Link Bandwidth Extended for Cm-Sized Implantable Medical devices 4196-4199
Karimi, Mousa* *(Université Laval)*; Jouaicha, Hicham *(Univ. Laval)*; Lellouche, François *(Research Unit, Institut Universitaire de Cardiologie et de Pneum)*; Bouchard, Pierre-Alexandre *(Institut Universitaire de Cardiologie et de Pneumologie de Québe)*; Sawan, Mohamad *(Westlake Univ.)*; Gosselin, Benoit *(Laval Univ.)*

A Counterpoise Design for RF-Induced Heating Reduction 4200-4203
Chen, Ji* *(University of Houston)*; Wang, Yu *(University of Houston)*; Zheng, Jianfeng *(University of Houston)*; Wang, Qingyan *(University of Houston)*

Design of Pressure Sensor Arrays to Assess Electrode Contact Pressure during in Vivo Recordings in the Gut 4204-4207
Athavale, Omkar Nitin *(The University of Auckland)*; Paskaranandavadivel, Niranchan *(The University of Auckland)*; Angeli, Timothy Robert *(Auckland Bioengineering Institute, University of Auckland)*; Avci, Recep *(The University of Auckland)*; Cheng, Leo K* *(The University of Auckland)*

An In-Vitro Study of Wireless Passive Inductor Integrated Cavity for Future Long-Term Implantable Resonator-Based Glucose Monitoring 4208-4211
Hassan, Rehab S.* *(Kyung Hee University)*

A Compact Optical Pressure Measurement System for Acquiring Intraocular Pressure and Ocular Pulse 4212-4216
Phan, Alex* *(UC San Diego - CMRR)*; Joslin, Kevin *(University of California, San Diego)*; Truong, Phuong *(UC San Diego)*; Camp, Andrew *(University of California, San Diego)*; Talke, Frank *(Center for Memory and Recording Research, University of Californ)*

An Extended-Range Inductive Near-Field Telemetry System for High-Resolution Mapping of Gastrointestinal Activity 4217-4220
Javan-Khoshkholgh, Amir *(New York Institute of Tech.)*; Farajidavar, Aydin* *(New York Institute of Tech.)*

Theme 07. IoT Systems (Oral Session)

Portable Smart-Space Research Interface to Predetermine Environment Acoustics for Cochlear Implant and Hearing Aid Users with CCi-MOBILE 4221-4224
Ghosh, Ria* *(University of Texas-Dallas)*; Chandra Shekar, Ram Charan *(University of Texas - Dallas)*; Hansen, John H.L. *(University of Texas at Dallas)*

Wireless Portable Soundscape Monitoring System for Auditory Profiling: A Potential Diagnostic Tool for Alzheimer's Disease 4225-4228
Lam, Danny *(Case Western Reserve University)*; Clarke, Daniel *(University of Texas at Dallas)*; Tafsir, Mohammad *(University of Texas at Dallas)*; Martinez, Joseph *(University of Texas at Dallas)*; Si, Qilin *(University of Texas at Dallas)*; Ardestani Khoubrouy, Soudeh* *(University of Texas at Dallas)*; Tan, Chin-Tuan *(University of Texas, Dallas)*

Validation of an IMU Gait Analysis Algorithm for Gait Monitoring in Daily Life Situations 4229-4232
Zhou, Lin* *(Digital Health Center, Hasso Plattner Institute, University of P)*; Tunca, Can *(Bogazici University)*; Fischer, Eric *(Hasso-Plattner-Institut, University of Potsdam)*; Brahms, Clemens Markus *(University of Potsdam)*; Ersoy, Cem *(Bogazici University)*; Granacher, Urs *(University of Potsdam)*; Arnrich, Bert *(University of Potsdam, Digital Engineering Faculty, Hasso Plattn)*

Quantitative Frailty Assessment based on Kinematic Parameters of Daily Living Activities 4233-4238
Panhwar, Yasmeen Naz* *(University of Wollongong)*; Naghdy, Fazel *(University of Wollongong, Wollongong, NSW)*; Stirling, David *(UOW)*; Naghdy, Golshah *(University of Wollongong, Wollongong, NSW)*; Potter, Janette *(Illawara Health and Medical Research Institute and Graduate Sch)*

The Estimation of Circadian Rhythm using Smart Wear 4239-4242
Hazuki, Masuda* *(Graduate School Ritsumeikan University)*; Okada, Shima *(Ritsumeikan University)*; Shiozawa, Naruhiro *(Ritsumeikan University)*; Makikawa, Masaaki *(Ritsumeikan University)*; Goto, Daisuke *(Ritsumeikan University)*

Quantifying Y Balance Test Performance with Multiple and Single Inertial Sensors 4243-4247
Johnston, William* *(University College Dublin, Insight Centre)*; Davenport, James *(University College Dublin)*; Connelly, Rachelle *(University College Dublin)*; Caulfield, Brian *(UCD)*

Theme 07. Modeling and Analysis – I (Oral Session)

Robust Epileptic Seizure Detection on Wearable Systems with Reduced False-Alarm Rate 4248-4251
Zanetti, Renato* *(EPFL)*; Aminifar, Amir *(EPFL)*; Atienza, David *(EPFL)*

A Machine Learning Approach to Detecting Low Medication State with Wearable Technologies 4252-4255
Cheon, Andy *(University of San Francisco)*; Jung, Stephanie Yeoju *(University of San Francisco)*; Prather, Collin *(University of San Francisco)*; Sarmiento, Matt *(University of San Francisco)*; Wong, Kevin *(University of San Francisco)*; Woodbridge, Diane* *(University of San Francisco)*

Modeling Human Movement Behavior among Nursing Profession 4256-4260
Feng, Tiantian* *(Signal Analysis & Interpretation Lab, USC)*; Narayanan, Shrikanth *(Univ. of Southern California)*

The Efficacy of Support Vector Machines in Modelling Deviations from the Beer-Lambert Law for Optical Measurement of Lactate 4261-4264
Mamouei, MohammadHossein* *(City, University of London)*; Budidha, Karthik *(City, University of London)*; Baishya, Nystha *(City, University of London)*; Qassem, Meha *(City University London)*; Kyriacou, Panayiotis *(City University London)*

Skeleton Data Pre-Processing for Human Pose Recognition using Neural Network 4265-4268
Guerra, Bruna Maria Vittoria* *(Università degli Studi di Pavia)*; Ramat, Stefano *(Università di Pavia)*; Gandolfi, Roberto *(University of Pavia)*; Beltrami, Giorgio *(Università degli Studi di Pavia)*; Schmid, Micaela *(Università degli Studi di Pavia)*

Cuffless and Continuous Blood Pressure Estimation from PPG Signals using Recurrent Neural Networks . 4269-4272
El-Hajj, Chadi* *(City, University of London)*; Kyriacou, Panayiotis *(City University London)*

Theme 07. Modeling and Analysis – II (Oral Session)

Physiological Signal Monitoring for Identification of Emotional Dysregulation in Children 4273-4277
Redd, Christian B* *(CSIRO)*; Silvera-Tawil, David *(CSIRO)*; Hopp, Dagney *(Royal Far West)*; Zandberg, Daniel *(Cerebral Palsy Alliance)*; Martiniuk, Alexandra *(The University of Sydney)*; Dietrich, Colin *(SADA Systems)*; Karunanithi, Mohanraj *(CSIRO Digital Productivity Flagship)*

Numerical Modelling of a Nanopore-Based Resistive-Pulse Sensor for Detection of Biomolecules 4278-4281
Berkenbrock, José Alvim* *(University of Saskatchewan)*; Scherer, Torsten *(Institute of Nanotechnology, Karlsruhe Institute of Technology)*; Mail, Matthias *(Institute of Nanotechnology, Karlsruhe Institute of Technology)*; Achenbach, Sven *(Dept. of Electrical and Computer Engineering, University of)*

Evaluation of Apgar Scores and Non-Nutritive Sucking Skills in Infants using a Novel Sensitized Non-Nutritive Sucking System 4282-4285
Akbarzadeh, Saeed* *(Fudan University)*; Farhoodi, Roozbeh *(University of Pennsylvania)*; Lyu, Tianchan *(Fudan University)*; Awais, Muhammad *(Fudan University)*; Zhao, Xian *(Fudan University)*; Farooq Abbasi, Saadullah *(Fudan University)*; Chen, Wei *(Fudan University)*

Smart Alarm based on Sleep Stages Prediction 4286-4289
Slyusarenko, Kostyantyn* *(Samsung Electronics Ukraine Company, LLC)*; Fedorin, Illia *(Samsung R&D Institute Ukraine)*

Predicting Poor Sleep Quality in Fibromyalgia with Wrist Sensors 4290-4293
Alge, Olivia* *(University of Michigan)*; Soroushmehr, Sayedmohammadreza *(University of Michigan, Ann Arbor)*; Gryak, Jonathan *(University of Michigan)*; Kratz, Anna *(University of Michigan)*; Najarian, Kayvan *(University of Michigan - Ann Arbor)*

Electroencephalography Data-Driven Lighting System to Improve Sleep Quality in Intensive Care Unit Patients: A Case Study 4294-4297
Koh, Anna* *(Cornell University)*; van Schie, Twan *(Delft University of Technology)*; Park, Yanis *(Cornell University)*; Kalantari, Saleh *(Cornell University)*

Theme 07. Neural Implants (Oral Session)

A Power Efficient Low-Noise and High Swing CMOS Amplifier for Neural Recording Applications 4298-4301
Naderi, Kebria *(Guilan Univ.)*; Habibzadeh Tonekabony Shad, Erwin* *(Norwegian Univ. of Science and Technology)*; Molinas, Marta *(Norwegian Univ. of Science and Technology)*; Heidari, Ali *(Guilan Univ.)*

Micro Bio Processor Development Kit for Wireless Neural Implants 4302-4305
Hong, Young-Jun* *(Samsung Electronics Co., Ltd.)*; Lee, Jaechun *(Samsung Advanced Institute of Technology)*; Kim, Jonghan *(Samsung Advanced Institute of Technology)*; Bae, ChiSung *(Samsung Advanced Institute of Technology)*; Kang, Joonseong *(Samsung Advanced Institute of Technology)*; Kim, Jong Pal *(Samsung Advanced Institute of Technology)*; Kim, Sang Joon *(Samsung Electronics)*; Yevtushenko, Vitaliy *(Samsung Advanced Institute of Technology - Ukraine)*; Sydorenko, Maksym *(Samsung Advanced Institute of Technology - Ukraine)*

A Multi-Channel Neural Recording System with Adaptive Electrode Selection for High-Density Neural Interface 4306-4309
Lee, Han-Sol* *(Korea University)*; Park, Hangue *(Texas A&M University)*; Lee, Hyung-Min *(Korea University)*

Subretinal Stimulation Chip Set with 3025 Electrodes, Spatial Peaking Filter, Illumination Adaptation and Implant Lifetime Optimization 4310-4313
Rothermel, Albrecht* *(University of Ulm)*; Kaim, Hans *(University of Ulm, Institute of Microelectronics)*; Gambach, Stefan *(University of Ulm, Institute of Microelectronics)*; Schuetz, Henning *(University of Ulm, Institute of Microelectronics)*; Moll, Steffen *(University of Ulm, Institute of Microelectronics)*; Steinhoff, Raphael *(University of Ulm, Institute of Microelectronics)*; Herrmann, Thoralf *(NMI Tuebingen)*; Zeck, Günther *(Natural and Medical Sciences Institute at the University of Tübi)*

Design and Microfabrication Strategies for Thin-Film, Flexible Optical Neural Implant 4314-4317
Kampasi, Komal* *(Lawrence Livermore National Laboratory)*; Alameda, Jennifer *(Lawrence Livermore National Laboratory)*; Sahota, Sarah *(Lawrence Livermore National Laboratory)*; Hernandez, Jose *(Lawrence Livermore National Laboratory)*; Patra, Susant *(Lawrence Livermore National Laboratory)*; Haque, Razi *(Lawrence Livermore National Laboratory)*

Lossless Compression of Intracortical Extracellular Neural Recordings using Non-Adaptive Huffman Encoding 4318-4321
Savolainen, Oscar* *(Imperial College London)*; Constandinou, Timothy *(Imperial College of Science, Technology and Medicine)*

Theme 07. Neurological Applications (Oral Session)

Modular Optoelectronic System for Wireless, Programmable Neuromodulation during Free Behavior ... 4322-4325
Orguc, Sirma* *(Massachusetts Institute of Technology)*; Sands, Joanna *(Massachusetts Institute of Technology)*; Sahasrabudhe, Atharva *(Massachusetts Institute of Technology)*; Anikeeva, Polina *(Massachusetts Institute of Technology)*; Chandrakasan, Anantha P. *(Massachusetts Institute of Technology)*

Smartwatch-Based Activity Analysis during Sleep for Early Parkinson's Disease Detection 4326-4329
Iakovakis, Dimitrios* *(Aristotle University of Thessaloniki)*; Mastoras, Rafail Evangelos *(Aristotle University of Thessaloniki)*; Hadjidimitriou, Stelios *(AUTH)*; Charisis, Vasileios *(Aristotle University of Thessaloniki)*; Bostanjopoulou, Sevasti *(Dept. of Neurology, Hippokration Hospital, Thessalonik)*; Katsarou, Zoe *(Dept. of Neurology, Hippokration Hospital Thessaloniki, Gre)*; Klingelhoefer, Lisa *(Dept. of Neurology Technical University Dresden, Dresden, G)*; Reichmann, Heinz *(Dept. of Neurology Technical University Dresden, Dresden, G)*; Trivredi, Dhaval *(International Parkinson Excellence Research Centre, King's College)*; Chaudhuri, Ray *(International Parkinson Excellence Research Centre, King's College)*; Hadjileontiadis, Leontios *(Aristotle University of Thessaloniki)*

Comparison of Machine Learning Approaches for Classifying Upper Extremity Tasks in Individuals Post-Stroke 4330-4336
Miller, Aaron* *(University of Tennessee)*; Quinn, Lori *(Teachers College, Columbia University)*; Duff, Susan *(Chapman University, Physical Therapy)*; Wade, Eric *(California Polytechnic State University, San Luis Obispo)*

Non-Invasive Recording of Parasympathetic Nervous System Activity on Auricular Vagal Nerve Branch 4337-4340
Li, Ting-Yu *(National Chiao Tung University)*; Tsai, Wei-Chung *(Kaohsiung Medical University)*; Lin, Shien-Fong* *(National Chiao Tung University)*

Theme 07. New Sensing Techniques (Oral Session)

Pressure Sensitive Skin for Prosthetic Hands: 2D Contact Location Determination using Output Connections from a Single Side 4341-4344
Jabban, Leen* *(University of Bath)*; Metcalfe, Benjamin William *(University of Bath)*; Zhang, Dingguo *(University of Bath)*; Iravani, Pejman *(University of Bath)*

Automatic Detection of Intestinal Bleeding using an Optical Sensor for Wireless Capsule Endoscopy ... 4345-4348
Khan, Alimul *(University of Saskatchewan)*; Md Hanif Ali, Sohag *(University of Saskatchewan)*; Vedaei, Seyed Shahim* *(University of Saskatchewan)*; Mohebbian, MohammadReza *(University of Saskatchewan)*; Wahid, Khan A *(University of Saskatchewan)*

Assessing an Automatic Procedure of Extraction of Physiological Parameters from Skin using Video Photoplethysmography 4349-4352
Barbieri, Riccardo *(Politecnico di Milano)*; Levi, Riccardo *(Politecnico di Milano)*; Mollura, Maximiliano* *(Politecnico di Milano)*; Marsella, Irene *(Politecnico di Milano)*; Ficarelli, Luca *(Politecnico di Milano)*; Negro, Matteo *(Politecnico di Milano, Milan, Italy)*; Cerina, Luca *(Politecnico of Milan)*; Mainardi, Luca *(Politecnico di Milano)*

Measurement of Dermal Water Content using a Multi-Wavelength Optical Sensor 4353-4356
Mamouei, MohammadHossein* *(City, University of London)*; Razban, Meysam *(City, University of London)*; Qassem, Meha *(City University London)*; Kyriacou, Panayiotis *(City University London)*

Fully Auto-Calibrated Active-Stereo-Based 3D Endoscopic System using Correspondence Estimation with Graph Convolutional Network 4357-4360
Furukawa, Ryo* *(Hiroshima City University)*; Oka, Shiro *(Hiroshima University Hospital)*; Kotachi, Takahiro *(Hiroshima University Hospital)*; Okamoto, Yuki *(Hiroshima University Hospital)*; Tanaka, Shinji *(Hiroshima University Hospital)*; Sagawa, Ryusuke *(National Institute of Advanced Industrial Science and Technology)*; Kawasaki, Hiroshi *(Kyushu University)*

Theme 07. Novel Monitoring Methods (Oral Session)

Eating Episode Detection with Jawbone-Mounted Inertial Sensing 4361-4364
Chun, Keum San* *(The University of Texas at Austin)*; Jeong, Hyoyoung *(Northwestern University)*; Adaimi, Rebecca *(The University of Texas at Austin)*; Thomaz, Edison *(University of Texas at Austin)*

Deep Learning-Based Swallowing Monitor for Realtime Detection of Swallow Duration 4365-4368
Kuramoto, Naomi* *(University of Tsukuba)*; Ichimura, Kazuhiro *(Ichimura Dental Clinic)*; Jayatilake, Dushyantha *(Plimes Inc)*; Shimokakimoto, Tomoya *(University of Tsukuba)*; Hidaka, Kikue *(University of Tsukuba)*; Suzuki, Kenji *(University of Tsukuba)*

A Flexible Antenna Array with Integrated Switching Matrix for Breast Cancer Detection 4369-4372
Kendall, Wesley* *(McGill University)*; Kranold, Lena *(McGill University)*; Hahn, Conner *(Trinity University)*; Studebaker, Sam *(Trinity University)*; Schwartz, Joshua *(Trinity University)*; Popovic, Milica *(McGill University)*

Multimodal Electrophysiological Signal Measurement using a New Flexible and Conductive Polymer Fiber-Electrode 4373-4376
Gauthier, Nicolas* *(Laval University)*; Mourad, Roudjane *(Laval University)*; Frasie, Antoine *(Laval University)*; Loukili, Mouna *(Laval University)*; Ben Saad, Asma *(Laval University)*; Pagé, Isabelle *(Université du Québec à Trois-Rivières)*; Messaddeq, Younès *(Centre d'Optique, Photonique et Laser (COPL), Université Laval,)*; Bouyer, Laurent *(University of Laval)*; Gosselin, Benoit *(Laval University)*

Non-Invasive and Wearable Thermometer for Continuous Monitoring of Core Body Temperature under Various Convective Conditions 4377-4380
Matsunaga, Daichi* *(NTT Device Technology Labs)*; Tanaka, Yujiro *(NTT)*; Seyama, Michiko *(NTT Device Technology Labs)*; Nagashima, Kei *(Waseda University)*

Near Infrared and Aquaphotomic Analysis of Water Absorption in Lactate Containing Media 4381-4384
Baishya, Nystha* *(City, University of London)*; Mamouei, MohammadHossein *(City, University of London)*; Budidha, Karthik *(City, University of London)*; Qassem, Meha *(City University London)*; Vadgama, Pankaj *(Queen Mary University of London)*; Kyriacou, Panayiotis *(City University London)*

Theme 07. Novel Sensing Methods (Oral Session)

Miniaturized Devices for Bioluminescence Imaging in Freely Behaving Animals 4385-4389
Celinskis, Dmitrijs* *(Brown University)*; Friedman, Nina *(Brown University)*; Koksharov, Mikhail *(Brown University)*; Murphy, Jeremy *(Brown University)*; Gomez-Ramirez, Manuel *(University of Rochester)*; Borton, David *(Brown University)*; Shaner, Nathan *(University of California)*; Hochgeschwender, Ute *(Central Michigan University)*; Lipscombe, Diane *(Brown University)*; Moore, Christopher *(Brown University)*

Bed Exit Action Detection based on Patient Posture with Long Short-Term Memory 4390-4393
Inoue, Madoka* *(AIPHONE CO., LTD.)*; Taguchi, Ryo *(Nagoya Institute of Technology)*

Kick Ring LL: A Multi-Sensor Ring Capturing Respiration, Electrocardiogram, Oxygen Saturation, and Skin Temperature 4394-4397
Ummel, Jason* *(Purdue University)*; Hoilett, Orlando *(Purdue University)*; Walters, Benjamin *(Purdue University)*; Bluhm, Nicholas *(Purdue University)*; Pickering, Alyson *(Purdue University)*; Wilson, Damen *(Purdue University)*; Linnes, Jacqueline Callihan *(Purdue University)*

Chest-Based Real-Time Pulse and Respiration Monitoring based on Bio-Impedance 4398-4401
Heydari, Fatemeh* *(Monash University)*; Pour Ebrahim, Malikeh *(Dept. of Electrical and Computer Systems Engineering, Monas)*; Yuce, Mehmet *(Monash University)*

Smart Bedsheet for Baby Monitoring Application: Measurement and Characterization Results 4402-4405
Munidasa, Samal *(York University)*; Baghaei, Parastoo *(York University)*; Shim, Edward *(Studio 1 Labs Inc.)*; Lin, Olivia *(Studio 1 Labs)*; Ghafar-Zadeh, Ebrahim* *(York University)*

The Pattern of Tongue's Motion: A Free-Exploration Study 4406-4409
Soresini, Giulia *(University of Illinois at Chicago)*; Marjanovic, Nicholas *(University of Illinois at Chicago)*; Patton, James *(U. Illinois at Chicago (UIC), & the Shirley Ryan Ability Lab (fo)*; Esmailbeigi, Hananeh* *(University of Illinois at Chicago (UIC))*

Theme 07. Photoplethysmograpic Sensors (Oral Session)

Motion Artifact Canceling PPG Heart Rate Sensor based on an Adaptive Filter Algorithm with Variable Tap Length 4410-4413
Tajita, Mizuki *(Osaka City University)*; Hara, Shinsuke* *(Osaka City University)*

An Exploration of Blue PPG Signal using a Novel Color Sensor-Based PPG System 4414-4420
Shchelkanova, Evgeniia* *(Kyushu Institute of Technology)*; Shchelkanov, Alexander *(Omsk State Technical Univ.)*; Shchapova, Liia *(Omsk State Technical Univ.)*; Shibata, Tomohiro *(Kyushu Institute of Technology)*

Optical Flow Sensor as a Reference for Reduction of Motion Artefacts in Photoplethysmographic Measurements 4421-4424
de Pinho Ferreira, Nicolas* *(INL, CNRS UMR 5270, INSA Lyon, University of Lyon)*; Massot, Bertrand *(INL, CNRS UMR 5270, INSA Lyon, University of Lyon)*; Gehin, Claudine *(INSA Lyon)*

Robot Assisted Instantaneous Heart Rate Estimator using Camera based Remote Photoplethysmograpy via Plane-Orthogonal-to-Skin and Finite State Machine 4425-4428
Lee, Hooseok *(Wonkwang Univ. School of Medicine)*; Ko, Hoon *(Wonkwang Univ. School of Medicine)*; Chung, Heewon *(Wonkwang Univ. School of Medicine)*; Lee, Jinseok* *(Wonkwang Univ. School of Medicine)*

Theme 07. Physiological Monitoring (Oral Session)

Open-Source 128-Channel Bioamplifier Module for Ambulatory Monitoring of Gastrointestinal Electrical Activity 4429-4432
Erickson, Jonathan C.* *(Washington and Lee University)*; Reed, Beth *(Washington and Lee University)*; Wharton, Jeremy *(Washington and Lee University)*; Thapa, Utkrist *(Washington and Lee University)*; Robey, Jack *(Washington and Lee University)*; Shrestha, Riwaj *(Washington and Lee University)*

A New Gastric Impedancemeter for Detecting the Development of a Visceral Edema: A Proof-of-Concept Study on an Experimental Endotoxemic Shock 4433-4436
Dopierala, Cindy* *(Université Grenoble Alpes, TIMC-IMAG Lab)*; Gumery, Pierre-Yves *(Université Grenoble Alpes)*; Frikha, Mohamed-Ridha *(Université Grenoble Alpes, VetAgro Sup)*; Thiebault, Jean-Jacques *(Université Grenoble Alpes, VetAgro Sup)*; Junot, Stéphane *(VetAgro Sup, Campus Vétérinaire, BP 83,69280, Marcy 1'Etoile)*; Defaye, Pascal *(Université Grenoble Alpes, CHUGA)*; Carabelli, Adrien *(Univ. Grenoble Alpes, CNRS, Grenoble INP, VetAgro Sup, CHU Greno)*; Tuvignon, Patrick *(Université Grenoble Alpes, CHUGA)*; Remond, Didier *(Univ. Clermont Auvergne, INRAE, UNH, Clermont-Ferrand)*; Hermet, Julien *(Univ. Clermont Auvergne, INRAE, UNH, Clermont-Ferrand)*; Cohade, Benoît *(Univ. Clermont Auvergne, INRAE, UNH, Clermont-Ferrand)*; Basrour, Skandar *(TIMA (CNRS- Crenoble INP - UJF))*; Cinquin, Philippe *(Joseph Fourier University / CNRS)*; Boucher, Francois *(Univ. Grenoble Alpes, TIMC - IMAG)*

Are Cuffless Devices Challenged Enough? Design of a Validation Protocol for Ambulatory Blood Pressure Monitors at the Wrist: The Case of the Aktiia Bracelet 4437-4440
Sola, Josep* *(Aktiia SA)*; Vybornova, Anna *(Aktiia SA)*; Fallet, Sibylle *(Aktiia SA)*; Olivero, Elisa *(aktiia S.A.)*; De Marco, Bastien *(Aktiia SA)*; Grossenbacher, Olivier *(Aktiia SA)*; Ignjatovic, Natalija *(Aktiia SA)*; Ignjatovic, Blagoje *(Aktiia SA)*; Favre-Bulle, Matthieu *(Aktiia SA)*; Nora, Levinson *(Aktiia SA)*; Siutryk, Nadège *(Aktiia SA)*; Chapuis, Valentin *(Aktiia SA)*; Bertschi, Mattia *(Aktiia SA)*; Alpert, Bruce S. *(University of Tennessee (retired))*

Cuffless Blood Pressure Estimation for Activities of Daily Living 4441-4445
Landry, Cederick* *(University of Waterloo)*; Hedge, Eric *(Schlegel - University of Waterloo Research Institute for Aging)*; Hughson, Richard *(Faculty of Applied Health Sciences, University of Waterloo)*; D. Peterson, Sean *(University of Waterloo)*; Arami, Arash *(University of Waterloo)*

A Novel Mainstream Capnometer System for Non-Invasive Positive Pressure Ventilation 4446-4449
Baba, Yuya* *(Nihon Kohden Corporation)*; Takatori, Fumihiko *(Nihon Kohden Corporation)*; Inoue, Masayuki *(Nihon Kohden Corporation)*; Matsubara, Isao *(Nihon Kohden Corporation)*

A Novel Nasal Cannula Type Mainstream Capnometer System Capable of Oxygen Administration 4450-4453
Aoyagi, Takayuki* *(Nihon Kohden Corporation)*; Kabumoto, Kenichiro *(Nihon Koden Corporation)*; Takatori, Fumihiko *(Nihon Kohden Corporation)*; Inoue, Masayuki *(Nihon Kohden Corporation)*

Theme 07. Physiological Simulators and Phantoms (Oral Session)

A Fetal Movement Simulation System for Wearable Vibrational Sensors 4454-4457
Yang, Chenxi* *(Stevens Institute of Technology)*; Tavassolian, Negar *(Stevens Institute of Technology)*

Fabricating Novel PDMS Vessels for Phantoms in Photoplethysmography Investigations 4458-4461
Nomoni, Michelle* *(City, University of London)*; May, James *(City, University of London)*; Kyriacou, Panayiotis *(City University London)*

A Comparative Study of Skin Phantoms for Microwave Applications 4462-4465
Kranold, Lena *(McGill University)*; Boparai, Jasmine* *(McGill University)*; Fortaleza, Leonardo *(McGill University)*; Popovic, Milica *(McGill University)*

An Automated System for Reactive Accelerated Aging of Implant Materials with In-Situ Testing 4466-4469
Shen, Konlin* *(University of California, Berkeley)*; Yau, Annabel *(University of California, Berkeley)*; Panchavati, Saarang *(University of California, Berkeley)*; Maharbiz, Michel *(University of California, Berkeley)*

Theme 07. Signal Processing for Wearable Systems (Oral Session)

R-Peak Detection using a Hybrid of Gaussian and Threshold Sensitivity 4470-4474
Hsu, Po-Ya* *(UC San Diego)*; Cheng, Chung-Kuan *(University of California, San Diego)*

Development of Band-Shaped Device and Detection Algorithm of Laryngeal Elevation 4475-4478
Nakamoto, Hiroyuki* *(Kobe University)*; Katsuno, Yuki *(Kobe University)*; Yamamoto, Akio *(Kobe University)*; Umehara, Ken *(Kobe University)*; Hanaie, Kaoru *(Kobe University)*; Bessho, Yusuke *(Bando Chemical Industries, LTD)*; Kobayashi, Futoshi *(Kobe University)*; Ishikawa, Akira *(Kobe University)*

Motion-Affected Electrode-Tissue Interface Characterization for Ambulatory EEG Recording 4479-4482
Yousefi, Tayebeh *(York University)*; Dabbaghian, Alireza *(York University)*; Kassiri, Hossein* *(York University)*

A Proposed Phonography-Based Measurement of Fetal Breathing Movement using Segmented Structures with Frequency Splitting 4483-4486
Kovács, Ferenc *(Pázmány Péter Catholic University, Faculty of Information)*; Goda, Márton Áron* *(Pázmány Péter Catholic University)*; Hosszu, Gabor *(Budapest University of Technology and Economics)*; Telek, Tamás *(St. Margaret Hospital)*

Derivative based Gait Event Detection Algorithm using Unfiltered Accelerometer Signals 4487-4490
Escamilla-Nunez, Rafael *(University of Toronto)*; Aguilar, Luis *(University of Toronto)*; Ng, Gabriel* *(University of Toronto)*; Gouda, Aliaa *(University of Toronto)*; Andrysek, Jan *(University of Toronto)*

Estimation of the Lung Function using Acoustic Features of the Voluntary Cough 4491-4497
Nemati, Ebrahim* *(Digital Health Lab in Samsung Research America)*; Rahman, Md Juber *(The University of Memphis)*; Blackstock, Erin *(Massachusetts General Hospital)*; Nathan, Viswam *(Samsung Research America Inc.)*; Rahman, Md Mahbubur *(Samsung Research America)*; Vatanparvar, Korosh *(Samsung Research America)*; Kuang, Jilong *(Samsung Research America)*

Theme 07. Smart Textiles (Oral Session)

Woven Electrocardiogram (ECG) Electrodes for Health Monitoring in Operational Environments 4498-4501
Arquilla, Katya* *(University of Colorado Boulder)*; Webb, Andrea *(The Charles Stark Draper Laboratory)*; Anderson, Allison *(University of Colorado Boulder)*

Design and Preliminary Implementation of an Air Microfluidics Enabled Soft Robotic Knee Brace towards the Management of Osteoarthritis 4502-4505
Gao, Run Ze* *(University of Waterloo)*; Marriott, Kendal *(University of Waterloo)*; Dickerson, Clark R. *(University of Waterloo)*; Maly, Monica R. *(University of Waterloo)*; Ren, Carolyn Liqing *(University of Waterloo)*

Electrostatic Energy Harvesting from Human Interactions with Smart Paper Electronics 4506-4509
Zhou, Alyssa* *(University of California, Berkeley)*; Maharbiz, Michel *(University of California, Berkeley)*

A Modular Open Source Health Monitoring Garment 4510-4513
Hewgill, Blake* *(Univ. of Vermont)*; McGinnis, Ryan S. *(Univ. of Vermont)*; Frolik, Jeff *(Univ. of Vermont)*

NeoWarm: Kangaroo Mother Care with Continuous Temperature Tracking and Heating 4514-4517
Bluhm, Nicholas* *(Purdue University)*; Hoilett, Orlando *(Purdue University)*; Walters, Benjamin *(Purdue University)*; Pickering, Alyson *(Purdue University)*; Linnes, Jacqueline Callihan *(Purdue University)*; Bucher, Sherri *(Indiana University School of Medicine, Indiana University)*

Theme 07. Stress and Pain (Oral Session)

Multi-Level Stress Assesment using Multi-Domain Fusion of ECG Signal 4518-4521
Ahmad, Zeeshan* *(Ryerson University)*; Khan, Naimul *(Ryerson University)*

RR Interval Analysis for the Distinction between Stress, Physical Activity and No Activity using a Portable ECG 4522-4525
Scherz, Wilhelm Daniel* *(HTWG Konstan)*; Seepold, Ralf *(HTWG Konstanz)*; Ortega, Juan Antonio *(Universidad de Sevilla)*; Martinez Madrid, Natividad *(Reutlingen University)*

Pain Detection using a Smartphone in Real Time 4526-4529
Kong, Youngsun* *(University of Connecticut)*; Posada-Quintero, Hugo Fernando *(University of Connecticut)*; Chon, Ki *(University of Connecticut)*

Prediction of Stress and Mental Workload during Police Academy Training using Ultra-Short-Term Heart Rate Variability and Breathing Analyses 4530-4533
Tiwari, Abhishek* *(Institut National de la Recherche Scientifique)*; Cassani, Raymundo *(Institut National de la Recherche Scientifique)*; Gagnon, Jean-François *(Thales Research and Technology)*; Lafond, Daniel *(Thales Research and Technology Canada)*; Tremblay, Sebastien *(Université Laval)*; Falk, Tiago *(Institut National de la Recherche Scientifique)*

Joint Distribution and Transitions of Pain and Activity in Critically Ill Patients 4534-4538
Demrozi, Florenc* *(Computer Science Dept., University of Verona)*; Pravadelli, Graziano *(Computer Science Dept., University of Verona)*; Tighe, Patrick *(University of Florida)*; Bihorac, Azra *(University of Florida)*; Rashidi, Parisa *(University of Florida)*

Design of a Wearable System to Capture Physiological Data to Monitor Surgeons' Stress during Surgery 4539-4542
Jia, Zixun *(Massachusetts Institute of Technology)*; Mejorado, David *(Massachusetts Institute of Technology)*; Poullados, Spyros *(Massachusetts Institute of Technology)*; Bae, Hyemin *(Harvard University)*; Traverso, Giovanni *(Massachusetts Institute of Technology)*; Dias, Roger Daglius *(Brigham and Women's Hospital, Harvard Medical School)*; Hanumara, Nevan* *(Massachusetts Institute of Technology)*

Theme 07. Textile Sensors (Oral Session)

Simultaneous Measurements of Capacitive Electrocardiogram and Ballistocardiogram using In-Bed Fabric Sheet Electrode for Blood Pressure Estimation 4543-4546
Sakajiri, Yuichiro* *(Tokyo Denki University)*; Ueno, Akinori *(Tokyo Denki University)*

A Study of Sofa-Type Capacitive Coupling Electrocardiograph System to Measure Stress Relief for Sleeping or Resting with Oxygen Taking 4547-4550
Jang, Yongwon* *(Electronics & Telecom Research Inst.)*; Kim, Seunghwan *(Electronics & Telecom Research Inst)*; Kim, Kiseong *(BioBrain Inc.)*; Yoo, Done-Sik *(ETRI (Electronics & Telecom Research Inst))*

Textile based Sensing Blanket for ECG Monitoring in the Intensive Care Unit 4551-4554
Davis, Cynthia *(General Electric Research)*; Kao, Tzu-Jen* *(GE Global Research Center)*; Obi, Aghogho *(General Electric Research)*; Rao, Anoop *(Stanford University)*; Stoffel, Nancy *(General Electric Research)*

Study of Performance of Knitted Conductive Sleeves as Wearable Textile Strain Sensors for Joint Motion Tracking 4555-4558
Isaia, Cristina* *(University of Nottingham)*; McMaster, Simon Adair *(Footfalls and Heartbeats Limited)*; McNally, Donal *(University of Nottingham)*

A Textile Embedded Wearable Device for Movement Disorders Quantification 4559-4562
Oliveira, Ana *(INESC TEC)*; Dias, Duarte *(INESC TEC)*; Lopes, Elodie *(INESC TEC)*; Vilas-Boas, Maria do Carmo *(INESCTEC)*; Cunha, Joao Paulo Silva* *(INESC TEC / University of Porto)*

Modeling and Reconstructing Textile Sensor Noise: Implications for Wearable Technology 4563-4566
Tian, Yupeng *(University of Toronto)*; Abdizadeh, Mohammad *(Myant)*; Mahnam, Amin *(University of Isfahan)*; Bhattachan, Presish *(Myant)*; Alizadeh Meghrazi, Milad *(University of Toronto)*; Eskandarian, Ladan *(Myant)*; Kabir, Muammar Muhammad *(Toronto Rehabilitation Institute, University Health Network)*; Mellal, Idir *(University of Toronto)*; Popovic, Milos R. *(University of Toronto)*; Lankarany, Milad* *(University of Toronto)*

Theme 07. Wearable Assisted Rehabilitation (Oral Session)

A Hands-Free Human-Computer-Interface Platform for Paralyzed Patients using a TENG-Based Eyelash Motion Sensor 4567-4570
Anaya, David Fernando* *(Monash University)*; Yuce, Mehmet *(Monash University)*

A Comparative Severity Assessment of Impaired Balance Due to Cerebellar Ataxia using Regression Models 4571-4574
Ngo, Thang* *(Deakin University)*; Abeysekara, Lahiru *(Deakin University)*; Pathirana, Pubudu N *(Deakin University)*; Horne, Malcolm *(Florey Institute of Neuroscience and Mental Health)*; Power, Laura *(Royal Victorian Eye and Ear Hospital)*; Szmulewicz, David *(Victorian Eye and Ear Hospital)*

Breathing Biofeedback Relaxation Intervention for Wheelchair Users in City Navigation 4575-4578
Herrera, Roxana* *(University College London)*; Holloway, Catherine *(University College London)*; Morgado Ramirez, Dafne Zuleima *(University College London)*; Zhang, Bingqing *(University College London)*; Cho, Youngjun *(University College London)*

Wearable Inertial Sensors for Exergames and Rehabilitation 4579-4582
Bethi, Satish Reddy *(NYU Tandon School of Engineering)*; RajKumar, Ashwin *(New York University)*; Vulpi, Fabio *(NYU Tandon School of Engineering)*; Raghavan, Preeti *(John Hopkins University School of Medicine)*; Kapila, Vikram* *(NYU Tandon School of Engineering)*

Cloud-Based Multiplayer Exergaming: Developing a Platform for Social Interaction as a Motivational Tool for Exercising in the Wheelchair Community 4583-4587
Enciso, James *(California State University, Los Angeles)*; Variya, Dhruval *(California State University, Los Angeles)*; Sunthonlap, James *(California State University, Los Angeles)*; Velasco, James *(California State University, Los Angeles)*; Pebdani, Roxanna *(University of Sydney)*; de Leon, Ray *(California State University, Los Angeles)*; Keslacy, Stefan *(California State University, Los Angeles)*; Dy, Christine *(California State University, Los Angeles)*; Won, Deborah Soonmee* *(California State University, Los Angeles)*

A Wearable Pendant Sensor to Monitor Compliance with Range of Motion Lymphatic Health Exercise .. 4588-4591
Wazir, Hassam Khan *(New York University)*; Bethi, Satish Reddy *(NYU Tandon School of Engineering)*; RajKumar, Ashwin *(New York University)*; Caruso, Fabio *(New York University)*; Kapila, Vikram* *(NYU Tandon School of Engineering)*

Theme 07. Wearable Mobility Assessment (Oral Session)

Adaptive Gait Segmentation Algorithm for Walking Bout Detection using Tri-Axial Accelerometers 4592-4595
O'Callaghan, Ben P.F.* *(University College Dublin)*; Doheny, Emer *(University College Dublin)*; Goulding, Cathy *(University College Dublin)*; Fortune, Emma *(Mayo Clinic)*; Lowery, Madeleine *(University College Dublin)*

Real-World Speed Estimation using Single Trunk IMU: Methodological Challenges for Impaired Gait Patterns 4596-4599
Paraschiv-Ionescu, Anisoara* *(Ecole Polytechnique Federale)*; Soltani, Abolfazl *(EPFL)*; Aminian, Kamiar *(Ecole Polytechnique Federale de Lausanne)*

Mini-Logger – A Wearable Inertial Measurement Unit (IMU) for Postural Sway Analysis 4600-4603
Soangra, Rahul* *(Chapman University)*; Pollind, Michael *(Chapman University)*

Capturing Accelerometer Outputs in Healthy Volunteers under Normal and Simulated-Pathological Conditions using ML Classifiers 4604-4607
Filippou, Valeria* *(Univ. of Leeds)*; Redmond, Anthony *(Univ. of Leeds)*; Bennion, Jacqueline *(Royal Free London NHS Foundation Trust)*; Backhouse, Michael *(Univ. of York)*; Wong, David *(Univ. of Manchester)*

Step Count Standardization: Validation of Step Counts from the Withings Activite using PiezoRxD and WGT3X-BT 4608-4611
Au-Yeung, Wan-Tai M.* *(Oregon Health and Science University)*; Kaye, Jeffrey A. *(Oregon Health and Science University)*; Beattie, Zachary *(Oregon Health & Science University)*

Theme 07. Wearable Monitoring Applications (Oral Session)

Augmented Reality Approach for Marker-Based Posture Measurement on Smartphones 4612-4615
Basiratzadeh, Shahin* *(University of Ottawa, Ottawa Hospital Research Institute)*; Lemaire, Edward *(The Ottawa Hospital Rehab Centre)*; Baddour, Natalie *(University of Ottawa)*

Recurrence Quantification Analysis for Human Activity Recognition 4616-4619
Ngo, Thang* *(Deakin University)*; Champion, Benjamin T. *(Deakin University)*; Matthew, Joordens *(Deakin University, School of Engineering)*; Andrew, Price *(Deakin University, School of Engineering)*; David, Morton *(Deakin University, School of Engineering)*; Pathirana, Pubudu N *(Deakin University)*

A Real-Time Fuzzy Logic Biofeedback Controller for Freestyle Swimming Body Posture Adjustment 4620-4623
Li, Rui* *(Victoria University)*; Ye, Qiang *(Nanjing Sports Institute)*; Lai, Tze Huei, Daniel *(Victoria University)*

A Feasibility Study towards Instrumentation of the Sport Concussion Assessment Tool (iSCAT) 4624-4627
Celik, Yunus *(Northumbria University)*; Powell, Dylan *(Northumbria University, Newcastle Upon-Tyne, England, United Kin)*; Woo, Wai Lok *(Northumbria University)*; Stuart, Samuel *(Northumbria University)*; Godfrey, Alan* *(Northumbria University)*

A Smart Collar for Assessment of Activity Levels and Environmental Conditions for Guide Dogs 4628-4631
Williams, Evan *(North Carolina State University)*; Cleghern, Zach *(North Carolina State University)*; Foster, Marc *(North Carolina State University)*; Holder, Timothy *(North Carolina State University)*; Roberts, David *(North Carolina State University)*; Bozkurt, Alper* *(North Carolina State University)*

Theme 07. Wearable Physiological Monitoring (Oral Session)

An Alternative Way to Measure Respiration Induced Changes of Circumferences: A Pilot Study 4632-4635
Laufer, Bernhard* *(Furtwangen University)*; Krueger-Ziolek, Sabine *(Furtwangen University)*; Docherty, Paul David *(University of Canterbury)*; Hoeflinger, Fabian *(Albert-Ludwigs-Universität Freiburg)*; Reindl, Leonhard *(Albert-Ludwigs-Universität Freiburg)*; Moeller, Knut *(Furtwangen University)*

Estimating Sedentary Breathing Rate from Chest-Worn Accelerometry from Free-Living Data 4636-4639
Telfer, Brian* *(MIT Lincoln Laboratory)*; Williamson, James *(MIT Lincoln Laboratory)*; Weed, Lara *(MIT Lincoln Laboratory)*; Bursey, Max *(U.S. Army)*; Frazee, Royce *(U.S. Army)*; Galer, Meghan *(U.S. Army)*; Moore, Charles *(U.S. Army)*; Buller, Mark *(U.S. Army Research Institute of Environmental Medicine)*; Friedl, Karl *(University of California at San Francisco)*

Evaluation in Healthy Subjects of a Transcutaneous Carbon Dioxide Monitoring Wristband during Hypo and Hypercapnia Conditions 4640-4643
Grangeat, Pierre* *(Univ. Grenoble Alpes, CEA, LETI, Minatec Campus)*; Gharbi, Sadok *(CEA/LETI/MINATEC)*; Koenig, Anne *(Univ. Grenoble Alpes, CEA, LETI, Minatec Campus)*; Comsa, Maria-Paula *(Univ. Grenoble Alpes, CEA, LETI, Minatec Campus)*; Accensi, Marc *(Univ. Grenoble Alpes, CEA, LETI, Minatec Campus)*; Grateau, Henri *(Univ. Grenoble Alpes, CEA, LETI, Minatec Campus)*; Ghaith, Abdallah *(Grenoble Alpes University)*; Chacaroun, Samarmar *(Univ. Grenoble Alpes)*; Doutreleau, Stéphane *(Université Grenoble-Alpes ; CHU Grenoble-Alpes)*; Verges, Samuel *(Univ. Grenoble Alpes)*

Validating Sweat Ammonia as Physiological Parameter for Wearable Devices in Sports Science 4644-4647
Renner, Esther* *(Friedrich-Alexander University Erlangen-Nürnberg (FAU))*; Lang, Nadine *(Fraunhofer-Institut für Integrierte Schaltungen IIS)*; Langenstein, Bernd *(Klinikum Nürnberg)*; Struck, Matthias *(Fraunhofer IIS)*; Bertsch, Thomas *(Klinikum Nürnberg)*

Energy-Efficient Real-Time Myocardial Infarction Detection on Wearable Devices 4648-4651
Rashid, Nafiul* *(Univ. of California, Irvine)*; Al Faruque, Mohammad Abdullah *(Univ. of California, Irvine)*

Feasibility of Continuous Monitoring of Core Body Temperature using Chest-Worn Patch Sensor 4652-4655
Rajbhandary, Paurakh* *(Vital Connect Inc.)*; Nallathambi, Gabriel *(VitalConnect)*

Theme 07. Wearable Sensors (Oral Session)

Wireless Wearable SpO2 Sensor Module with Bendable Build-Up Substrate 4656-4659
Yoda, Atsuto* *(Shinko Electric Industries Co., Ltd.)*; Terasawa, Takehito *(Research & Development Division, Shinko Electric Industries Co.,)*; Fujii, Tomoharu *(Research & Development Division, Shinko Electric Industries Co.,)*; Ihara, Yoshihiro *(Research & Development Division, Shinko Electric Industries Co.,)*

Design of Magnetic Sensor based All-in-One Cardiorespiratory Health Monitoring System 4660-4663
Sarkar, Sayan* *(WeCare Medservice LLP)*

Comparison of Features by Simultaneous Measurement of Blood Pressure Pulse Wave and Electrocardiogram 4664-4667
Osawa, Yosuke* *(Chuo University)*; Hata, Satoshi *(Chuo University)*; Hori, Masataka *(Chuo University)*; Dohi, Tetsuji *(The University of Tokyo)*

Estimation of Respiration Rate and Sleeping Position using a Wearable Accelerometer 4668-4671
Doheny, Emer* *(University College Dublin)*; Lowery, Madeleine *(University College Dublin)*; Russell, Audrey *(St Vincent's University Hospital)*; Ryan, Silke *(St Vincent's University Hospital)*

Static Accuracy of Resistive Bend Sensors 4672-4675
Hollingshead, Robert Luke* *(Curtin University)*; Henry-Etesse, Louise *(ENSTA-Bretagne)*; Tankere, Emilien *(ENSTA-Bretagne)*; Kamper, Derek *(North Carolina State University)*; Tan, Tele *(Curtin University)*

Step Capacitive Array Sensor to Trigger Stimulation on Functional Electrical Stimulators Devices for Drop Foot: Preliminary Results 4676-4679
Aqueveque, Pablo *(Univ. of Concepcion)*; Pastene, Francisco *(Univ. of Concepcion)*; Osorio, Rodrigo *(Univ. of Concepcion)*; Gomez, Britam* *(Univ. of Concepcion)*; Ortega, Paulina *(Univ. of Concepcion)*

Theme 08. Biologically Inspired Robotics and Micro-Biorobotics – Modeling (Oral Session)

Autonomous Control of a Tendon-Driven Robotic Limb with Elastic Elements Reveals that Added Elasticity Can Enhance Learning 4680-4686
Marjaninejad, Ali* *(University of Southern California)*; Tan, Jie *(Google)*; Valero-Cuevas, Francisco *(University of Southern California)*

Simple Kinematic Feedback Enhances Autonomous Learning in Bio-Inspired Tendon-Driven Systems 4687-4693
Marjaninejad, Ali *(University of Southern California)*; Urbina-Meléndez, Darío *(1992)*; Valero-Cuevas, Francisco* *(University of Southern California)*

Sampling-Based Nonlinear Stochastic Optimal Control for Neuromechanical Systems 4694-4699
Reed, Emily* *(Univ. of Southern California)*; Pereira, Marcus Aloysius *(Georgia Institute of Technology)*; Valero-Cuevas, Francisco *(Univ. of Southern California)*; Theodorou, Evangelos *(Georgia Institute of Technology)*

Blind Obstacle Avoidance using Taxicab Geometry for Nanorobot-Assisted Direct Drug Targeting 4700-4703
Sharifi, Neda *(The University of Waikato)*; Ali, Muhammad* *(University of Waikato)*; Holmes, Geoffrey *(The University of Waikato)*; Chen, Yifan *(The University of Waikato)*

Bionic Design of a Disposable Compliant Surgical Forceps with Optimized Clamping Performance 4704-4707
Sun, Yilun* *(Technical University of Munich)*; Zhang, Dingzhi *(Technical University of Munich)*; Lueth, Tim *(Technical University of Munich)*

Design of a Portable Anthropomimetic Upper Limb Rehabilitation Device for Patients Suffering from Neuromuscular Disability 4708-4712
K, Vinay* *(IIIT Bangalore)*; Vazhiyal, Vikas *(NIMHANS)*; Rao, Madhav *(IIITBangalore)*

Theme 08. Computer-Assisted Surgery (Oral Session)

Development of Haptic Simulator for Practicing the Intraarticular Needle Injection under Echography ... 4713-4716
Alamilla, Ma de los Angeles* *(INSA-Lyon)*; Moreau, Richard *(INSA-Lyon)*; Redarce, Tanneguy *(Institut National des Sciences Appliquées (INSA de Lyon))*

In Vitro Assessment of the Role of the Nucleus Pulposus in the Mechanism of Vertebral Body Fracture under Dynamic Compressive Loading using High-Speed Cineradiography 4717-4720
Diotalevi, Lucien* *(École de Technologie Supérieure)*; Wagnac, Eric *(Ecole de Technologie Superieure)*; Laurent, Hugo *(Ecole de Technologie Superieure)*; Petit, Yvan *(École de Technologie Supérieure)*

Robot Technology in Analyzing Tooth Removal – A Proof of Concept 4721-4727
van Riet, Tom Cornelis Theodorus* *(Academic Medical Center, University of Amsterdam)*; De Graaf, Willem Mathys *(Delft University of Technology)*; van Antwerpen, Reinier *(Technical University Delft)*; van Frankenhuyzen, Jan *(Technical University Delft)*; de Lange, Jan *(Academic Medical Center, University of Amsterdam)*; Kober, Jens *(Delft University of Technology)*

Working Pose and Layout Optimization of Surgical Robot 4728-4731
Shi, Chao *(Beihang University)*; Zhu, Gang *(School of Biological Science and Medical Engineering, Beihang Un)*; Yan, Yadong *(Beihang University)*; Chen, Xiangqian *(Beihang University)*; Wang, Yu* *(Beihang University)*; U, Kaicheng *(Beihang University)*

3D Pose and Curvature Estimation of Bendable Interventional Device using Single-View X-Ray Image .. 4732-4736
Lim, Sunghwan *(Korea Institute of Science and Technology)*; Ha, Junhyoung *(Korea Institute of Science and Technology)*; Lee, Deukhee* *(Korea Institute of Science and Technology)*

Theme 08. Human-Machine Interfaces (Oral Session)

Usability and Acceptance of using a Lower-Limb Exoskeleton Controlled by a BMI in Incomplete Spinal Cord Injury Patients: A Case Study 4737-4740
Quiles, Vicente* *(Universidad Miguel Hernandez de Elche)*; Ferrero, Laura *(Universidad Miguel Hernandez de Elche)*; Ianez, Eduardo *(Universidad Miguel Hernandez de Elche)*; Ortiz, Mario *(Universidad Miguel Hernández)*; Megía, Álvaro *(Biomechanics Unit of the National Paraplegic Hospital)*; Comino, Natalia *(Biomechanics Unit of the National Paraplegic Hospital)*; Gil-Agudo, Ángel *(Hospital Nacional de Parapléjicos de Toledo)*; Azorin, Jose M. *(Universidad Miguel Hernandez de Elche)*

'Write' but Not 'Spell' Chinese Characters with a BCI-Controlled Robot 4741-4744
Han, Jin* *(Tianjin University)*; Xu, Minpeng *(Tianjin University)*; Wang, Yijun *(Institute of Semiconductors, Chinese Academy of Sciences)*; Tang, Jiabei *(Tianjin University)*; Liu, Miao *(Tianjin University)*; An, Xingwei *(Tianjin University)*; Jung, Tzyy-Ping *(University of California San Diego)*; Ming, Dong *(Tianjin University)*

Using SSVEP-BCI to Continuous Control a Quadcopter with 4-DOF Motions 4745-4748
Mei, Jie* *(Tianjin University)*; Xu, Minpeng *(Tianjin University)*; Wang, Lijie *(Tianjin University)*; Ke, Yufeng *(Tianjin University)*; Wang, Yijun *(Institute of Semiconductors, Chinese Academy of Sciences)*; Jung, Tzyy-Ping *(University of California San Diego)*; Ming, Dong *(Tianjin University)*

Fitts' Law in the Presence of Interface Inertia 4749-4752
Sutjipto, Sheila* *(University of Technology, Sydney)*; Lai, Yujun *(University of Technology Sydney (UTS))*; Carmichael, Marc Garry *(University of Technology, Sydney)*; Paul, Gavin *(UTS)*

Towards Sonomyography-Based Real-Time Control of Powered Prosthesis Grasp Synergies 4753-4757
Bimbraw, Keshav *(Georgia Institute of Technology)*; Fox, Elizabeth *(Georgia Institute of Technology)*; Weinberg, Gil *(Georgia Tech)*; Hammond, Frank L.* *(Georgia Institute of Technology)*

Estimation of Energy Absorption Capability of Arm using Force Myography for Stable Human-Machine Interaction 4758-4761
Ramos, Andres* *(Queen's University)*; Hashtrudi-Zaad, Keyvan *(Queen's University)*

Theme 08. Methodology in Biorobotics and Biomechatronics (Oral Session)

Development of a Learning-Based Terrain Classification Framework for Pushrim-Activated Power-Assisted Wheelchairs 4762-4765
Khalili, Mahsa* *(University of British Columbia)*; McConkey, Keenan *(University of British Columbia)*; Ta, Kevin *(University of British Columbia)*; Wu, Lyndia *(University of British Columbia)*; Van der Loos, H. F. Machiel *(University of British Columbia)*; Borisoff, Jaimie F. *(British Columbia Institute of Technology)*

A Novel Approach for Automatic State Detection of a Magnetically Actuated Capsule 4766-4769
Xu, Yangxin* *(The Chinese University of Hong Kong)*; Li, Keyu *(The Chinese University of Hong Kong)*; Meng, Max Q.-H. *(The Chinese University of Hong Kong)*

Automatic Tracking of the Muscle Tendon Junction in Healthy and Impaired Subjects using Deep Learning 4770-4774
Leitner, Christoph* *(Graz University of Technology)*; Jarolim, Robert *(Institute of Physics, University of Graz)*; Konrad, Andreas *(University of Graz)*; Kruse, Annika *(University of Graz)*; Tilp, Markus *(University of Graz)*; Schröttner, Jörg *(Graz University of Technology)*; Baumgartner, Christian *(Graz University of Technology)*

Comparative Study of a Biomechanical Model-Based and Black-Box Approach for Subject-Specific Movement Prediction 4775-4778
Walter, Johannes Raphael *(University of Stuttgart)*; Saini, Harnoor *(University of Stuttgart)*; Maier, Benjamin *(University of Stuttgart)*; Mostashiri, Naser *(University of Auckland)*; Lara, Jaime *(The University of Auckland)*; Zarshenas, Homayoon* *(University of Auckland)*; Hinze, Christoph *(University of Stuttgart)*; Shuva, Shahnewaz *(University of Stuttgart)*; Köhler, Johannes *(University of Stuttgart)*; Sahrmann, Annika Stephanie *(University of Stuttgart)*; Chang, Che-Ming *(University of Auckland)*; Csiszar, Akos *(University of Stuttgart)*; Galliani, Simona *(University of Auckland)*; Cheng, Leo K. *(The University of Auckland)*; Röhrle, Oliver *(University of Stuttgart)*

Development of Self-Adaptable Mechanism to Compensate Angle-Dependent Flexor Tone of the Elbow Joint Post-Stroke: A Pilot Study 4779-4782
Phan, Thanh *(Catholic University of America)*; Nguyen, Hien *(The Catholic University of America)*; Vermillion, Billy *(Catholic University of America)*; Lee, Sang Wook* *(Catholic University of America)*

Effects of a Head Support on Children with Hypotonia in the Cervical Spine 4783-4786
Kerst, Bradford* *(University of Tulsa)*; Crouch, Lynda *(Little Light House)*; Fox, Jamey *(University of Tulsa/Little Light House)*; Wilson, Julia *(University of Tulsa)*; Schultz, Joshua *(The University of Tulsa)*

Theme 08. Motor Control (Oral Session)

HD-EMG Electrode Count and Feature Selection Influence on Pattern-Based Movement Classification Accuracy 4787-4790
Lara, Jaime *(The University of Auckland)*; Paskaranandavadivel, Niranchan* *(The University of Auckland)*; Cheng, Leo K *(The University of Auckland)*

Analysis of Motor Unit Activities during Multiple Motor Tasks by Real-Time EMG Decomposition: Perspective for Myoelectric Control 4791-4794
Chen, Chen *(Shanghai Jiao Tong University)*; Yu, Yang *(Shanghai Jiao Tong University)*; Sheng, Xinjun* *(Shanghai Jiao Tong University)*; Zhu, Xiangyang *(Shanghai Jiao Tong University)*

Haptic Coupling in Dyads Improves Motor Learning in a Simple Force Field 4795-4798
Batson, Josiah *(University of Wyoming)*; Kato, Yasuhiro *(Saitama University)*; Shuster, Kathleen *(University of Wyoming)*; Patton, James *(U. Illinois at Chicago (UIC), & the Shirley Ryan Ability Lab (fo)*; Reed, Kyle *(University of South Florida)*; Tsuji, Toshiaki *(Saitama University)*; Novak, Domen* *(University of Wyoming)*

Muscles Cooperation Analysis using Akaike Information Criteria for Anterior Cruciate Ligament Injury Prevention 4799-4802
Uchiyama, Emiko* *(The University of Tokyo)*; Suzuki, Hinako *(The University of Tokyo)*; Ikegami, Yosuke *(The University of Tokyo)*; Nakamura, Yoshihiko *(University of Tokyo)*; Taketomi, Shuji *(The University of Tokyo Hospital)*; Kawaguchi, Kohei *(UTokyo Sports Science Initiative)*; Mizutani, Yuri *(The University of Tokyo)*; Doi, Tokuhide *(Geriatric Health Care Facility Narita Tomisato Tokushuen)*

Relations between Speed-Accuracy Trade-Off and Muscle Synergy in Isometric Contraction Tasks 4803-4806
Sano, Tsubasa* *(Nagaoka University of Technology)*; Takeda, Misaki *(Nagaoka University of Technology)*; Nambu, Isao *(Nagaoka University of Technology)*; Wada, Yasuhiro *(Nagaoka University of Technology)*

Evaluation of the Tiller Switch Layout of a Tractor using Eye-Fixation Related Potentials 4807-4810
Yoshioka, Naohito* *(Osaka Institute of Technology / Yanmar, Co., Ltd.)*; Kimura, Tomohiro *(Yanmar, Co., Ltd.)*; Shu, Yuzhuo *(Yanmar, Co., Ltd.)*; Okamatsu, Taro *(Yanmar, Co., Ltd.)*; Araki, Nobuyuki *(Yanmar, Co., Ltd.)*; Ohsuga, Mieko *(Osaka Institute of Technology)*

Theme 08. Musculo-Skeletal Biomechanics – I (Oral Session)

Classification of Post-Anterior Cruciate Ligament Dynamics using Non-Traditional Features 4811-4814
Alzakerin, Helia Mahzoun *(University of Connecticut)*; Halkiadakis, Yannis *(University of Connecticut)*; Morgan, Kristin* *(University of Connecticut)*

A Method for Quantitative Evaluation of a Valgus Knee Orthosis using Biplane X-Ray Images 4815-4818
Zeighami, Ali* *(École de Technologie Supérieure (ÉTS))*; Dumas, Raphaël *(Univ. Lyon, Université Claude Bernard Lyon 1, IFSTTAR)*; Bleau, Jacinte *(Laboratoire Orthopédique Médicus)*; Lavoie, Frédéric *(Centre Hospitalier de l'Université de Montréal)*; De Guise, Jacques *(Ecole de Technologie Supérieure)*; Aissaoui, Rachid *(École de Technologie Supérieure)*

Simultaneous in Vivo Estimation of Muscle, Tendon, and Ankle Impedance 4819-4822
Jakubowski, Kristen* *(Northwestern University)*; Ludvig, Daniel *(Northwestern University)*; Lee, Sabrina *(Northwestern University)*; Perreault, Eric *(Northwestern University)*

Estimating Trunk and Neck Stabilization for Avoiding Head Impact during Real-World Falls in Older Adults 4823-4826
Kuo, Calvin* *(University of British Columbia)*; Shishov, Natalie *(Simon Fraser University)*; Elabd, Karam *(Simon Fraser University)*; Komisar, Vicki *(Simon Fraser University)*; Chong, Helen *(Simon Fraser University)*; Phu, Tamara *(Simon Fraser University)*; Anderson, Lyndsey *(Simon Fraser University)*; Hoshizaki, Blaine *(University of Ottawa)*; Laing, Arthur *(Waterloo University)*; Cripton, Peter *(University of British Columbia)*; Robinovitch, Stephen *(Simon Fraser University)*

Machine Learning and Deep Neural Network Architectures for 3D Motion Capture Datasets 4827-4830
Boyle, Alistair* *(Univ. of Ottawa)*; Ross, Gwyneth B. *(Univ. of Ottawa)*; Graham, Ryan B *(Univ. of Ottawa)*

Design and Evaluation of a Modularized Ankle-Foot Orthosis with Quick Release Mechanism 4831-4834
Li, Wentao* *(University of Ottawa)*; Lemaire, Edward *(The Ottawa Hospital Rehab Centre)*; Baddour, Natalie *(University of Ottawa)*

Theme 08. Musculo-Skeletal Biomechanics – II (Oral Session)

Locally Periodic Kernel-Based Regression to Identify Time-Varying Ankle Impedance during Locomotion: A Simulation Study 4835-4838
Cavallo, Gaia* *(VUB)*; Schouten, Alfred C. *(Delft Univ. of Technology)*; Lataire, John *(Vrije Univ. Brussel)*

Muscle Synergy Control during Hand Reach Task on Varying Shoulder Configuration 4839-4843
Mazumder, Oishee* *(Tata Consultancy Services)*; Rai, Ayush *(Indian Institute of Technology Patna)*; Sinha, Aniruddha *(Tata Consultancy Services Ltd.)*

Combined Hind Limb Suspension and sRANK-L on Bone Strength in Mice by Finite Element Analysis: Effects of Anatomic Model Height 4844-4847
Hezrony, Benjamin* *(The College of New Jersey)*; Speacht, Toni *(Penn State College of Medicine)*; Donahue, Henry *(Virginia Commonwealth University)*; Lau, Anthony *(The College of New Jersey)*

Statistical Human Body Shape Model Including Elderly People 4848-4853
Yoshiyasu, Yusuke* *(AIST)*; Samy, Vincent *(CNRS-AIST JRL)*; Imamura, Yumeko *(The National Institute of Advanced Industrial Science and Techno)*; Ayusawa, Ko *(National Institute of Advanced Industrial Science and Technology)*; Sagawa, Ryusuke *(National Institute of Advanced Industrial Science and Technology)*; Yoshida, Eiichi *(National Institute of Advanced Industrial Science and Technology)*

Ankle Torque Forecasting using Time-Delayed Neural Networks 4854-4857
Zarshenas, Homayoon* *(University of Auckland)*; Ruddy, Bryan *(University of Auckland)*; Kempa-Liehr, Andreas *(University of Auckland)*; Besier, Thor *(University of Auckland)*

Estimating Lower Limb Kinematics using Distance Measurements with a Reduced Wearable Inertial Sensor Count 4858-4862
Sy, Luke* *(University of New South Wales)*; Lovell, Nigel H. *(University of New South Wales)*; Redmond, Stephen James *(University of New South Wales)*

Theme 08. Rehabilitation Robotics (Oral Session)

Personalized Balance and Fall Risk Visualization with Kinect Two 4863-4866
Hayashibe, Mitsuhiro* *(Tohoku University)*; Gonzalez, Alejandro *(CONACYT-Universidad Autónoma de San Luis Potosí)*; Tournier, Maxime *(INRIA CAMIN team and LIRMM, CNRS/University of Montpellier)*

HandMATE: Wearable Robotic Hand Exoskeleton and Integrated Android App for at Home Stroke Rehabilitation 4867-4872
Sandison, Melissa* *(The Catholic University of America)*; Phan, Khue *(Catholic University of America)*; Casas, Rafael *(The Catholic University of America)*; Nguyen, Lan *(The Catholic University of America)*; Lum, Michael *(University of Maryland)*; Pergami-Peries, Matteo *(Catholic University of America)*; Lum, Peter *(The Catholic University of America)*

Developing a Hybrid Soft Mechanism for Assisting Individualized Flexion and Extension of Finger Joints 4873-4877
Kokubu, Shota* *(Chiba University)*; Yu, Wenwei *(University of Chiba)*

Subject-Specific, Impairment-Based Robotic Training of Functional Upper Limb Movements 4878-4881
Nguyen, Hien *(The Catholic University of America)*; Phan, Thanh *(Catholic University of America)*; Vermillion, Billy *(Catholic University of America)*; Lee, Sang Wook* *(Catholic University of America)*

Developing a Method to Control an Arm-Assist-Suit by Predicting Arm-Trajectory using Electromyography 4882-4885
Tanaka, Taichi* *(Nagaoka University of Technology)*; Nambu, Isao *(Nagaoka University of Technology)*; Wada, Yasuhiro *(Nagaoka University of Technology)*

Movement Strategy and EMG Activities of the Upper Extremity at Assisted Reaching Exercise with a 7 DOF Collaborative Robot 4886-4889
Kato, Yasuhiro* *(Saitama University)*; Olenšek, Andrej *(University Rehabilitation Institute Republic of Slovenia)*; Zadravec, Matja *(University Rehabilitation Institute Republic of Slovenia)*; Matjaèiæ, Zlatko *(University Rehabilitation Institute)*; Tsuji, Toshiaki *(Saitama University)*; Cikajlo, Imre *(University Rehabilitation Institute)*

Theme 08. Surgical Robotics (Oral Session)

Development and Preclinical Trials of a Novel Steerable Cannula for 360° Arthroscopic Capsular Release in Minimally Invasive Surgery 4890-4894
Kim, Jongwoo *(Biorobotics LAB, Seoul National University)*; Kim, YoonJeong *(KIST)*; Cho, Kyu-Jin *(Seoul National University)*; Kim, Keri* *(Korea Institute of Science and Technology)*

Development of a Variable-Stiffness and Shape-Detection Manipulator based on Low-Melting-Point-Alloy for Minimally Invasive Surgery 4895-4898
Wei, Xiaoyong *(Nanjing University of Aeronautics and Astronautics)*; Ju, Feng *(Nanjing University of Aeronautics and Astronautics)*; Chen, Bai* *(Nanjing University of Aeronautics and Astronautics)*; Guo, Hao *(Nanjing University of Aeronautics and Astronautics)*; Qi, Fei *(Nanjing University of Aeronautics and Astronautics)*; Bai, Dongming *(NUAA)*; Ding, Yadong *(Nanjing University of Aeronautics and Astronautics)*

Palpation-Based Multi-Tumor Detection Method Considering Moving Distance for Robot-Assisted Minimally Invasive Surgery 4899-4902
Yun, Yahui *(Nanjing University of Aeronautics and Astronautics)*; Ju, Feng* *(Nanjing University of Aeronautics and Astronautics)*; Zhang, Yingxuan *(Nanjing University of Aeronautics and Astronautics)*; Zhu, Chengjun *(Jiangsu Province Hospital)*; Wang, Yaoyao *(Nanjing University of Aeronautics and Astronautics)*; Guo, Hao *(Nanjing University of Aeronautics and Astronautics)*; Wei, Xiaoyong *(Nanjing University of Aeronautics and Astronautics)*; Chen, Bai *(Nanjing University of Aeronautics and Astronautics)*

Characterizing Limits of Vision-Based Force Feedback in Simulated Surgical Tool-Tissue Interaction ... 4903-4908
Huang, Kevin* *(Trinity College)*; Chitrakar, Digesh *(Trinity College)*; Mitra, Rahul *(Trinity College)*; Subedi, Divas *(Trinity College)*; Su, Yun-Hsuan *(University of Washington)*

VibroSleeve: A Wearable Vibro-Tactile Feedback Device for Arm Guidance 4909-4912
Prabhu, Deepa* *(Swinburne University of Technology)*; Hasan, Muhammad Muhammad Mehedi Al Emran *(Swinburne University of Technology)*; Wise, Lisa *(Swinburne University of Technology)*; MacMahon, Clare *(La Trobe University)*; McCarthy, Chris *(Swinburne University of Technology)*

Theme 08. Wearable Robotics – I (Oral Session)

System Identification to Characterise Shoulder Joint Dynamics in Two Degrees of Freedom 4913-4916
Yahya, Yahya Z.* *(The University of Auckland, Auckland Bioengineering Institute)*; Besier, Thor *(University of Auckland)*; Taberner, Andrew *(The University of Auckland)*; Ruddy, Bryan *(University of Auckland)*

Shoulder Muscles Electromyographic Responses in Automotive Workers Wearing a Commercial Exoskeleton 4917-4920
Pinho, João *(University of São Paulo)*; Parik-Americano, Pedro *(University of Sao Paulo)*; Taira, Camila *(University of Sao Paulo)*; Pereira, William *(Mercedes Benz do Brasil)*; Caparroz, Edilene *(Mercdes Benz do Brasil)*; Forner-Cordero, Arturo* *(Escola Politécnica da Universidade de Sao Paulo)*

Design of a Passive, Variable Stiffness Exoskeleton for Triceps Deficiency Mitigation 4921-4925
McPherson, Andrew* *(Univ. of California, Berkeley)*; Matthew, Robert, P *(UC Berkeley)*; Estrada, Michael *(Univ. of California, Berkeley)*; Bajcsy, Ruzena *(UC Berkeley, CITRIS)*; Tomizuka, Masayoshi *(UC Berkeley)*

Wearable Shoulder Exoskeleton with Spring-Cam Mechanism for Customizable, Nonlinear Gravity Compensation 4926-4929
Asgari, Morteza *(University of Tennessee)*; Hall, Patrick *(University of Tennessee)*; Moore, Bradley *(University of Tennessee)*; Crouch, Dustin Lee* *(University of Tennessee - Knoxville)*

A Mechanized Pediatric Elbow Joint Powered by a DE-Based Artificial Skeletal Muscle 4930-4935
Behboodi, Ahad* *(University of Delaware)*; DeSantis, Cody *(University of Delaware)*; Lubsen, Jacob *(University of Delaware)*; Lee, Samuel *(Shriners Hospital for Children)*

Motor-Augmented Wrist-Driven Orthosis: Flexible Grasp Assistance for People with Spinal Cord Injury ... 4936-4940
McPherson, Andrew* *(University of California, Berkeley)*; Patel, Vatsal *(Yale University)*; Downey, Phillip *(University of California, Berkeley)*; Alvi, Ahmed Abbas *(The University of Hong Kong)*; Abbott, Michael *(University of California, Berkeley)*; Stuart, Hannah *(University of California, Berkeley)*

Theme 08. Wearable Robotics – II (Oral Session)

Development of a Tendon-Driven Wearable Assist System for Thumb Motion of Hand Paralysis 4941-4946
Yoshikawa, Dan* *(University of Tsukuba)*; Kawamoto, Hiroaki *(University of Tsukuba)*; Sankai, Yoshiyuki *(University of Tsukuba)*

A Prosthetic Gripper with Three Opposing Fingers Driven by a Hydraulic Actuator 4947-4950
Yamanaka, Yuma* *(Osaka Institute of Technology)*; Yoshikawa, Masahiro *(Osaka Institute of Technology)*

A Tendon-Driven Prosthetic Hand using Continuum Structure 4951-4954
Yan, Yadong *(Beihang University)*; Wang, Yu* *(Beihang University)*; Chen, Xiangqian *(Beihang University)*; Shi, Chao *(Beihang University)*; Yu, Jiazheng *(Beihang University)*; Cheng, Chang *(Colorado College)*

Sonomyography Combined with Vibrotactile Feedback Enables Precise Target Acquisition without Visual Feedback 4955-4958
Patwardhan, Shriniwas* *(George Mason University)*; Mukherjee, Biswarup *(Indian Institute of Technology Madras)*; Dhawan, Ananya *(GMU)*; Alzamani, Meena *(George Mason University)*; Noor, Abdul *(George Mason University)*; Engdahl, Susannah *(George Mason University)*; Joiner, Wilsaan *(George Mason University)*; Sikdar, Siddhartha *(George Mason University)*

HERCULES: A Three Degree-of-Freedom Pneumatic Upper Limb Exoskeleton for Stroke Rehabilitation 4959-4962
Burns, Martin *(Stevens Institute of Technology)*; Zavoda, Zachary *(Stevens Institute of Technology)*; Nataraj, Raviraj *(Case Western Reserve University)*; Pochiraju, Kishore *(Stevens Institute of Technology)*; Vinjamuri, Ramana* *(Stevens Institute of Technology)*

An Electric Cosmetic Prosthetic Hand with Vibrotactile Sense 4963-4966
Sakuma, Mizuki* *(Nagoya Institute of Technology)*; Kito, Yuki *(Nagoya Institute of Technology)*; Tanaka, Yoshihiro *(Nagoya Institute of Technology)*; Yoshikawa, Masahiro *(Osaka Institute of Technology)*; Kawashima, Noritaka *(Research Institute, National Rehabilitation Center for Persons Wi)*

Theme 09. Computer Modeling and Simulation (Oral Session)

A Model and Simulation with Therapeutic Device-Protocol Design Implications for Acute and Chronic Wounds 4967-4973
O'Clock, George* *(University of Minnesota)*; Strouse Watt, Wendy *(DuBois Vision Clinic)*

Estimation of Yttrium-90 Distribution in Liver Radioembolization using Computational Fluid Dynamics and Deep Neural Networks 4974-4977
Taebi, Amirtaha* *(University of California, Davis)*; Vu, Catherine *(University of California, Davis)*; Roncali, Emilie *(University of California, Davis)*

Development and Validation of a Predictive Model for Hemodynamic Responses to Resuscitation during Uncontrolled Hemorrhage 4978-4981
Reisner, Nicholas *(Massachusetts General Hospital)*; Peterson, Jeffrey *(Massachusetts General Hospital)*; Dubick, Michael *(US Army Institute for Surgical Research)*; Reisner, Andrew* *(Massachusetts General Hospital)*

Towards Improving Sleep Quality using Automatic Sleep Stage Classification and Binaural Beats 4982-4985
Munoz, Jose Pablo *(Univ. del Valle de Guatemala)*; Rivera, Luis Alberto* *(Univ. Del Valle de Guatemala)*

Practical Machine Learning-Based Sepsis Prediction 4986-4991
Pettinati, Michael *(Biofourmis)*; Chen, Gengbo *(Biofourmis)*; Rajput, Kuldeep Singh *(Biofourmis)*; Selvaraj, Nandakumar* *(Biofourmis Inc)*

Kinematic Simulations of Static Radiographs Provides Discriminating Features of Multiple Hip Pathologies 4992-4995
Adewuyi, Adewale *(Harvard University)*; Levy, Emily *(The University of Texas at Dallas)*; Wells, Joel *(The University of Texas Southwestern Medical Center)*; Avneesh, Chhabra *(The University of Texas Southwestern Medical Center)*; Fey, Nicholas* *(The University of Texas at Dallas)*

Theme 09. CV Diagnostics, Therapies and Safety (Oral Session)

Blood Pressure Measurement by Coupling an External Pressure and Photo-Plethysmographic Signals 4996-4999
Lubin, Mathilde* *(CEA Léti MINATEC)*; Vray, Didier *(INSA-LYON, CNRS UMR5220, INSERM U630)*; Bonnet, Stéphane *(CEA Léti MINATEC)*

Challenging the Limitations of Atrial Fibrillation Detection in the Presence of Other Cardiac Arrythmias ... 5000-5003
Genzoni, Elsa *(Swiss Center for Electronics and Microtechnology (CSEM), Neuchât)*; Braun, Fabian* *(CSEM SA)*; Van Zaen, Jérôme *(Swiss Center for Electronics and Microtechnology (CSEM), Neuchât)*; Renevey, Philippe *(CSEM)*; Lemay, Mathieu *(CSEM)*; Pruvot, Etienne *(Lausanne University Hospital (CHUV), Lausanne, Switzerland)*; Vesin, Jean-Marc *(EPFL)*

Using Resting State Heart Rate Variability and Skin Conductance Response to Detect Depression in Adults 5004-5007
Tyszczuk Smith, Lukasz* *(Univ. of Sheffield)*; Levita, Liat *(The Univ. of Sheffield)*; Amico, Francesco *(Trinity College Dublin)*; Fagan, Jennifer *(Trinity College Dublin)*; H. Yek, John *(Trinity College Dublin)*; Brophy, Justin *(Trinity College Dublin)*; Zhang, Haihong *(Institute for Infocomm Research)*; Arvaneh, Mahnaz *(Univ. of Sheffield)*

Modeling Approach for an Aortic Dissection with Endovascular Stenting 5008-5011
Shiraishi, Yasuyuki* *(Tohoku University)*; Yambe, Tomoyuki *(Tohoku Univ)*; Narracott, Andrew James *(University of Sheffield)*; Qian, Yi *(Macquarie University)*; Yamada, Akihiro *(Tohoku University)*

An Innovative Hybrid Approach for Detection of Pacemaker Pulses at Low Sampling Frequency 5012-5015
Nallathambi, Gabriel* *(VitalConnect)*; Selvaraj, Nandakumar *(Biofourmis Inc)*; Rajbhandary, Paurakh *(Vital Connect Inc.)*

Safety of a High-Efficiency Electrical Fence Energizer 5016-5020
Kroll, Mark William* *(University of Minnesota)*; Perkins, Pete *(Safety Engineering)*; Pratt, Hugh *(CPLSO)*; Stuart, Edward *(Amarok, Inc)*; Bury, Joseph *(Amarok, Inc)*; Panescu, Dorin *(Zidan Medical, Inc.)*

Theme 09. Drug Delivery and Microfluidics (Oral Session)

Computer Modeling of Drug Delivery with Thermosensitive Liposomes in a Realistic Three-Dimensional Geometry 5021-5024
Ramajayam, Krishna* *(Medical University of South Carolina)*; Wolfe, A. Marissa *(Ralph H. Johnson VA Medical Center)*; Motamarry, Anjan *(Medical University of South Carolina)*; Yost, John *(Medical Univ. of South Carolina)*; Yost, Michael *(Medical Univ. of South Carolina)*; Haemmerich, Dieter *(Medical University of South Carolina)*

Microfluidic Valve Arrays for Drug Delivery in Organ-on-Chips 5025-5028
Gharib, Isam* *(Polytechnique Montreal)*; Sawan, Mohamad *(Ecole Polytechnique)*

Examining the Anti-Tumor Activity of Dp44mT-Loaded Nanoparticles in Vitro 5029-5032
Holley, Claire *(University of Houston)*; Majd, Sheereen* *(University of Houston)*

Planning Framework for Robot-Assisted Blood-Brain Barrier Opening with Focused Ultrasound 5033-5036
Thomas, Gaelle* *(University of Strasbourg, CNRS, ICube)*; Barbé, Laurent *(University of Strasbourg, CNRS, ICube)*; Larrat, Benoît *(1 NeuroSpin, Direction de la Recherche Fondamentale, Institut de)*; Agou, Pauline *(NeuroSpin, Direction de la Recherche Fondamentale, Institut des)*; Vappou, Jonathan *(ICube Laboratory)*; Nageotte, Florent *(University of Strasbourg)*

Development and Characterization of a PCB-Based Microfluidic Y-Channel 5037-5040
Kassanos, Panagiotis* *(Imperial College London)*; Seichepine, Florent *(Imperial College London)*; Kassanos, Ioannis *(National Technical University of Athens)*; Yang, Guang-Zhong *(Imperial College London)*

Smartphone-Enabled Dynamic Chemiluminescence Biomarker Quantitation using Acoustic Tweezers Approach 5041-5044
Chen, Xian *(Tianjin University)*; Liu, Bohua *(Tianjin University)*; Pang, Wei *(Tianjin University, College of Precision Instruments and Opto-el)*; Duan, Xuexin* *(Tianjin University)*

Theme 09. Hyperthermia and Thermal Therapies (Oral Session)

Surfactant Enhanced Laser-Induced Vapor Bubbles for Potential use in Thulium Fiber Laser Lithotripsy .. 5045-5048
Giglio, Nicholas *(University of North Carolina at Charlotte)*; Hutchens, Thomas *(University of North Carolina at Charlotte)*; Wilson, Christopher *(University of North Carolina at Charlotte)*; Gonzalez, David *(University of North Carolina at Charlotte)*; Fried, Nathaniel* *(Univ of North Carolina at Charlotte)*

Novel Optical Linear Beam Shaping Designs for use in Laparoscopic Laser Sealing of Vascular Tissues ... 5049-5052
Hutchens, Thomas *(University of North Carolina at Charlotte)*; Giglio, Nicholas *(University of North Carolina at Charlotte)*; Cilip, Christopher *(Univ of North Carolina at Charlotte)*; Rosenbury, Sarah *(University of North Carolina at Charlotte)*; Hardy, Luke *(University of North Carolina at Charlotte)*; Kerr, Duane *(Medtronic)*; Nau, William *(Medtronic)*; Fried, Nathaniel* *(Univ of North Carolina at Charlotte)*

A New Model for Estimation of Individual Blood Flow Effect during Multimode Thermal Therapy of Tumor ... 5053-5056
Wang, Yifei *(Shanghai Jiao Tong University)*; Zhang, Kangwei *(Shanghai Jiao Tong University)*; Zhang, Aili* *(Shanghai Jiao Tong University)*; Xu, Lisa Xuemin *(Shanghai Jiaotong University)*

Temperature Estimation for MR-Guided Microwave Hyperthermia using Block-Based Compressed Sensing 5057-5060
Faridi, Pegah *(Kansas State University)*; Shrestha, Tej *(Kansas State University)*; Pyle, Marla *(Kansas State University)*; Basel, Matthew *(Kansas State University)*; Bossmann, Stefan *(Kansas State University)*; Prakash, Punit *(Kansas State University)*; Natarajan, Balasubramaniam* *(Kansas State University)*

Limb Hypothermia for the Prevention of Chemotherapy-Induced Peripheral Neuropathy – Modality for Optimal Cooling 5061-5064
Bandla, Aishwarya* *(National University of Singapore)*; Santhanakrishnan, Priyadharshini *(National University of Singapore)*; Magarajah, Gayathiri *(National University of Singapore)*; Vaidya, Gauri Ajey *(National University of Singapore)*; Subramanian, Arjun *(National University of Singapore)*; He, Wei *(Singapore Institute of Manufacturing Technology, A*STAR)*; Wilder-Smith, Einar P V *(Natioinal University of Singapore, National University Hospital)*; Lee, Soo Chin *(National University Health System)*; Thakor, Nitish *(National University of Singapore)*; Sundar, Raghav *(National University Health System)*

Theme 09. Image-Guided and Catheter Therapies (Oral Session)

An Adaptive Respiratory Motion Compensation Algorithm with Singular Value Decomposition for Intracardiac Catheter Tracking 5065-5068
Lai, Dakun* *(University of Electronic Science and Technology of China)*; Ding, Fangmei *(University of Electronic Science and Technology of China)*; Xie, Chunliu *(University of Electronic Science and Technology of China)*; Zhang, Yifei *(University of Electronic Science and Technology of China)*

Active Endoscope Preserving Image Orientation for Endonasal Skull Base Surgery 5069-5072
Ryu, Geunwoong *(Korea Institute of Science and Technology, Korea University of S)*; Park, Chul Min *(Korea Institute of Science and Technology (KIST))*; Kim, Jeongryul *(Korea Institute of Science and Technology)*; Kim, Keri* *(Korea Institute of Science and Technology)*

Development of an Electrical Impedance Tomography Spectroscopy for Pressure Ulcer Monitoring Tool: Preliminary Study 5073-5076
Kang, SooIn* *(The University of Tokyo)*; Noyori, Shuhei *(The University of Tokyo)*; Noguchi, Hiroshi *(Osaka City University)*; Takahashi, Toshiaki *(The University of Tokyo)*; Sanada, Hiromi *(The University of Tokyo)*; Mori, Taketoshi *(The University of Tokyo)*

Minimally Invasive Real-Time Electrical Impedance Spectroscopy Diagnostic Tool for Lung Parenchyma Pathologies 5077-5080
Riu, Pere J* *(Universitat Politecnica de Catalunya (UPC))*; Company, Georgina *(Universitat Politecnica de Catalunya)*; Bragos, Ramon *(Technical University of Catalonia (UPC))*; Rosell, Javier *(Universitat Politècnica de Catalunya)*; Paredes, Virginia *(Hospital de la Santa Creu i Sant Pau)*; Torrego, Alfons *(HSCSP)*

Surgical Tracking, Registration, and Navigation Characterization for Image-Guided Renal Interventions ... 5081-5084
Jackson, Peter* *(Rochester Institute of Technology)*; Simon, Richard A. *(Rochester Institute of Technology)*; Linte, Cristian A. *(Rochester Institute of Technology)*

A Hamiltonian Engine for Radiotherapy Optimization 5085-5088
Malekmohammadi, Mehrdad* *(University of Toronto)*; Dabiri, Keivan *(University of Toronto)*; Mathews, Joshua *(Dept. of Radiation Medicine, Roswell Park Comprehensive Can)*; Nazareth, Daryl *(Dept. of Radiation Medicine, Roswell Park Comprehensive Can)*; Tamura, Hirotaka *(DXR Laboratory Inc., Yokohama, Japan)*; Sheikholeslami, Ali *(University of Toronto)*

Theme 09. Laboratory and Ambulatory Systems – I (Oral Session)

Case Study: Application of a Systematic Quality Improvement Methodology to a Medical Device Safety Alerts Process 5089-5092
Gribbons, Brendan, Brendan* *(Lower Mainland Biomedical Engineering)*; Yong, Laura *(Lower Mainland Biomedical Engineering)*

Increasing the Safety of Unannounced Meal Detection for Artificial Pancreas Closed-Loop with Patient's Hourly Meal Schedule 5093-5096
Villeneuve, Emma* *(Univ. Grenoble Alpes, CEA, LETI, F-38000 Grenoble.)*; Lachal, Sylvain *(Diabeloop)*; Desir, Chesner *(DIABELOOP)*; Benhamou, Pierre Yves *(Univ. Grenoble Alpes, CHU Grenoble Alpes, Endocrinology, CS10217)*; Franc, Sylvia *(CERITD)*; Charpentier, Guillaume *(Centre Hospitalier Sud-Francilien, Dept. of Diabetes and En)*; Huneker, Erik *(Diabeloop)*; Doron, Maeva *(CEA LETI)*

Evaluation of the Pulse Wave in the Face for the Patients with Rotary Blood Pump (RP) in the Outpatient Clinic 5097-5100
Yambe, Tomoyuki* *(Tohoku Univ)*

A Comparison of Manual and Robot Assisted Retinal Vein Cannulation in Chicken Chorioallantoic Membrane 5101-5105
Patel, Niravkumar* *(Johns Hopkins University)*; Urias, Muller *(Johns Hopkins University)*; He, Changyan *(Johns Hopkins University)*; Gehlbach, Peter *(Johns Hopkins Medical Institute)*; Iordachita, Iulian *(Johns Hopkins University)*

VR Glasses based Measurement of Responses to Dichoptic Stimuli: A Potential Tool for Quantifying Amblyopia? 5106-5110
Panachakel, Jerrin Thomas* *(Indian Institute of Science, Bangalore)*; A. G., Ramakrishnan *(Indian Institute of Science, Bangalore)*; K.P., Manjunath *(Nethra Eye Hospital, Bengaluru)*

In Silico Cloning of Target Type 2 Diabetes Population for Treatments Development and Decision Support 5111-5114
Visentin, Roberto* *(University of Padova,)*; Schiavon, Michele *(University of Padova)*; Dalla Man, Chiara *(University of Padova)*

Theme 09. Laboratory and Ambulatory Systems – II (Oral Session)

Pulse Oximetry at the Wrist during Sleep: Performance, Challenges and Perspectives 5115-5118
Braun, Fabian* *(CSEM SA)*; Theurillat, Patrick *(CSEM SA)*; Proenca, Martin *(CSEM SA)*; Lemkaddem, Alia *(CSEM)*; Ferrario, Damien *(CSEM)*; De Jaegere, Kurt *(Dept. of Pulmonary Medicine, University Hospital (Inselspit)*; Horvath, Christian M *(Dept. of Pulmonary Medicine, University Hospital (Inselspit)*; Roth, Corinne *(Dept. of Neurology (Sleep- Wake-Epilepsy Centre), University)*; Brill, Anne-Kathrin *(Dept. of Pulmonary Medicine, University Hospital (Inselspit)*; Lemay, Mathieu *(CSEM)*; Ott, Sebastian R. *(Dept. of Pulmonary Medicine, University Hospital (Inselspit)*

Blood Collection from the Porcine Ear using a Jet Injector 5119-5123
Xu, Jiali* *(Auckland Bioengineering Institute, The University of Auckland)*; Mckeage, James William *(Auckland Bioengineering Institute)*; Ruddy, Bryan *(University of Auckland)*; Nielsen, Poul *(The University of Auckland)*; Taberner, Andrew *(The University of Auckland)*

Characterisation of Upper Airway Collapse in OSA Patients using Snore Signals: A Cluster Analysis Approach 5124-5127
Sebastian, Arun* *(University of Sydney)*; Cistulli, Peter *(University of Sydney)*; Cohen, Gary *(Sleep Investigation Laboratory, Center for Sleep Health and Rese)*; de Chazal, Philip *(University of Sydney)*

Diagnosis System for Swallowing and Peristalsis Function for Artificial Tongue and Esophagus Development 5128-5131
Yambe, Tomoyuki* *(Tohoku Univ)*

A Usability and User-Experience Analysis of VitalsAssist: A mHealth Application to Monitor Vital Signs in Acute Care Settings 5132-5135
Baig, Mirza Mansoor *(Orion Health)*; GholamHosseini, Hamid* *(Auckland University of Technology)*; Ahmad, Farhan *(VitalsAssist)*

Model-Based Analysis for Real-Time Label-Free Ultraviolet Quantification of Ultrafast Plasmonic Polymerase Chain Reaction 5136-5139
Mohammadyousef, Padideh* *(McGill University)*; Paliouras, Miltiadis *(Lady Davis Institute for Medical Research Jewish General Hospital)*; Trifiro, Mark A. *(Lady Davis Institute for Medical Research Jewish General Hospita)*; Kirk, Andrew G. *(McGill University)*

Theme 09. Laboratory and Ambulatory Systems – III (Oral Session)

Short Term Blood Glucose Prediction based on Continuous Glucose Monitoring Data 5140-5145
Mohebbi, Ali* *(Technical University of Denmark)*; Johansen, Alexander Rosenberg *(Technical University of Denmark)*; Hansen, Nicklas *(Technical University of Denmark)*; Christensen, Peter Ebert *(Technical University of Denmark)*; Tarp, Jens *(Novo Nordisk)*; Jensen, Morten Lind *(Novo Nordisk A/S)*; Bengtsson, Henrik *(Novo Nordisk A/S)*; Morup, Morten *(DTU Compute)*

Investigation of a Ballistocardiogram-Based Technique for Unobtrusive Monitoring of Fluid Accumulation in the Body 5146-5149
Suriani, Irene* *(Technical University Eindhoven)*; Bulut, Murtaza *(Philips Research)*; van Lieshout, Ron *(Philips Research)*; Bouma, Peter *(Philips Research)*; Dellimore, Kiran *(Philips Research)*

Performance Evaluation of the Circadia Contactless Breathing Monitor and Sleep Analysis Algorithm for Sleep Stage Classification 5150-5153
Lauteslager, Timo* *(Circadia Technologies Ltd.)*; Kampakis, Stylianos *(Circadia Technologies Ltd)*; Williams, Adrian J. *(Professor of Sleep Medicine, King's College London)*; Maslik, Michal *(Imperial College London)*; Siddiqui, Fares *(Circadia Technologies Ltd)*

Assessment of Air-Oxygen Blender and Flow Meter Setup in Neonatal Intensive Care Units 5154-5157
Dion, Joseph* *(Lower Mainland Biomedical Engineering)*; Sosnowski, Emil-Peter *(Lower Mainland Biomedical Engineering)*; Mirembe, Tina *(Lower Mainland Biomedical Engineering)*

Theme 09. Robot-Assisted Therapies and Rehabilitation (Oral Session)

IRebot: An Interactive Rehabilitation Robot with Gesture Control 5158-5161
Segal, Avigal* *(Colorado School of Mines)*; Lesak, Mark C. *(United States Military Academy)*; Suttora, Neil *(University)*; Silverman, Anne *(Colorado School of Mines)*; Petruska, Andrew J. *(Colorado School of Mines)*

Kinematic Biomarkers of Chronic Neck Pain during Curvilinear Walking: A Data-Driven Differential Diagnosis Approach 5162-5166
Jiménez-Grande, David* *(Univ. of Birmingham)*; Atashzar, Seyed Farokh *(ECE Dept. at Western Univ. (UWO), and Canadian Surgica)*; Martinez-Valdes, Eduardo *(Univ. of Birmingham)*; De Nunzio, Alessandro Marco *(LUNEX International Univ. of Health, Exercise and Sports)*; Falla, Deborah *(Univ. of Birmingham)*

The Development and in Vivo Validation of an External Fixation Device with Standardized Micromotion for Accelerating Fracture Healing 5167-5170
Qi, Weichen* *(The University of Hong Kong)*; Feng, Xiaoreng *(Dept. of Orthopaedics and Traumatology, Queen Mary Hospital)*; Zhang, Teng *(The University of Hong Kong, Queen Marry Hospital)*; Leung, Frankie Ka-Li *(The University of Hong Kong)*

Robotic Assessments of Proprioception and the Impact of Age 5171-5175
Davies, Tristan Luke* *(Curtin Univ.)*; Parsons, Richard Whaddon *(Curtin Univ.)*; Tan, Tele *(Curtin Univ.)*

Multiscale Entropy Derived Complexity Index Analysis Demonstrates Significant Mediolateral Sway in Persons with Multiple Sclerosis Compared to Healthy Controls 5176-5179
Etzelmueller, Mark* *(Trinity College Dublin)*; Yap, Siew Mei *(St. Vincent's University Hospital)*; O'Keeffe, Clodagh *(Trinity College Dublin)*; Gaughan, Maria *(St. Vincent's University Hospital)*; McGuigan, Chris *(St. Vincent's University Hospital)*; Reilly, Richard *(Trinity College Dublin)*

A Study of the Safety and Functionality of Gamified Electromyographic Biofeedback for Children with Cerebral Palsy 5180-5183
Narducci, Ellie* *(Curtin University)*; Mouttet, Kirsty *(Curtin University)*; Shahbazi, Amir *(Curtin University)*; Pool, Dayna *(Curtin University)*; Tan, Tele *(Curtin University)*

Theme 09. Stimulation and Electrophysiological Mapping – I (Oral Session)

Long-Term Non-Anesthetic Preclinical Study Available Extra-Cranial Brain Activator (ECBA) System for the Future Minimally-Invasive Human Neuro-Modulation 5184-5187
Lee, Hyungwoo* *(Samsung Advanced Institute of Technology)*; Mun, Junseung *(POSTECH)*; Lee, Jin San *(KyungHee University Medical Center)*; Chung, Yeongu *(Asan Medical Center)*; Jung, Wooram *(Samsung Medical Center)*; Kang, Joonseong *(Samsung Advanced Institute of Technology)*; Park, Sung-Min *(POSTECH)*; Kang, Wonok *(Pohang University of Science and Technology (POSTECH))*; Kim, Sehyeon *(POSTECH)*; Seo, Dae Won *(Samsung Medical Center)*; Na, Duk-Lyul *(Samsung Medical Center)*; Shon, Young-Min *(Samsung Medical Center)*; Kim, Sang Joon *(Samsung Electronics)*

Miniaturized Intracerebral Potential Recorder for Long-Term Local Field Potential of Deep Brain Signals . 5188-5191
Wu, Yi-Hui* *(National Chiao-Tung Univ.)*; Ou-Yang, Yi-Huan *(Biomedical Electronics Translational Research Center (BETRC), Na)*; Chen, Chiung-Chu *(Chang Gung Univ.)*; Lee, Chen-Yi *(National Chiao Tung Univ.)*; Wu, Chung-Yu *(National Chiao Tung Univ.)*; Ker, Ming-Dou *(National Chiao Tung Univ.)*

Device Configuration and Patient's Body Composition Significantly Affect RF Heating of Deep Brain Stimulation Implants during MRI: An Experimental Study at 1.5T and 3T 5192-5197
Bhusal, Bhumi* *(Northwestern University)*; Thanh Nguyen, Bach *(Northwestern University, Dept. of Radiology, Feinberg School)*; Vu, Jasmine *(Northwestern University)*; Elahi, Behzad *(Northwestern University, Dept. of Physical Therapy and Huma)*; Rosenow, Joshua *(Northwestern University)*; Nolt, Mark J. *(Northwestern University)*; Pilitsis, Julie *(Albany Medical College)*; DiMarzio, Marisa *(Albany Medical College)*; Rad, Laleh Golestani *(Northwestern University)*

Changes in Autonomic Nervous System and Axillary Temperature Caused by Electric Potential Therapy 5198-5201
Toriumi, Kyouhei *(Kogakuin University)*; Fukuoka, Yutaka* *(Kogakuin University)*

Physiological Modeling of Concentration-Effect Relationship for Nondepolarizing Neuromuscular Blocking Drugs 5202-5207
Hoshino, Hikaru* *(University of Hyogo)*; Furutani, Eiko *(Kyoto University)*; Sugawara, Tomonori *(Kagawa University)*; Takeda, Toshihiro *(Kagawa University Hospital)*; Sawanobori, Yoshiharu *(Kagawa University)*; Shirakami, Gotaro *(Kagawa University Hospital)*

Electrical Stimulation of the Infraorbital Nerve Induces Diving Reflex in a Dose-Controlled Manner 5208-5211
Shah, Kevin *(Northwell Health)*; Sonti, Anup *(Feinstein Institutes for Medical Research)*; Wu, Yi-Chen *(Feinstein Institute for Medical Research)*; Powell, Keren *(Feinstein Institutes for Medical Research)*; Li, Chunyan* *(Feinstein Institute for Medical Research)*; Doobay, Mohini D. *(Feinstein Institute for Medical Research)*; Narayan, Raj *(Feinstein Institute for Medical Research)*

Theme 09. Stimulation and Electrophysiological Mapping – II (Oral Session)

Trace Mapping: A New Visualization Technique for Analyzing Gastrointestinal High-Resolution Electrical Mapping Data 5212-5215
Chan, Chih-Hsiang Alexander *(Univ. of Auckland)*; Aghababaie, Zahra *(Univ. of Auckland)*; Paskaranandavadivel, Niranchan *(The Univ. of Auckland)*; Cheng, Leo K *(The Univ. of Auckland)*; Avci, Recep *(The Univ. of Auckland)*; Angeli, Timothy Robert* *(Auckland Bioengineering Institute, Univ. of Auckland)*

Measurement of Vagus Nerve Response to Transcutaneous Electrical Ear Canal Stimulation in Anesthetized Rat 5216-5219
Imazawa, Wataru* *(Tokyo Denki University)*; Nakamura, Hajime *(Tokyo Denki University)*; Yagi, Masayuki *(Tokyo Medical and Dental University)*; Morishita, Koji *(Tokyo Medical and Dental University)*; Otomo, Yasuhiro *(Tokyo Medical and Dental University)*; Ueno, Akinori *(Tokyo Denki University)*

Design and Experimental Research of Implantable Lower Esophageal Sphincter Stimulator based on Android Bluetooth 5220-5223
Chen, Xi-wen *(Southeast University)*; Lü, Xiaoying* *(Southeast University)*; Wang, Zhigong *(Southeast University)*; Fan, Zhining *(The First Affiliated Hospital of Nanjing Medical University)*; Zhu, Chuanqing *(Southeast University)*; Chen, Jia-Wei *(First Affiliated Hospital of Nanjing Medical University)*; Zhao, Lili *(The First Affiliated Hospital of Nanjing Medical University)*

Electroencephalogram Reactivity to Hyperglycemia in Patients with Type 1 Diabetes 5224-5227
Ngo, Cuong Q.* *(Swinburne Univ. of Technology)*; Chai, Rifai *(Swinburne Univ. of Technology)*; Jones, Timothy *(Princess Margaret Hospital for Children)*; Nguyen, Hung T. *(Swinburne Univ. of Technology)*

A Smartphone based Platform for Portable Non-Invasive Light and Sound Neuromodulation 5228-5231
Jacob, Nikhil Kurian *(University of Manchester)*; Kings, Holly Olivia *(Cardiff University)*; Casson, Alexander James* *(The University of Manchester)*

Frequency-Dependent Light Stimulation Effects on Performance during Vigilance Tasks on a Laptop 5232-5235
Victor, Luis Hector* *(Rice University)*; Sano, Akane *(Rice University)*

Theme 09. Therapeutic Ultrasound (Oral Session)

Fusion of Multiple-Angles Intraoperative US Images and Pretreatment MR Images for USgHIFU Treatment of Uterine Fibroid: Retrospective Evaluation based on Clinical Dataset 5236-5239
Yang, Cong *(Shanghai Jiao Tong Univ.)*; Huang, Qianwen *(School of Biomedical Engineering, Shanghai Jiao Tong Univ.)*; Ji, Xiang *(Shanghai Jiao Tong Univ.)*; Bai, Jingfeng* *(Shanghai Jiao Tong Univ.)*

Safety Assessment of a Wearable Low-Intensity Pulsed Ultrasound Device for Relieving Mental Illness Symptoms 5240-5243
Chen, JIe* *(University of Alberta)*

Photo-Mediated Ultrasound Therapy to Treat Retinal Neovascularization 5244-5247
Paulus, Yannis* *(University of Michigan)*; Qin, Yu *(University of Michigan)*; Yu, Yixin *(University of Michigan)*; Fu, Julia *(University of Michigan)*; Wang, Xueding *(University of Michigan)*; Yang, Xinmai *(University of Kansas)*

Theme 09. Thermal Ablation (Oral Session)

Sensor-Free Force Control of Tendon-Driven Ablation Catheters through Position Control and Contact Modeling 5248-5251
Jolaei, Mohammad *(Concordia University)*; Hooshiar, Amir* *(Concordia University)*; Sayadi, Amir *(Concordia University)*; Dargahi, Javad *(Concordia University)*; Packirisamy, Muthukumaran *(University of Concordia)*

Long-Term Survival Results Following Endobronchial RF Ablation in a Healthy-Porcine Model 5252-5258
Yoneda, Ken *(University of California, Davis)*; Herth, Felix *(University of Heidelberg, Germany)*; Spangler, Taylor *(VDx Veterinary Diagnostics)*; Raina, Shashank *(Zidan Medical)*; Panescu, Dorin* *(Zidan Medical, Inc.)*

Transmural Temperature Monitoring to Quantify Thermal Conduction and Lesion Formation during Gastric Ablation, an Emerging Therapy for Gastric Dysrhythmias 5259-5262
Sayat, Mikhael *(Auckland Bioengineering Institute, University of Auckland)*; Aghababaie, Zahra *(University of Auckland)*; Cheng, Leo K *(The University of Auckland)*; Paskaranandavadivel, Niranchan *(The University of Auckland)*; Avci, Recep *(The University of Auckland)*; Rickus, Johan *(Auckland Bioengineering Institute, University of Auckland)*; Ruha, Wharengaro *(Auckland Bioengineering Institute, University of Auckland)*; Angeli, Timothy Robert* *(Auckland Bioengineering Institute, University of Auckland)*

Assessment of Thermal Damage to Myometrium during Microwave Ablation of Uterine Fibroids 5263-5266
Zia, Ghina *(Kansas State University)*; Sebek, Jan *(Kansas State University)*; Alvarez, Estefi *(Hologic)*; Prakash, Punit* *(Kansas State University)*

Multi-Physics Modeling of Thermoacoustic Pulse Generation and Propagation during Pulsed Microwave Ablation of Tissue 5267-5271
Evans, Audrey* *(University of Wisconsin)*; Ma, Chu *(University of Wisconsin-Madison)*; Hagness, Susan *(University of Wisconsin-Madison)*

Monitoring Focal Laser Ablation with Interstitial Fluence Probes: Monte Carlo Simulation and Phantom Validation 5272-5275
Geoghegan, Rory* *(University of California, Los Angeles)*; Priester, Alan *(University of California, Los Angeles)*; Zhang, Le *(University of California, Los Angeles)*; Wu, Holden *(University of California, Los Angeles)*; Marks, Leonard *(University of California, Los Angeles)*; Natarajan, Shyam *(University of California, Los Angeles)*

Theme 10. Bioinformatics – Bioinformatics for Health Monitoring (Oral Session)

ECG-Based Identity Validation during Bathing in Different Water Temperature 5276-5279
Xu, Jianbo* *(The University of Aizu)*; Cui, Peng *(The University of Aizu)*; Chen, Wenxi *(University of Aizu)*

Electroencephalography Symmetry in Power, Waveform and Power Spectrum in Major Depression 5280-5283
Lin, Ziyi *(University of Chinese Academy of Sciences)*; Liu, Juntao *(Institute of Electronics, Chinese Academy of Sciences)*; Duan, Feng *(The Sixth Medical Center of PLA General Hospital)*; Liu, Rui *(The Sixth Medical Center of PLA General Hospital)*; Xu, Shengwei *(Institute of Electronics, Chinese Academy of Science)*; Cai, Xinxia* *(Institute of Electronics, Chinese Academy of Sciences)*

An Effective Disease Risk Indicator Tool 5284-5287
Taha, Kamal* *(Khalifa University)*; Yoo, Paul *(Bournemouth University)*

Mitigating Hypovolemia-Induced Miscalibration of Photoplethysmogram-Derived Blood Pressure 5288-5291
Zia, Jonathan* *(Georgia Institute of Technology)*; Kimball, Jacob *(Georgia Institute of Technology)*; Hahn, Jin-Oh *(University of Maryland)*; Inan, Omer *(Georgia Institute of Technology)*

An Empirical Method of Automatic Pattern Extraction for Clinical Text Classification 5292-5295
Hussain, Musarrat* *(Kyung Hee University)*; Hussain, Jamil *(Ubiquitous Computing Laboratory)*; Ali, Taqdir *(Kyung Hee University, South Korea)*; Lee, Sungyoung *(Kyung Hee University)*

Collecting Big Behavioral Data for Measuring Behavior against Obesity 5296-5299
Papapanagiotou, Vasileios *(Aristotle University of Thessaloniki)*; Sarafis, Ioannis *(Aristotle University of Thessaloniki)*; Diou, Christos* *(Aristotle University of Thessaloniki)*; Ioakimidis, Ioannis *(Karolinska Institute, NVS, Division of Applied Neuroendocrinolog)*; Charmandari, Evangelia *(Biomedical Research Foundation of the Academy of Athens)*; Delopoulos, Anastasios *(Aristotle University of Thessaloniki)*

Theme 10. Bioinformatics – Omics and Computational Biology (Oral Session)

Integrative Analysis to Identify Race-Associated Metabolite Biomarkers for Hepatocellular Carcinoma 5300-5303
Chen, Yifan *(Georgetown University)*; Barefoot, Megan *(Georgetown University Medical Center)*; Varghese, Rency *(Georgetown University Medical Center)*; Wang, Kuijun *(Georgetown University)*; Di Poto, Cristina *(Georgetown University)*; Ressom, Habtom* *(Georgetown University)*

A Network-Based Embedding Method for Drug-Target Interaction Prediction 5304-5307
Parvizi, Poorya* *(The University of Edinburgh)*; Azuaje, Francisco *(UCB Celltech)*; Theodoratou, Evropi *(The University of Edinburgh)*; Luz, Saturnino *(University of Edinburgh)*

Evaluating the Predictability of Cancer Types from 536 Somatic Mutations: A New Dataset 5308-5311
Dehkharghanian, Taher* *(University of Ontario Institute of Technology)*; Rahnamayan, Shahryar *(University of Ontario Institute of Technology (UOIT))*; Tizhoosh, Hamid Reza *(University of Waterloo)*

Predicting Cancer Types From miRNA Stem-Loops using Deep Learning 5312-5315
Laplante, Jean-Francois *(Université de Moncton)*; Akhloufi, Moulay* *(Université de Moncton)*

Identification of Differentially Expressed Subpathways via a Bilevel Consensus Scoring of Network Topology and Gene Expression 5316-5319
Balomenos, Panos* *(University of Patras)*; Dragomir, Andrei *(National University of Singapore)*; Tsakalidis, Athanasios *(University of Patras)*; Bezerianos, Anastasios *(National University of Singapore)*

Epigenetic Changes Associated with Mechanisms of Disparities in Hepatocellular Carcinoma 5320-5325
Varghese, Rency *(Georgetown University Medical Center)*; Zhou, Yuan *(Georgetown University)*; Chen, Yifan *(Georgetown University)*; Barefoot, Megan *(Georgetown University Medical Center)*; Tadesse, Mahlet *(Georgetown University)*; Ressom, Habtom* *(Georgetown University)*

Theme 10. General and Theoretical Informatics: Algorithms (Oral Session)

Accurate TMS Head Modeling: Interfacing SimNIBS and BEM-FMM in a MATLAB-Based Module 5326-5329
Bicalho Saturnino, Guilherme* *(Technical University of Denmark)*; Wartman, William *(Worcester Polytechnic Institute)*; Makarov, Sergey *(Electrical and Computer Engineering, Worcester PolytechnicInstit)*; Thielscher, Axel *(Copenhagen University Hospital Hvidovre, Denmark & Biomedical En)*

Automatic Sleep Stage Detection: A Study on the Influence of Various PSG Input Signals 5330-5334
Tautan, Alexandra-Maria* *(University Politehnica of Bucharest)*; Rossi, Alessandro C. *(Onera Health)*; de Francisco, Ruben *(Onera Health)*; Ionescu, Bogdan *(Universitatea Politehnica of Bucharest)*

Apneic Event Estimation Only using SpO2 Dynamics in Sleep Apnea Patients 5335-5338
Yoon, Heenam *(Seoul National University)*; Choi, Ji Ho *(Soonchunhyang University Bucheon Hospital)*; Baek, Hyun Jae* *(Soonchunhyang University)*

A Per-Sample Digitized Algorithm for Automatically Detecting Apnea and Hypopnea Events from Airflow and Oximetry 5339-5342
Uddin, Md* *(University of Technology Sydney)*; Chow, Chin Moi *(The University of Sydney)*; Ling, Sai Ho, Steve *(University of Technology Sydney)*; Su, Steven Weidong *(University of Technology, Sydney)*

Generation of Virtual Patient Data for In-Silico Cardiomyopathies Drug Development using Tree Ensembles: A Comparative Study 5343-5346
Pezoulas, Vasileios C. *(University of Ioannina)*; Grigoriadis, Grigoris *(University of Ioannina)*; Tachos, Nikolaos *(Unit of Medical Technology and Intelligent Information Systems,)*; Barlocco, Fausto *(Dept. of Experimental and Clinical Medicine, University of)*; Olivotto, Iacopo *(Dept. of Experimental and Clinical Medicine, University of)*; Fotiadis, Dimitrios I.* *(University of Ioannina)*

Heart Rate Monitoring using Sparse Spectral Curve Tracing 5347-5352
Zhou, Menglian *(Biofourmis Inc.)*; Selvaraj, Nandakumar* *(Biofourmis Inc)*

Theme 10. General and Theoretical Informatics: Data Mining (Oral Session)

Diabetes and Composition of Weight Lifting and Cardio in Exercise 5353-5356
Bhargava, Yesoda* *(University of York)*; Bopardikar, Ajit *(Samsung Research India, Bangalore, Karnataka)*; Bland, Martin *(University of York)*

Data Mining and Fusion of Unobtrusive Sensing Solutions for Indoor Activity Recognition 5357-5361
Ekerete, Idongesit* *(Ulster University)*; Garcia-Constantino, Matias Fernando *(Ulster University)*; Diaz, Yohanca *(Dundalk Institute of Technology, DKIT, Republic of Ireland.)*; Giggins, Oonagh *(Dundalk Institute of Technology)*; Mustafa, Mustafa *(School of Computer Science, University of Manchester, Manchester)*; Konios, Alexandros *(School of Computing, Electronics and Mathematics, Coventry Univ)*; Pouliet, Pierre *(Université de Limoges, Limoges, France)*; Nugent, Chris *(University of Ulster)*; McLaughlin, James *(University of Ulster)*

Graphical-Based Multivariate Analysis for Knee Joint Clinical and Kinematic Data Correlation Assessment 5362-5368
Bensalma, Fatima* *(TELUQ)*; Richardson, Glen *(Dalhousie University)*; Ouakrim, Youssef *(TELUQ)*; Fuentes, Alexandre *(EMOVI)*; Dunbar, Michael *(Dalhousie University)*; Hagemeister, Nicola *(École de Technologie Supérieure)*; Mezghani, Neila *(TELUQ)*

"How Are You?" Estimation of Anxiety, Sleep Quality, and Mood using Computational Voice Analysis . 5369-5373
Kim, Samuel* *(Canary Speech, LLC)*; Kwon, Namhee *(Canary Speech, LLC)*; Henry, O'Connell *(Canary Speech, LLC)*; Fisk, Nathan *(NuSkin, Inc.)*; Scott, Ferguson *(NuSkin, Inc.)*; Mark, Bartlett *(NuSkin, Inc)*

Statistical Analysis of Inter-Attribute Relationships in Unfractionated Heparin Injection Problems 5374-5377
Wang, Haizhou *(Pennsylvania State University)*; Yang, Hui* *(The Pennsylvania State University)*

Association Between Consecutive Ambient Air Pollution and Chronic Obstructive Pulmonary Disease Hospitalization: Time Series Study during 2015-2017 in Chengdu China 5378-5381
Zhang, Yi* *(University of Electronic Science and Technology of China)*; Wang, Ziyue *(University of Electronic Science and Technology of China)*; Xu, Jingjing *(University of Electronic Science and Technology of China Hospita)*; Liu, YiQi *(Xichang People's Hospital)*; Zhou, Bin *(Chengdu Gold Disk UESTC Multimedia Technology Co Ltd)*; Zhang, Nan *(Chengdu Gold Disk UESTC Multimedia Technology Co Ltd)*; He, Mingjie *(Chengdu Gold Disk UESTC Multimedia Technology Co Ltd)*; Fan, Jipeng *(Chengdu Gold Disk UESTC Multimedia Technology Co Ltd)*; Liu, Xianbo *(Chengdu Gold Disk UESTC Multimedia Technology Co Ltd)*; Zhao, Jian *(Chengdu Gold Disk UESTC Multimedia Technology Co Ltd)*; Yang, Qin *(University of Electronic Science and Technology of China)*; Zhang, Lifu *(University of Electronic Science and Technology of China)*; Cao, Yu *(Central South University)*; Su, Steven Weidong *(University of Technology, Sydney)*

Theme 10. General and Theoretical Informatics: Decision Support Systems (Oral Session)

Assisting the Non-Invasive Diagnosis of Liver Fibrosis Stages using Machine Learning Methods 5382-5387
Emu, Mahzabeen *(Lakehead University)*; Kamal, Farjana Bintay *(Lakehead University)*; Choudhury, Salimur *(Lakehead University)*; Alves de Oliveira, Thiago Eustaquio* *(Lakehead University)*

Outpatient Monitoring of Pectus Excavatum: A Neural Network-Based Approach 5388-5393
Servi, Michaela* *(Dept. of Industrial Engineering, University of Florence)*; Furferi, Rocco *(Dept. of Industrial Engineering, University of Florence)*; Santarelli, Chiara *(University of Florence Dept. of Information Engineering)*; Uccheddu, Fancesca *(University of Florence Dept. of Industrial Engineering)*; Volpe, Yary *(Dept. of Industrial Engineering, University of Florence)*; Ghionzoli, Marco *(Meyer Children's Hospital)*; Messineo, Antonio *(Meyer Children's Hospital)*

Markov Decision Process Modeling for Multi-Stage Optimization of Intervention and Treatment Strategies in Breast Cancer 5394-5397
Imani, Farhad *(Pennsylvania State University)*; Qiu, Zihang *(Pennsylvania State University)*; Yang, Hui* *(The Pennsylvania State University)*

Transfer Learning for Detection of Atrial Fibrillation in Deterministic Compressive Sensed ECG 5398-5401
Abdelazez, Mohamed* *(Carleton Univ.)*; Chan, Adrian *(Carleton Univ.)*; Rajan, Sreeraman *(Carleton Univ.)*

Digital Therapeutic Platform for Management of Systemic Lupus Erythematosus 5402-5405
Rudin, Vanessa *(Mymee, Inc.)*; Lubow, Eric *(Mymee, Inc.)*; Lytle, Millennia *(Mymee, Inc.)*; Bundy, Nicole* *(Mymee, Inc.)*; Culjat, Martin *(Mymee, Inc.)*; Dyhrberg, Mette *(Mymee, Inc.)*

Optimizing Individualized Treatment Planning for Parkinson's Disease using Deep Reinforcement Learning 5406-5409
Watts, Jeremy* *(University of Tennessee)*; Khojandi, Anahita *(University of Tennessee)*; Vasudevan, Rama Krishnan *(Oak Ridge National Laboratory)*; Ramdhani, Ritesh *(Northwell Health)*

Theme 10. General and Theoretical Informatics: Deep Learning and Big Data to Knowledge (Oral Session)

Convolutional Neural Network for Freezing of Gait Detection Leveraging the Continuous Wavelet Transform on Lower Extremities Wearable Sensors Data 5410-5415
Shi, Bohan* *(National University of Singapore)*; Yen, Shih-Cheng *(National University of Singapore)*; Tay, Arthur *(National University of Singapore)*; Tan, Dawn May Leng *(Singapore General Hospital)*; Chia, Nicole Shuang Yu *(National Neuroscience Institute, Singapore)*; Au, Wing Lok *(National Neuroscience Institute, Singapore)*

Epileptic Seizure Detection for Imbalanced Data Sets using an Integrated Machine Learning Approach . 5416-5419
Masum, Mohammad *(Kennesaw State University)*; Shahriar, Hossain* *(Kennesaw State University)*; Haddad, Hisham *(Kennesaw State University)*

Predicting the Assisted Living Care Needs using Machine Learning and Health State Survey Data 5420-5423
Jeremic, Aleksandar* *(McMaster University)*; Nikolic, Dejan *(University Children's Hospital)*; Kostadinovic, Milena *(Clinical Center Serbia)*; Santric Milicevic, Milena *(Faculty of Medicine)*

3D Human Knee Flexion Angle Estimation using Deep Convolutional Neural Networks 5424-5427
Chalangari, Pouria* *(Concordia Univ.)*; Fevens, Thomas *(Concordia)*; Rivaz, Hassan *(Concordia Univ.)*

A Preliminary Study of Predicting Effectiveness of Anti-VEGF Injection using OCT Images based on Deep Learning 5428-5431
Feng, Dehua* *(Xi'an Jiaotong University)*; Chen, Xi *(Xi'an Jiaotong University)*; Zhou, Zhiguo *(University of Central Missouri)*; Liu, Haotian *(Xi'an Jiaotong University)*; Wang, Yanfen *(the Second Affiliated Hospital of Xiang Jiaotong University)*; Bai, Ling *(the Second Affiliated Hospital of Xiang Jiaotong University)*; Zhang, Shu *(the Second Affiliated Hospital of Xiang Jiaotong University)*; Mou, Xuanqin *(Xi'an Jiaotong University)*

Theme 10. General and Theoretical Informatics: Machine Learning – I (Oral Session)

Predicting Alzheimer's Disease using Driving Simulator Data 5432-5435
Blanchette, Ryan* *(University of Tennessee-Knoxville)*; Khojandi, Anahita *(University of Tennessee)*; Cox, Daniel *(University of Virginia)*; Oliver, Michael *(University of Tennessee Medical Center)*; Fernandez, Roberto *(University of Tennessee Medical Center)*

Comparing Laboratory and In-the-wild Data for Continuous Parkinson's Disease Tremor Detection 5436-5441
Zhang, Ada* *(Carnegie Mellon University)*; Torre, Fernando De la *(Carnegie Mellon University)*; Hodgins, Jessica *(Carnegie Mellon University)*

Predicting Length of Stay for Cardiovascular Hospitalizations in the Intensive Care Unit: Machine Learning Approach 5442-5445
Alsinglawi, Belal *(Western Sydney Univ.)*; Alnajjar, Fady SK* *(UAE Univ.)*; Mubin, Omar *(Western Sydney Univ.)*; Novoa, Mauricio *(Western Sydney Univ.)*; Alorjani, Mohammed *(Jordan Univ. of Science and Technology)*; Karajeh, Ola *(Virginia Polytechnic Institute and State Univ.)*; Darwish, Omar *(Ferrum College)*

Evaluation of Machine Learning-Based Patient Outcome Prediction using Patient-Specific Difficulty and Discrimination Indices 5446-5449
Shakeri Hossein Abad, Zahra* *(Cumming School of Medicine, University of Calgary)*; Kline, Adrienne *(Miss)*; Lee, Joon *(University of Calgary)*

Automated Detection of Rest Disruptions in Critically Ill Patients 5450-5454
Iyengar, Vasundhra *(Univ. of Florida)*; Bihorac, Azra *(Univ. of Florida)*; Rashidi, Parisa* *(Univ. of Florida)*

Automated Assessment System for Neonatal Endotracheal Intubation using Dilated Convolutional Neural Network 5455-5458
Zhao, Shang* *(George Washington University)*; Xiao, Xiao *(The George Washington University)*; Zhang, Xiaoke *(George Washington University)*; Li, Wei *(the George Washington University)*; Meng, Yan *(George Washington University)*; Soghier, Lamia *(Children's National Medical Center)*; Hahn, James *(George Washington University)*

Theme 10. General and Theoretical Informatics: Machine Learning – II (Oral Session)

Predicting Mortality in Critical Care Patients with Fungemia using Structured and Unstructured Data 5459-5463
Baxter, Sally L.* *(University of California San Diego)*; Klie, Adam *(University of California, San Diego, Bioinformatics and Systems)*; Radha Saseendrakumar, Bharanidharan *(University of California San Diego)*; Ye, Gordon *(University of California, San Diego)*; Hogarth, Michael *(University of California San Diego)*; Nemati, Shamim *(Emory University School of Medicine)*

Machine Learning-Driven Drug Discovery: Prediction of Structure-Cytotoxicity Correlation Leads to Identification of Potential Anti-Leukemia Compounds 5464-5467
Li, Zishen *(Wuhan University)*; Lam, Yun Wah *(City University of Hong Kong)*; Liu, Qi *(City University of Hong Kong)*; Lau, Alison Y. K. *(City University of Hong Kong)*; Au-Yeung, Ho Yu *(University of Hong Kong)*; Chan, Rosa H. M.* *(City University of Hong Kong)*

Supervised Machine-Learning Algorithms in Real-Time Prediction of Hypotensive Events 5468-5471
Chookhachizadeh Moghadam, Mina* *(University of California Irvine)*; Masoumi, Ehsan *(University of California Irvine)*; Bagherzadeh, Nader *(University of California Irvine & CPCC)*; Ramsingh, Davinder *(Loma Linda University)*; Kain, Zeev N. *(University of California Irvine)*

Learning a Phenotypic-Attribute Attentional Brain Connectivity Embedding for ADHD Classification using Rs-fMRI 5472-5475
Gao, Ming-Shan *(National Tsing Hua University)*; Tsai, Fu-Sheng *(National Tsing Hua University)*; Lee, Chi-Chun* *(National Tsing Hua University)*

Neural Physiological Model: A Simple Module for Blood Glucose Prediction 5476-5481
Kang, Gu *(Dartmouth College)*; Dang, Ruoqi *(Xi'an Jiaotong Univ.)*; Prioleau, Temiloluwa* *(Dartmouth College)*

A Knowledge-Reserved Distillation with Complementary Transfer for Automated FC-Based Classification across Hematological Malignancies 5482-5485
Li, Jeng-Lin *(Dept. of Electrical Engineering, National Tsing Hua University)*; Chang, Ting-Yu *(Dept. of Internal Medicine, College of Medicine, National)*; Wang, Yu-Fen *(Tai-Cheng Stem Cell Therapy Center, National Taiwan University)*; Ko, Bor-Sheng *(Dept. of Internal Medicine, National Taiwan University Hosp)*; Tang, Jih-Luh *(Dept. of Internal Medicine, National Taiwan University Hosp)*; Lee, Chi-Chun* *(National Tsing Hua University)*

Theme 10. General and Theoretical Informatics: Machine Learning – III (Oral Session)

Behavior Score-Embedded Brain Encoder Network for Improved Classification of Alzheimer Disease using Resting State FMRI 5486-5489
Hsieh, Wan-Ting *(Dept. of Electrical Engineering, National Tsing Hua University)*; Jeremy, Lefort-Besnard *(Dept. of Electrical Engineering, National Tsing Hua University)*; Yang, Hao-Chun *(Dept. of Electrical Engineering, National Tsing Hua University)*; Kuo, Li-Wei *(National Health Research Institutes)*; Lee, Chi-Chun* *(National Tsing Hua University)*

Depression Screening from Text Message Reply Latency 5490-5493
Tlachac, ML* *(Worcester Polytechnic Institute)*; Rundensteiner, Elke *(Worcester Polytechnic Institute)*

Decision Tree Learning Algorithm for Classifying Knee Injury Status using Return-to-Activity Criteria .. 5494-5497
Girard, Céline I.* *(University of Ottawa)*; Warren, Claire E. *(University of Ottawa)*; Romanchuk, Nicholas *(University of Ottawa)*; Del Bel, Michael J *(University of Ottawa)*; Carsen, Sasha *(Cheo and University of Ottawa)*; Chan, Adrian D. C. *(Carleton University)*; Benoit, Daniel L. *(University of Ottawa)*

Identification of Patterns of Cognitive Impairment for Early Detection of Dementia 5498-5501
A S, Anusha* *(IISc)*; Ranjan, Uma *(IISc)*; Sharma, Medha *(IISc)*; Dutt, Siddharth *(IISc)*

Nonlinear Machine Learning Models for Insulin Bolus Estimation in Type 1 Diabetes Therapy 5502-5505
Noaro, Giulia* *(University of Padova)*; Cappon, Giacomo *(University of Padova)*; Sparacino, Giovanni *(University of Padova)*; Del Favero, Simone *(University of Padova, Padova, Italy)*; Facchinetti, Andrea *(University of Padova)*

Non-Segmented ECG Bio-Identification using Short Time Fourier Transform and Fréchet Mean Distance 5506-5509
Jeremic, Aleksandar* *(McMaster University)*; Biran, Abdullah *(McMaster University)*

Theme 10. General and Theoretical Informatics: Prediction and Machine Learning (Oral Session)

Visual Computing of Causality in Personalized Depression 5510-5513
Pham, Tuan D.* *(Prince Mohammad Bin Fahd University)*

Exploratory Analysis of Concussion Recovery Trajectories using Multi-Modal Assessments and Serum Biomarkers 5514-5518
Roy, Zachary *(Missouri State University)*; Subhash, Sujit *(Missouri University of Science and Technology)*; Bui, Lien *(Missouri State University)*; Hadi, Bassam *(Mercy Hospital)*; Hier, Daniel *(Missouri University of Science and Technology)*; Wunsch, Donald *(Missouri Univ of Science and Technology)*; Olbricht, Gayla *(Missouri University of Science and Technology)*; Obafemi-Ajayi, Tayo* *(Missouri State University)*

Enumerated Sparse Extraction of Important Surgical Planning Features for Mandibular Reconstruction 5519-5522
Nagai, Kazuki* *(Kyoto University)*; Nakao, Megumi *(Kyoto University)*; Ueda, Nobuhiro *(Nara Medical University)*; Imai, Yuichiro *(Rakuwakai Otowa Hospital, Kyoto)*; Kirita, Tadaaki *(Nara Medical University)*; Matsuda, Tetsuya *(Kyoto University)*

A Robust Blood-Based Signature of Cerebrospinal Fluid Aβ42 Status 5523-5526
Eke, Chima Stanley* *(School of Engineering, Computing and Mathematics, University of)*; Sakr, Fatemah *(Rostock University of Medicine)*; Jammeh, Emmanuel *(Plymouth University, School of Computing and Mathematics)*; Zhao, Peng *(Plymouth University)*; Ifeachor, Emmanuel *(University of Plymouth)*

Delirium Prediction in the Intensive Care Unit: A Temporal Approach 5527-5530
Lucini, Filipe Rissieri* *(University of Calgary)*; Fiest, Kirsten M *(University of Calgary)*; Stelfox, Henry Thomas *(University of Calgary)*; Lee, Joon *(University of Calgary)*

Practical Acoustic Energy-Based Estimation of Inhalation Flow Rate for Asthma Monitoring 5531-5536
Jeddi, Zineb* *(International University of Rabat, College of Engineering & Arch)*; Ghogho, Mounir *(Université Internationale de Rabat (UIR))*; Bohr, Adam *(University of Copenhagen)*; Bøtker, Johan Peter *(University of Copenhagen)*; Li, Yongquan *(University of Copenhagen)*; Kassou, Ismail *(Mohamed V University)*

Theme 10. Health Informatics – Behavioral Health Informatics (Oral Session)

Classifying Mild Cognitive Impairment from Behavioral Responses in Emotional Arousal and Valence Evaluation Task – AI Approach for Early Dementia Biomarker in Aging Societies – 5537-5543
Rutkowski, Tomasz Maciej* *(RIKEN)*; Abe, Masato S. *(RIKEN AIP)*; Koculak, Marcin *(Jagiellonian University)*; Otake-Matsuura, Mihoko *(RIKEN AIP)*

A Dynamic Bayesian Network Approach to Behavioral Modelling of Elderly People during a Home-Based Augmented Reality Balance Physiotherapy Programme 5544-5547
Georga, Eleni I. *(University of Ioannina)*; Gatsios, Dimitris *(University of Ioannina)*; Tsakanikas, Vasilis D. *(University of Ioannina)*; Kourou, Konstantina *(Unit of Biological Applications and Technology, University of Io)*; Liston, Matthew *(Centre for Human and Applied Physiological Sciences, King's Coll)*; Pavlou, Marousa *(Centre for Human and Applied Physiological Sciences, King's College)*; Kikidis, Dimitris *(National and Kapodistrian University of Athens)*; Bibas, Thanos *(University of Athens)*; Nikitas, Christos *(National and Kapodistrian University of Athens)*; Bamiou, Doris *(University College London)*; Fotiadis, Dimitrios I.* *(University of Ioannina)*

Predicting Mini-Mental Status Examination Scores through Paralinguistic Acoustic Features of Spontaneous Speech 5548-5552
Fu, Ziyang *(The University of Edinburgh)*; Haider, Fasih* *(The University of Edinburgh)*; Luz, Saturnino *(University of Edinburgh)*

Reinforcement Learning using EEG Signals for Therapeutic use of Music in Emotion Management 5553-5556
Dutta, Esha *(Texas A&M University, College Station)*; Bothra, Ananya *(Texas A&M University, College Station)*; Chaspari, Theodora *(Texas A&M University)*; Ioerger, Thomas *(Texas A&M University)*; Mortazavi, Bobak* *(Texas A&M University)*

Data-Driven Insights on Behavioral Factors that Affect Diabetes Management 5557-5562
Morton, Samuel *(Dartmouth College)*; Li, Rui *(Dartmouth College)*; Dibbo, Sayanton Vhaduri *(Dartmouth College)*; Prioleau, Temiloluwa* *(Dartmouth College)*

Deep Learning with Long Short-Term Memory Networks for Classification of Dementia Related Travel Patterns 5563-5566
Vuong, Nhu Khue* *(Institute for Infocomm Research)*; Liu, Yong *(Nanyang Technological University)*; Chan, Syin *(Nanyang Technological University)*; Lau, Chiew Tong *(Nanyang Technological University)*; Chen, Zhenghua *(Institute for Infocomm Research (I2R))*; Wu, Min *(Institute for Infocomm Research, A*STAR, Singapore)*; LI, Xiaoli *(A*STAR)*

Theme 10. Health Informatics – Computer-Aided Decision Making (Oral Session)

Single Lead ECG-Based Ventricular Repolarization Classification for Early Identification of Unexpected Ventricular Fibrillation 5567-5570
Lai, Dakun* *(University of Electronic Science and Technology of China)*; Zhang, Yifei *(University of Electronic Science and Technology of China)*; Zhang, Xinshu *(University of Electronic Science and Technology of China)*

Predicting Sleep Quality in Osteoporosis Patients using Electronic Health Records and Heart Rate Variability 5571-5574
Sadeghi, Reza* *(Wright State University)*; Banerjee, Tanvi *(Wright State University)*; Hughes, John *(Wright State University)*

Analyzing Acoustic and Prosodic Fluctuations in Free Speech to Predict Psychosis Onset in High-Risk Youths 5575-5579
Agurto, Carla* *(IBM)*; Pietrowicz, Mary *(IBM)*; Norel, Raquel *(IBM)*; Eyigoz, Elif *(IBM)*; Stanislawski, Emma *(Dept. of Psychiatry, Icahn School of Medicine at Mount Sina)*; Cecchi, Guillermo *(IBM T. J. Watson Research Center, Yorktown Heights, NY)*; Corcoran, Cheryl *(Dept. of Psychiatry, Icahn School of Medicine at Mount Sina)*

Sleep Apnea Event Detection from Sub-Frame based Feature Variation in EEG Signal using Deep Convolutional Neural Network 5580-5583
Mahmud, Tanvir* *(Bangladesh University of Engineering and Technology)*; Khan, Ishtiaque Ahmed *(Bangladesh University of Engineering and Technology)*; Mahmud, Talha Ibn *(Bangladesh University of Engineering and Technology)*; Fattah, Shaikh Anowarul *(Bangladesh University of Engineering and Technology)*; Zhu, Weiping *(Concordia University)*; Ahmad, Omair *(Concordia University)*

Hybrid RNN-ANN based Deep Physiological Network for Pain 5584-5587
Wang, Run* *(Fudan University)*; Xu, Ke *(School of Information Science and Technology, Fudan University)*; Feng, Hui *(Fudan University)*; Chen, Wei *(Fudan University)*

A Tablet and Mobile-Based Application for Remote Diagnosis and Analysis of Movement Disorder Symptoms 5588-5591
Ferleger, Benjamin* *(University of Washington)*; Sonnet, Kazi *(University of Washington)*; Morriss, Thomas *(Northeastern University)*; Ko, Andrew *(University of Washington)*; Chizeck, Howard *(University of Washington)*; Herron, Jeffrey *(University of Washington)*

Theme 10. Health Informatics – Electronic Health Records (Oral Session)

A Secure Privacy Preserving Cloud-Based Framework for Sharing Electronic Health Data 5592-5597
Ilokah, Munachiso *(University of Ontario Institute of Technology)*; Eklund, J. Mikael* *(University of Ontario Institute of Technology)*

Bayesian Statistic Model for Nurse Call Data Considering Time-Series, Individual Patient Variabilities and Massive Zero-Count Call Data 5598-5601
Noguchi, Hiroshi* *(Osaka City University)*; Miyahara, Maki *(The University of Tokyo)*; Kang, SooIn *(The University of Tokyo)*; Noyori, Shuhei *(The University of Tokyo)*; Takahashi, Toshiaki *(The University of Tokyo)*; Sanada, Hiromi *(The University of Tokyo)*; Mori, Taketoshi *(The University of Tokyo)*

Improved Classification of Medical Data using Meta-Best Feature Selection 5602-5605
Chaplin, Matthew *(Southern Illinois Univ. Edwardsville)*; Grubb, Jacob *(Southern Illinois Univ. Edwardsville)*; Clifford, Thomas *(Southern Illinois Univ. Edwardsville)*; Bruce, Justin *(Southern Illinois Univ. Edwardsville)*; Obafemi-Ajayi, Tayo *(Missouri State Univ.)*; Matta, John* *(Southern Illinois Univ. Edwardsville)*

Predicting Acute Kidney Injury after Surgery 5606-5609
Al-Jefri, Majed* *(Univ. of Calgary)*; Lee, Joon *(Univ. of Calgary)*; James, Matthew *(Univ. of Calgary)*

AIDEx – An Open-Source Platform for Real-Time Forecasting Sepsis and a Case Study on Taking ML Algorithms to Production 5610-5614
Amrollahi, Fatemeh* *(University of California San Diego)*; Shashikumar, Supreeth *(University of California San Diego)*; Kathiravelu, Pradeeban *(Emory)*; Sharma, Ashish *(Emory University)*; Nemati, Shamim *(University of California San Diego)*

Hierarchical Gaussian Process Modeling and Estimation of State-Action Transition Dynamics in Breast Cancer 5615-5618
Qiu, Zihang *(Pennsylvania State University)*; Imani, Farhad *(Pennsylvania State University)*; Yang, Hui* *(The Pennsylvania State University)*

Theme 10. Health Informatics – Health Data Acquisition, Management and Visualization (Oral Session)

How Dominant Hand and Foot Dexterity May Reveal Dementia Onset: A Motor and Cognitive Dual-Task Study 5619-5622
Mancioppi, Gianmaria *(Scuola Superiore Sant'Anna)*; Fiorini, Laura* *(Scuola Superiore Sant'Anna)*; Rovini, Erika *(Scuola Superiore Sant'Anna)*; Zeghari, Radia *(University of Cote d'Azur)*; Gros, Auriane *(Université Nice Sophia Antipolis)*; Manera, Valeria *(Université Nice Sophia Antipolis)*; Robert, Philippe *(Universitè Nice Sophia Antipolis)*; Cavallo, Filippo *(Scuola Superiore Sant'Anna)*

Proactive Role of Clinical Engineering in the Adoption of ISO/IEC 80001-1 within Healthcare Delivery Organization 5623-5626
Alwi, Rudolf* *(Winnipeg Regional Health Authority)*; Prowse, Paul *(Winnipeg Regional Health Authority)*; Gaamangwe, Tidimogo *(Winnipeg Regional Health Authority and Health Sciences Centre)*

Potential Prognostic Markers in the Heart Rate Variability Features for Early Diagnosis of Sepsis in the Pediatric Intensive Care Unit using Convolutional Neural Network Classifiers 5627-5630
Amiri, Paria* *(Tehran University of Medical Sciences)*; Abbasi, Hamid *(University of Auckland)*; Derakhshan, Amin *(Shahed University)*; Gharib, Behdad *(Tehran University of Medical Sciences)*; Nooralishahi, Behrang *(Tehran University of Medical Sciences, Children's Medical Center)*; Mirzaaghayan, Mohamadreza *(Tehran University of Medical Sciences)*

A Novel Tool for Non-Invasive Fetal Electrocardiography Research: The NInFEA Dataset 5631-5634
Sulas, Eleonora *(University of Cagliari)*; Pili, Giulia *(DIEE - University of Cagliari)*; Gusai, Elisa *(DIEE - University of Cagliari)*; Baldazzi, Giulia* *(University of Cagliari)*; Urru, Monica *(Division of Paediatric Cardiology, S. Michele Hospital, Cagliari,)*; Tumbarello, Roberto *(Division of Paediatric Cardiology, S. Michele Hospital, Cagliari,)*; Raffo, Luigi *(University of Cagliari)*; Pani, Danilo *(University of Cagliari)*

MDB: Monitoring Dysfunctional Behaviors for Patients with Bipolar Disorder 5635-5639
Choksi, Kushan* *(Stony Brook University)*; Nagaraj, Sanjay *(Stony Brook University)*; Thielke, Ryan *(Stony Brook University)*; Lin, Shan *(Stony Brook University)*

Multi-Domain Data Capture and Cloud Buffered Multimodal Evaluation Platform for Clinical Assessment of Cerebellar Ataxia 5640-5643
Abeysekara, Lahiru* *(Deakin University)*; Tran, Ha *(Deakin University)*; Pathirana, Pubudu N *(Deakin University)*; Horne, Malcolm *(Florey Institute of Neuroscience and Mental Health)*; Power, Laura *(Royal Victorian Eye and Ear Hospital)*; Szmulewicz, David *(Victorian Eye and Ear Hospital)*

Theme 10. Health Informatics – Information Technology (Oral Session)

Health Analytics as a Service with Artemis Cloud: Service Availability 5644-5648
McGregor, Carolyn* *(Univ of Ontario Inst of Technology)*; Inibhunu, Catherine *(University of Ontario Institute of Technology)*; Glass, Jonah *(Ontario Tech University)*; Doyle, Ian *(University of Ontario Institute of Technology)*; Gates, Aaron *(University of Ontario Institute of Technology)*; Madill, John *(University of Ontario Institute of Technology)*; Pugh, James Edward *(Dept. of Paedatrics, University of Toronto)*

Service-Oriented Medical Device Connectivity: Particular Standards for Endoscopic Surgery 5649-5652
Andersen, Björn* *(Universität zu Lübeck)*; Kasparick, Martin *(University of Rostock)*; Riech, Kathrin Pia *(University of Lübeck)*; Klöckner, Stephan *(Olympus Winter & Ibe GmbH)*; Keller, Anton *(Aesculap AG)*; Mündermann, Lars *(Karl Storz SE \& Co. KG)*; Maier-Holzberg, Julian *(Schölly Fiberoptic GmbH)*; Timmermann, Dirk *(University of Rostock)*; Ingenerf, Josef *(Universität zu Lübeck)*

An Automated Toolchain for Quantitative Characterisation of Structural Connectome from MRI based on Non-Anatomical Cortical Parcellation 5653-5656
Das, Sarbani* *(University of Southampton)*; Maharatna, Koushik *(University of Southampton)*

Phenotyping Cognitive Impairment using Graphomotor and Latency Features in Digital Clock Drawing Test 5657-5660
Davoudi, Anis *(University of Florida)*; Dion, Catherine *(University of Florida)*; Amini, Shawna *(University of Florida)*; Libon, David *(Rowan University)*; Tighe, Patrick *(University of Florida)*; Price, Catherine *(University of Florida)*; Rashidi, Parisa* *(University of Florida)*

Smartphone-Based Clinical Pathways in Pediatrics: A Case Study 5661-5664
Georgi, Nawras* *(Université de Rennes 1 - LTSI INSERM U1099)*; Kuchenbuch, Mathieu *(Université de Rennes 1)*; Beuchée, Alain *(Rennes University Hospital and INSERM U642)*; Pladys, Patrick *(Centre Hospitalier Universitaire)*; Carrault, Guy *(Université de Rennes 1)*

Point Cloud Processing Method for Food Volume Estimation based on Dish Space 5665-5668
Suzuki, Takuo* *(Aichi Prefectural University)*; Futatsuishi, Kana *(Aichi Prefectural University)*; Yokoyama, Kana *(Aichi Prefectural University)*; Amaki, Nobuko *(Aichi Prefectural University)*

Generative Adversarial Networks for Robust Breast Cancer Prognosis Prediction with Limited Data Size 5669-5672
Hsu, Te-Cheng *(Institute of Communication Engineering, National Tsing-Hua University)*; Lin, Che* *(National Taiwan University)*

Theme 10. Health Informatics – Mobile Health (Oral Session)

Application of Machine Learning to Support Self-Management of Asthma with mHealth 5673-5677
Tsang, Kevin Cheuk Him* *(University of Edinburgh)*; Pinnock, Hilary *(University of Edinburgh)*; Wilson, Andrew *(University of East Anglia)*; Shah, Syed Ahmar *(Chancellor's Fellow (Tenure-Track), University of Edinburgh)*

Effects of a Smartphone-Based Wearable Telerehabilitation System for In-Home Dynamic Weight-Shifting Balance Exercises by Individuals with Parkinson's Disease 5678-5681
An, Junmo* *(University of Houston)*; Kim, Jiyeon *(University of Houston)*; Lai, Eugene *(Houston Methodist Neurological Institute)*; Lee, Beom-Chan *(University of Houston)*

CoughGAN: Generating Synthetic Coughs that Improve Respiratory Disease Classification 5682-5688
Ramesh, Vishwajith *(Univ. of California, San Diego)*; Vatanparvar, Korosh* *(Samsung Research America)*; Nemati, Ebrahim *(Digital Health Lab in Samsung Research America)*; Nathan, Viswam *(Samsung Research America Inc.)*; Rahman, Md Mahbubur *(Samsung Research America)*; Kuang, Jilong *(Samsung Research America)*

CoughMatch – Subject Verification using Cough for Personal Passive Health Monitoring 5689-5695
Vatanparvar, Korosh* *(Samsung Research America)*; Nemati, Ebrahim *(Digital Health Lab in Samsung Research America)*; Nathan, Viswam *(Samsung Research America Inc.)*; Rahman, Md Mahbubur *(Samsung Research America)*; Kuang, Jilong *(Samsung Research America)*

Pain and Physical Activity Association in Critically Ill Patients 5696-5699
Davoudi, Anis *(University of Florida)*; Ozrazgat-Baslanti, Tezcan *(University of Florida)*; Tighe, Patrick *(University of Florida)*; Bihorac, Azra *(University of Florida)*; Rashidi, Parisa* *(University of Florida)*

Adapting to Noise in Speech Obfuscation by Audio Profiling using Generative Models for Passive Health Monitoring 5700-5704
Vatanparvar, Korosh* *(Samsung Research America)*; Nathan, Viswam *(Samsung Research America Inc.)*; Nemati, Ebrahim *(Digital Health Lab in Samsung Research America)*; Rahman, Md Mahbubur *(Samsung Research America)*; Kuang, Jilong *(Samsung Research America)*

Theme 10. Health Informatics – Security, Privacy, and Patient Safety (Oral Session)

Cyber-Attacks and Threats for Healthcare – A Multi-Layer Threat Analysis 5705-5708
Spanakis, Emmanouil G.* *(Foundation for Research and Technology – Hellas (FORTH))*; Silvia, Bonomi *(Università degli Studi di Roma "La Sapienza")*; Sfakianakis, Stelios *(Foundation for Research and Technology Hellas)*; Santucci, Giuseppe *(Sapienza University of Rome)*; Simone, Lenti *(Università degli Studi di Roma "La Sapienza")*; Sorella, Mara *(Università degli Studi di Roma "La Sapienza")*; Tanasache, Florin D. *(Università degli Studi di Roma "La Sapienza")*; Palleschi, Alessia *(Università degli Studi di Roma "La Sapienza")*; Ciccotelli, Claudio *(Università degli Studi di Roma "La Sapienza")*; Sakkalis, Vangelis *(Foundation for Research and Technology - Hellas (FORTH))*; Magalini, Sabina *(Fondazione Policlinico Universitario Agostino Gemelli)*

Quality-by-Design-Engineered pBFT Consensus Configuration for Medical Device Development 5709-5713
Kolasa, Yaël *(CYBERNANO)*; Bastogne, Thierry* *(Université de Lorraine)*; Georges, Jean-Philippe *(Université de Lorraine)*; Kubler, Sylvain *(Université de Lorraine)*

Gradient Mechanism to Preserve Differential Privacy and Deter against Model Inversion Attacks in Healthcare Analytics 5714-5717
Krall, Alexander *(Pennsylvania State University)*; Finke, Daniel *(Pennsylvania State University)*; Yang, Hui* *(The Pennsylvania State University)*

Trauma Activation Responsiveness: An RFID-Enabled Trauma Flowsheet 5718-5721
Enayati, Moein* *(Mayo Clinic)*; Heaton, Heather *(Mayo Clinic)*; Wang, Rona *(New York Presbyterian-Weill Cornell Medicine)*; Marisamy, Gomathi *(Mayo Clinic)*; Zanjirani Farahani, Nasibeh *(Mayo Clinic)*; Hellmich, Thomas *(Mayo Clinic)*; Pasupathy, Kalyan *(Mayo Clinic)*; Kim, Brian *(Mayo Clinic)*; Nestler, David *(Mayo Clinic)*

Can Not Touching the Nose or Eyes Help Cold Prevention? Possibility of Application using a Smartwatch and Self-Checking 5722-5728
Maeda, Atsuhiko* *(NTT)*

Novel Feature Selection for Artificial Intelligence using Item Response Theory for Mortality Prediction 5729-5732
Kline, Adrienne* *(Miss)*; Shakeri Hossein Abad, Zahra *(Cumming School of Medicine, University of Calgary)*; Kline, Theresa *(University of Calgary)*; Lee, Joon *(University of Calgary)*

Theme 10. Health Informatics – Technology and Services for Home Care and Assisted Living (Oral Session)

MMT-HEAR: Multiple Moving Targets Heartbeats Estimation and Recovery using IR-UWB Radars 5733-5736
Yang, Xiuzhu* *(Beijing Univ. of Posts and Telecommunications)*; Zhang, Xinyue *(Beijing Univ. of Posts and Telecommunications)*; Qian, Hongyu *(Beijing Univ. of Posts and Telecommunications)*; Ding, Yi *(Beijing Univ. of Posts and Telecommunications)*; Zhang, Lin *(Beijing Univ. of Posts and Telecommunications)*

Improving Wheelchair Route Planning through Instrumentation and Navigation Systems 5737-5740
Dzafic, Dzenan *(RWTH Aachen University)*; Cooper, Rory *(University of Pittsburgh)*; Candiotti, Jorge* *(VA Pittsburgh Healthcare Systems)*

Fall Detector Adapted to Nursing Home Needs through an Optical-Flow based CNN 5741-5744
Carlier, Alexy *(Univ Rennes, INSA Rennes, CNRS, IETR - UMR 6164, Rennes, France.)*; Peyramaure, Paul* *(Univ Rennes, INSA Rennes, CNRS, IETR - UMR 6164, Rennes, France.)*; Favre, Ketty *(Univ Rennes, CNRS, IETR - UMR 6164, Rennes, France.)*; Pressigout, Muriel *(Univ Rennes, INSA Rennes, CNRS, IETR - UMR 6164, Rennes, France.)*

Subject Identification using a Depth Camera for Patient Ambulation Monitoring 5745-5748
Steele, Alec *(The University of Texas at Dallas)*; You, Zihang *(The University of Texas at Dallas)*; Nourani, Mehrdad* *(University of Texas at Dallas)*; Bopp, Melinda *(Central Arkansas Veterans Healthcare System)*; Taylor, Tanya *(Central Arkansas Veterans Healthcare System)*; Sullivan, Dennis *(Central Arkansas Veterans Healthcare System)*

IoT Ink Pen for Ecological Monitoring of Daily Life Handwriting 5749-5752
Di Febbo, Davide* *(Politecnico di Milano)*; Lunardini, Francesca *(Politecnico di Milano)*; Malavolti, Milad *(Politecnico di Milano)*; Pedrocchi, Alessandra *(Politecnico di Milano)*; Borghese, Nunzio Alberto *(University of Milan)*; Ferrante, Simona *(Politecnico di Milano)*

Care Guide System for Caregivers of Person with Dementia 5753-5756
Kim, Gyungha *(Korea Institute of Science and Technology)*; Jeon, Hwawoo *(Korea Institute of Science and Technology, Seoul 136-791,)*; Park, Sungkee *(Korea Institute of Science and Technology)*; Choi, Yong Suk *(Dept. of Computer Science and Engineering, Hanyang University)*; Lim, Yoonseob* *(Korea Institute of Science and Technology)*

Theme 10. Health Informatics for Aging, Rehabilitation, and Disabilities (Oral Session)

RehabFork: An Interactive Game-Assisted Upper Limb Stroke Rehabilitation System 5757-5760
Jayasree-Krishnan, Veena *(NYU Tandon School of Engineering)*; Bethi, Satish Reddy *(NYU Tandon School of Engineering)*; Kumar, Sahil *(NYU Tandon School of Engineering)*; Rajaguru Jayanthi, Renu Karthick *(University of Bristol, UK)*; Ghosh, Shramana *(NYU Tandon School of Engineering)*; Raghavan, Preeti *(John Hopkins University School of Medicine)*; Kapila, Vikram* *(NYU Tandon School of Engineering)*

Biomechanical Parameters Assessment for the Classification of Parkinson Disease using Bidirectional Long Short Term Memory 5761-5764
Butt, Abdul Haleem *(Scuola Superiore Sant'anna)*; Cavallo, Filippo *(Scuola Superiore Sant'Anna)*; Maremmani, Carlo *(Azienda USL Toscana Nord-Ovest)*; Rovini, Erika* *(Scuola Superiore Sant'Anna)*

A Position Weight Matrix Feature Extraction Algorithm Improves Hand Gesture Recognition 5765-5768
Chahid, Abderrazak *(King Abdullah University of Science and Technology)*; Khushaba, Rami N. *(University of Technology, Sydney (UTS))*; Al-Jumaily, Adel *(University of Technology Sydney)*; Laleg, Taous-Meriem* *(King Abdullah University of Science and Technology (KAUST))*

Kinect V2 Tracked Body Joint Smoothing for Kinematic Analysis in Musculoskeletal Disorders 5769-5772
Mangal, Naveen Kumar* *(IIT Jodhpur)*; Tiwari, Anil Kumar *(LNM Institute of Information Tech., Jaipur)*

DoMoMEA: A Home-Based Telerehabilitation System for Stroke Patients 5773-5776
Zedda, Andrea *(Electrical and Electronic Engineering Dept., University of)*; Gusai, Elisa* *(DIEE - University of Cagliari)*; Caruso, Marco *(Politecnico di Torino)*; Bertuletti, Stefano *(University of Sassari)*; Baldazzi, Giulia *(University of Cagliari)*; Spanu, Salvatore *(Mathematics and Informatics Dept., University of Cagliari)*; Riboni, Daniele *(Mathematics and Informatics Dept., University of Cagliari)*; Pibiri, Andrea *(Medical Sciences and Public Health Dept., University of Cag)*; Monticone, Marco *(Medical Sciences and Public Health Dept., University of Cag)*; Cereatti, Andrea *(University of Sassari)*; Pani, Danilo *(University of Cagliari)*

SMART BEAR: A Large Scale Pilot Supporting the Independent Living of the Seniors in a Smart Environment 5777-5780
Kouris, Ioannis* *(National Technical University of Athens)*; Vellidou, Eleftheria *(National Technical University of Athens)*; Koutsouris, Dimitrios *(Biomedical Engineering Laboratory, School of Electrical and Comp)*

Theme 10. Imaging Informatics: Image Analysis, Processing and Classification – I (Oral Session)

Correlation-Guided Network for Fine-Grained Classification of Glomerular Lesions in Kidney Histopathology Images 5781-5784
Li, Fengyi *(Ping An Healthcare Technology)*; Nan, Yang* *(Ping An Healthcare Technology)*; Hou, Xiaoshuai *(Ping An Healthcare Technology)*; Chunmei, Xie *(Ping An Healthcare Technology)*; Wang, Jiaping *(Ping An Healthcare Technology)*; Lv, Chuanfeng *(PingAn Tech)*; Xie, Guotong *(PingAn Tech)*

Quantification of Advanced Dementia Patients' Engagement in Therapeutic Sessions: An Automatic Video based Approach using Computer Vision and Machine Learning 5785-5788
Zhang, Liangfei* *(University of St Andrews)*; Arandjelovic, Ognjen *(University of St Andrews)*; Dewar, Sonia *(University of St Andrews)*; Astell, Arlene *(University of Reading)*; Doherty, Gayle *(University of St Andrews)*; Ellis, Maggie *(University of St Andrews)*

Camera-Based Hand Tracking using a Mirror-Based Multi-View Setup 5789-5793
Lim, Guan Ming* *(Nanyang Technological University)*; Jatesiktat, Prayook *(NTU)*; Kuah, Christopher Wee Keong *(Tan Tock Seng Hospital Rehabilitation Centre)*; Ang, Wei Tech *(Nanyang Technological University)*

iWaste: Video-Based Medical Waste Detection and Classification 5794-5797
Chen, Junbo* *(New York University)*; Mao, Jeffrey *(NYU Tandon School of Engineering)*; Thiel, Cassandra *(NYU Langone Health)*; Wang, Yao *(Polytechnic Institute of New York University)*

Gait Parameter Estimation of Elderly People using 3D Human Pose Estimation in Early Detection of Dementia 5798-5801
Kondragunta, Jyothsna* *(Technische Universität Chemnitz)*; Hirtz, Gangolf *(Technische Universität Chemnitz)*

Human 3D Pose Estimation in a Lying Position by RGB-D Images for Medical Diagnosis and Rehabilitation 5802-5805
Wu, Qingqiang *(Xi'an Jiaotong University)*; Xu, Guanghua* *(Xi'an Jiaotong University)*; Zhang, Sicong *(Xi'an Jiaotong University)*; Li, Yu *(Xi'an Jiaotong University)*; Wei, Fan *(Xi'an Jiaotong University)*

Theme 10. Imaging Informatics: Image Analysis, Processing and Classification – II (Oral Session)

3D Reconstruction of the Human Trunk for Designing Personalized Braces : Precision Study 5806-5809
Daoud, Youstina* *(Polytechnique Montréal)*; Cheriet, Farida *(Ecole Polytechnique of Montreal)*; Beauséjour, Marie *(Université de Sherbrooke)*; Debanné, Philippe *(École Polytechnique de Montréal)*; Labelle, Hubert *(Research Center, Sainte-Justine Hospital)*

Assessment of Interhemispheric Cerebral Perfusion Deficit in Carotid Artery Stenosis 5810-5813
Khan, Amir A.* *(George Mason University)*; Patel, Jigar *(Imaging Service, VA Maryland Health Care System, Baltimore, MD)*; Lal, Brajesh *(University of Maryland)*; Sikdar, Siddhartha *(George Mason University)*

Multi-Phase Cross-Modal Learning for Noninvasive Gene Mutation Prediction in Hepatocellular Carcinoma 5814-5817
Gu, Jiapan *(Institute for Infocomm Research (I2R), Agency for Science, Technology)*; Zhao, Ziyuan* *(Institute for Infocomm Research (I2R), Agency for Science, Technology)*; Zeng, Zeng *(I2R, A*STAR)*; Wang, Yuzhe *(National University of Singapore)*; Qiu, Zhengyiren *(National University of Singapore)*; Veeravalli, Bharadwaj *(National University of Singapore)*; Goh, Brian, Kim Poh *(Singapore General Hospital)*; Bonney, Glenn Kunnath *(National University Hospital Singapore)*; Madhavan, Krishnakumar *(National University Hospital Singapore)*; Chan, Wan Ying *(National Cancer Centre Singapore)*; Lim, Kheng Choon *(Singapore General Hospital)*; Thng, Choon Hua *(National Cancer Centre)*; Chow, Pierce *(Senior Consultant)*

Model-Based Registration for Pneumothorax Deformation Analysis using Intraoperative Cone-Beam CT Images 5818-5821
Maekawa, Hinako* *(Kyoto University)*; Nakao, Megumi *(Kyoto University)*; Mineura, Katsutaka *(Kyoto University)*; Chen-Yoshikawa, Toyofumi *(Kyoto University)*; Matsuda, Tetsuya *(Kyoto University)*

Non-Contact Heart Rate Monitoring in Neonatal Intensive Care Unit using RGB Camera 5822-5825
Chen, Qiong *(Fudan University)*; Jiang, Xinyu *(Fudan University)*; Liu, Xiangyu *(School of Art Design and Media, East China University of Science)*; Lu, Chunmei *(Children's Hospital of Fudan University, Shanghai)*; Wang, Laishuan *(Children's Hospital of Fudan University, Shanghai)*; Chen, Wei* *(Fudan University)*

A Simple Two-Dimensional Location Embedding for Passive Infrared Motion-Sensing based Home Monitoring Applications 5826-5830
Botros, Angela* *(University of Bern, ARTORG Gerontechnology and Rehabilitation)*; Schütz, Narayan *(University of Bern)*; Saner, Hugo *(University Clinic for Cardiology, University Hospital, Inselspit)*; Buluschek, Philipp *(DomoSafety SA)*; Nef, Tobias *(Gerontechnology and Rehabilitation, ARTORG Center for Bioemedical)*

Theme 10. Natural Language Processing for Health (Oral Session)

A "Verbal Thermometer" for Assessing Neurodegenerative Disease: Automated Measurement of Pronoun and Verb Ratio from Speech 5831-5837
Jarrold, William* *(Independent Researcher / Consultant)*; Rofes, Adria *(University of Groningen)*; Pressman, Peter *(Dept. of Neurology, University of Colorado)*; WIlson, Stephen *(Dept. of Hearing and Speech Sciences, Vanderbilt University)*; Stabler, Edward *(Dept. of Linguistics, UCLA)*; Gorno Tempini, Maria Luisa *(University of California San Francisco)*

Measuring Pain in Sickle Cell Disease using Clinical Text 5838-5841
Alambo, Amanuel* *(Wright State University)*; Andrew, Ryan *(Wright State University)*; GollarahalLi, Sid *(Duke University)*; Vaughn, Jacqueline *(Duke University School of Nursing)*; Banerjee, Tanvi *(Wright State University)*; Thirunarayan, Krishnaprasad *(Wright State University)*; Abrams, Daniel M *(Northwestern University)*; Shah, Nirmish R. *(Duke University)*

Predicting the Pathogenicity of Protein Coding Mutations using Natural Language Processing 5842-5846
Rehmat, Naeem *(National University of Computer & Emerging Sciences)*; Farooq, Hammad *(Computational Biology Research Lab (cbrlab.org), Dept. of C)*; Kumar, Sanjay *(IBM)*; Hussain, Sibt ul *(NUCES, FAST)*; Naveed, Hammad* *(National University of Computer & Emerging Sciences)*

Understanding Patient Complaint Characteristics using Contextual Clinical BERT Embeddings 5847-5850
Saha, Budhaditya *(Medius Health)*; Lisboa, Sanal *(Medius Health)*; Ghosh, Shameek* *(Medius Health)*

Cross-Corpus Feature Learning between Spontaneous Monologue and Dialogue for Automatic Classification of Alzheimer's Dementia Speech 5851-5855
de la Fuente Garcia, Sofia* *(The University of Edinburgh)*; Haider, Fasih *(The University of Edinburgh)*; Luz, Saturnino *(University of Edinburgh)*

A Tablet-Based App to Discriminate Children at Potential Risk of Handwriting Alterations in a Preliteracy Stage 5856-5859
Dui, Linda Greta* *(Politecnico di Milano)*; Lunardini, Francesca *(Politecnico di Milano)*; Termine, Cristiano *(Univ. dell'Insubria, Varese)*; Matteucci, Matteo *(Politecnico di Milano)*; Ferrante, Simona *(Politecnico di Milano)*

Theme 10. Public Health Informatics (Oral Session)

Statistical Analysis of County-Level Contributing Factors to Opioid-Related Overdose Deaths in the United States 5860-5863
Kim, Haedong *(Pennsylvania State University)*; Yang, Hui* *(The Pennsylvania State University)*

BigO: A Public Health Decision Support System for Measuring Obesogenic Behaviors of Children in Relation to Their Local Environment 5864-5867
Diou, Christos* *(Aristotle University of Thessaloniki)*; Sarafis, Ioannis *(Aristotle University of Thessaloniki)*; Papapanagiotou, Vasileios *(Aristotle University of Thessaloniki)*; Alagialoglou, Leonidas *(Aristotle University of Thessaloniki)*; Lekka, Irini *(Medical School, Aristotle University of Thessaloniki)*; Filos, Dimitrios *(Aristotle University o Thessaloniki)*; Stefanopoulos, Leandros *(Aristotle University of Thessaloniki)*; Kilintzis, Vassilis *(Aristotle University of Thessaloniki)*; Maramis, Christos *(Aristotle University of Thessaloniki)*; Karavidopoulou, Youla *(Aristotle University of Thessaloniki)*; Maglaveras, Nikolaos *(Aristotle University of Thessaloniki)*; Ioakimidis, Ioannis *(Karolinska Institute, NVS, Division of Applied Neuroendocrinology)*; Charmandari, Evangelia *(Biomedical Research Foundation of the Academy of Athens)*; Kassari, Penio *(Biomedical Research Foundation of the Academy of Athens)*; Tragomalou, Athanasia *(Biomedical Research Foundation of the Academy of Athens)*; Mars, Monica *(Wageningen University)*; Nguyen, Thien An Ngoc *(University College Dublin);* Kechadi, Tahar *(Insight Centre for Data Analytics, University College Dublin)*; O' Donnel, Shane *(University College Dublin)*; Doyle, Gerardine *(University College Dublin)*; Browne, Sarah *(Temple Street Childrens' University Hospital)*; O'Malley, Grace *(Children's Health Ireland at Temple Street)*; Heimeier, Rachel *(International English School)*; Riviou, Katerina *(Ellinogermaniki Agogi);* Koukoula, Evangelia *(Ekpaideftiria N. Mpakogianni)*; Filis, Konstantinos *(COSMOTE)*; Hassapidou, Maria *(International Hellenic University)*; Pagkalos, Ioannis *(International Hellenic University)*; Ferri, Daniel *(Mysphera)*

Dynamic Physician-Patient Matching in the Healthcare System 5868-5871
Chen, Ruimin *(The Pennsylvania State University)*; Chen, Mutong *(Pennsylvania State University)*; Yang, Hui* *(The Pennsylvania State University)*

Deriving a Novel Health Index using a Large-Scale Population based Electronic Health Record with Deep Networks 5872-5875
Hung, Chen-Ying *(National Tsing Hua University)*; Chen, Huan-Yu *(National Tsing Hua University)*; Lawrence, Wee *(Allianz SE)*; Lin, Ching-Heng *(Dept. of Medical Research, Taichung Veterans General Hospit)*; Lee, Chi-Chun* *(National Tsing Hua University)*

Inferring the Spatial Distribution of Physical Activity in Children Population from Characteristics of the Environment 5876-5879
Sarafis, Ioannis *(Aristotle University of Thessaloniki)*; Diou, Christos* *(Aristotle University of Thessaloniki)*; Papapanagiotou, Vasileios *(Aristotle University of Thessaloniki)*; Alagialoglou, Leonidas *(Aristotle University of Thessaloniki)*; Delopoulos, Anastasios *(Aristotle University of Thessaloniki)*

Anomalous Antimicrobial Susceptibility Trend Identification 5880-5883
Tlachac, ML* *(Worcester Polytechnic Institute)*; Rundensteiner, Elke *(Worcester Polytechnic Institute)*; Barton, Kerri *(Massachusetts Dept. of Public Health)*; Troppy, Scott *(Massachusetts Dept. of Public Health)*; Beaulac, Kirthana *(Tufts Medical Center)*; Doron, Shira *(Tufts Medical Center)*

Theme 10. Sensor Informatics – mHealth (Oral Session)

Passive Sensor Data based Future Mood, Health and Stress Prediction: User Adaptation using Deep Learning 5884-5887
Yu, Han* *(Rice University)*; Sano, Akane *(Rice University)*

Smartphone based Human Activity Recognition with Feature Selection and Dense Neural Network 5888-5891
Bashar, Syed Khairul* *(University of Connecticut)*; Fahim, Md Abdullah Al *(University of Connecticut)*; Chon, Ki *(University of Connecticut)*

Unannounced Meal Detection for Artificial Pancreas Systems using Extended Isolation Forest 5892-5895
Zheng, Fei* *(INRIA, CNRS, LJK, Univ. Grenoble Alpes, Grenoble INP)*; Bonnet, Stéphane *(CEA Léti MINATEC)*; Villeneuve, Emma *(Univ. Grenoble Alpes, CEA, LETI, F-38000 Grenoble.)*; Doron, Maeva *(CEA LETI)*; Lepecq, Aurore *(Univ. Grenoble Alpes, CEA, LETI, DTBS, LS2P, F-38000 Gre)*; Forbes, Florence *(INRIA- Jean Kuntzman Laboratory , Grenoble University)*

Early versus Late Modality Fusion of Deep Wearable Sensor Features for Personalized Prediction of Tomorrow's Mood, Health, and Stress 5896-5899
Li, Boning* *(Rice University)*; Sano, Akane *(Rice University)*

Oral Cavity Pressure Measurement-Based Respiratory Monitoring System with Reduced Susceptibility to Motion Artifacts 5900-5904
Nabavi, Seyedfakhreddin* *(McGill University)*; Bhadra, Sharmistha *(McGill University)*

Finding Comfortable Routes for Ambulance Transfers of Newborn Infants 5905-5908
Partridge, Tom* *(Univ. of Nottingham)*; Morris, David Edward *(Univ. of Nottingham)*; Light, Roger Alan *(Univ. of Nottingham)*; Leslie, Andrew *(CenTre Neonatal Transport, Univ. Hospitals of Leicester)*; Sharkey, Don *(Univ. of Nottingham)*; Crowe, John *(Univ. of Nottingham)*; McNally, Donal *(Univ. of Nottingham)*

Theme 10. Sensor Informatics: Physiological Monitoring – I (Oral Session)

Revisiting Motion-Based Respiration Measurement from Videos 5909-5912
Zhan, Qi *(Hunan University)*; Hu, Jingjing *(Hunan University)*; Yu, Zitong *(Oulu University)*; Li, Xiaobai *(Oulu University)*; Wang, Wenjin* *(Philips Research)*

Examining Four Experimental Paradigms for EEG-Based Sleep Quality Evaluation with Domain Adaptation 5913-5916
Mu, Wenrui *(Shanghai Jiao Tong University)*; Lu, Bao-Liang* *(Shanghai Jiao Tong University)*

Autoencoders for Health Improvement by Compressing the Set of Patient Features 5917-5920
Cabrera-Bean, Margarita* *(Universitat Politècnica de Catalunya, UPC, BarcelonaTECH)*; Pereira Dos Santos, Victor Jerri *(Universitat Politècnica de Catalunya)*; Roso-Llorach, Albert *(Fundació Institut Universitari per a la recerca a l'Atenció Prim)*; Fernandez, Sergio *(IDIAPJGol)*; Vidal, Josep *(Universitat Politècnica de Catalunya)*; Violán, Concepción *(IDIAP Jordi Gol)*

Physiological Response to Vibro-Acoustic Stimulation in Healthy Subjects: A Preliminary Study 5921-5924
Cavallo, Filippo *(Scuola Superiore Sant'Anna)*; Rovini, Erika *(Scuola Superiore Sant'Anna)*; Dolciotti, Cristina *(University of Pisa)*; Radi, Lorenzo *(Scuola Superiore Sant'Anna)*; Della Ragione, Riccardo *(Neurocare)*; Bongioanni, Paolo *(Azienda Ospedaliero-Universitaria Pisana)*; Fiorini, Laura* *(Scuola Superiore Sant'Anna)*

Stochastic Modeling for Photoplethysmography Compression 5925-5928
Xu, Ke* *(School of Information Science and Technology, Fudan University)*; Jiang, Xinyu *(Fudan University)*; Dai, Chenyun *(Fudan University)*; Chen, Wei *(Fudan University)*

Robust PPG-Based Ambulatory Heart Rate Tracking Algorithm 5929-5934
Huang, Nicholas *(Biofourmis)*; Selvaraj, Nandakumar* *(Biofourmis Inc)*

Theme 10. Sensor Informatics: Physiological Monitoring – II (Oral Session)

Toward Early Severity Assessment of Obstructive Lung Disease using Multi-Modal Wearable Sensor Data Fusion during Walking 5935-5938
Rahman, Md Juber* *(The University of Memphis)*; Nemati, Ebrahim *(Digital Health Lab in Samsung Research America)*; Rahman, Md Mahbubur *(Samsung Research America)*; Vatanparvar, Korosh *(Samsung Research America)*; Nathan, Viswam *(Samsung Research America Inc.)*; Kuang, Jilong *(Samsung Research America)*

Covariance Intersection to Improve the Robustness of the Photoplethysmogram Derived Respiratory Rate 5939-5942
Zhang, Jia* *(ETH Zurich)*; Scebba, Gaetano *(ETH Zurich)*; Karlen, Walter *(ETH Zurich)*

A Field Study to Capture Events of Interest (EoI) from Living Labs using Wearables for Spatiotemporal Monitoring Towards a Framework of Smart Health (sHealth) 5943-5947
Rahman, Md Juber* *(The University of Memphis)*; Morshed, Bashir *(The University of Memphis)*; Harmon, Brook *(University of Memphis)*

Respiratory Rate Estimation using PPG: A Deep Learning Approach 5948-5952
Bian, Dayi *(Biofourmis Inc)*; Mehta, Pooja *(Biofourmis Inc.)*; Selvaraj, Nandakumar* *(Biofourmis Inc)*

Forecasting Stress, Mood, and Health from Daytime Physiology in Office Workers and Students 5953-5957
Umematsu, Terumi* *(NEC Corp.)*; Sano, Akane *(Rice Univ.)*; Taylor, Sara *(Massachusetts Institute of Tech.)*; Tsujikawa, Masanori *(NEC Corp.)*; Picard, Rosalind *(Massachusetts Institute of Tech.)*

Real-World Consumer-Grade Sensor Signal Alignment Procedure Applied to High-Noise ECG to BCG Signal Synchronization 5958-5962
Schütz, Narayan* *(University of Bern)*; Botros, Angela *(University of Bern, ARTORG Gerontechnology and Rehabilitation)*; Knobel, Samuel Elia Johannes *(ARTORG Center, Gerontechnology and Rehabilitation Group, University)*; Saner, Hugo *(University Clinic for Cardiology, University Hospital, Inselspit)*; Buluschek, Philipp *(DomoSafety SA)*; Nef, Tobias *(Gerontechnology and Rehabilitation, ARTORG Center for Bioemedical)*

Theme 10. Sensor Informatics: Physiological Monitoring – III (Oral Session)

Feature Selection using F-Statistic Values for EEG Signal Analysis 5963-5966
Peng, Genchang *(University of Texas at Dallas)*; Nourani, Mehrdad* *(University of Texas at Dallas)*; Harvey, Jay *(UT Southwestern Medical Center)*; Dave, Hina *(The University of Texas Southwestern Medical Center)*

Estimating Reliability of Signal Quality of Physiological Data from Data Statistics Itself for Real-Time Wearables 5967-5970
Zaman, MD Sabbir* *(University of Memphis)*; Morshed, Bashir *(The University of Memphis)*

Comparison of Three Normalization Methods in Monitoring Analgesic Depth with Photoplethysmographic Diastolic Interval 5971-5975
Chen, Wanlin *(Zhejiang University)*; Feng, Ying *(Zhejiang University)*; Chen, Xinzhong *(Zhejiang University)*; Jiang, Feng *(Zhejiang University)*; Miao, Jiajun *(Zhejiang University)*; Chen, Shali *(Zhejiang University)*; Chen, Hang* *(Zhejiang University)*

Effect of Daily Stress on Heart-Rate Variability during Stroop Color Word Task 5976-5979
Park, Soyeon *(Sookmyung University)*; Yu, Juwon *(Sookmyung WOMEN'S University)*; Kang, Sunhwa *(Sookmyung women's University)*; Lee, Hyeonju *(Sookmyung women's University)*; Dong, Suh-Yeon* *(Sookmyung Women's University)*

Screening of Ischemic Heart Disease based on PPG Signals using Machine Learning Techniques 5980-5983
Pal, Poulomi* *(Indian Institute of Technology, Kharagpur)*; Ghosh, Sudipta *(Indian Institute of Technology, Kharagpur)*; Saha, Kalyan Kumar *(Medical College and Hospital Kolkata)*; Chattopadhyay, Bhabani Prasad *(Medical College And Hospital, Kolkata)*; Mahadevappa, Manjunatha *(Indian Institute of Technology Kharagpur)*

Identifying Trace Alternant Activity in Neonatal EEG using an Inter-Burst Detection Approach 5984-5987
Raurale, Sumit Arun* *(University College Cork)*; Boylan, Geraldine *(University College Cork)*; Lightbody, Gordon *(University College Cork)*; O'Toole, John M. *(University College Cork)*

Theme 10. Sensor Informatics – Wearable Systems and Sensors (Oral Session)

Efficient Respiratory Rate Extraction on a Smartwatch 5988-5991
Pollreisz, David *(TU Wien)*; TaheriNejad, Nima* *(TU Wien)*

Unobtrusive Blood Pressure Estimation using Personalized Autoregressive Models 5992-5995
Zheng, Yali* *(Shenzhen Technology University)*; Liu, Qing *(Xi'an Jiaotong-Liverpool University)*; Poon, Carmen C. Y. *(The Chinese University of Hong Kong)*

The Design of a Parkinson's Tremor Predictor and Estimator using a Hybrid Convolutional-Multilayer Perceptron Neural Network 5996-6000
Ibrhaim, Anas *(Western Univ.)*; Zhou, Yue *(Univ. of Western Ontario)*; Jenkins, Mary *(Univ. of Western Ontario)*; Trejos, Ana Luisa *(The Univ. of Western Ontario)*; Naish, Michael D.* *(The Univ. of Western Ontario)*

Dyskinesia Severity Estimation in Patients with Parkinson's Disease using Wearable Sensors and a Deep LSTM Network 6001-6004
Hssayeni, Murtadha *(Florida Atlantic University)*; Jimenez-Shahed, Joohi *(Icahn School of Medicine at Mount Sinai, New York City, NY.)*; Burack, Michelle A. *(Dept. of Neurology, University of Rochester Medical Center,)*; Ghoraani, Behnaz* *(Florida Atlantic University)*

Reveal Temporal Patterns of Smoking Behavior in Real Life using Data Acquired through Automatic Tracking Systems 6005-6008
Zhai, Donghui* *(KUL & imec)*; Capela, Neide Simoes *(IMEC)*; Schiavone, Giuseppina *(imec, Holst Centre)*; Van Hoof, Chris *(IMEC)*; De Raedt, Walter *(imec)*

A Spectral-Longitudinal Model for Detection of Heart Attack from 12-Lead Electrocardiogram Waveforms ... 6009-6012
Tadesse, Girmaw Abebe* *(University of Oxford)*; Javed, Hamza *(University of Oxford)*; Weldemariam, Komminist *(IBM Research)*; Zhu, Tingting *(University of Oxford)*

Theme 11. Biomedical Engineering Education and Society (Oral Session)

Young Women Exposed Actively to the Value of Biomedical Engineering 6013-6017
Thompson, Lara* *(University of the District of Columbia)*; Zhang, Nian *(University of the District of Columbia)*

Design, Control, and Simulation of a Neonatal Incubator 6018-6023
Zimmer, Daniel* *(University of Alaska Anchorage)*; Inks, Aaron *(University of Alaska Anchorage)*; Sendi, Chokri *(University of Alaska Anchorage)*; Clark, Nathan *(The University of Alaska Anchorage)*

Experience with Teaching Different Modeling Techniques on the Example of Glucose Insulin Regulation Model 6024-6027
Kulhánek, Tomáš* *(Charles University in Prague)*; Kofránek, Jiří *(Creative Connections s.r.o.)*

Updating the Biomedical Engineering Curriculum in Latin America: Moving from Management and Maintenance to Design and Development of Medical Devices 6028-6031
Azpiroz-Leehan, Joaquin* *(Universidad Autonoma Metropolitana)*; Sacristan, Emilio *(Universidad Autónoma Metropolitana)*; Urbina-Medal, E. Gerardo *(Universidad Autonoma Metropolitana)*; Martinez-Licona, Fabiola *(Universidad Autonoma Metropolitana)*

Teaching Cardiopulmonary Auscultation to Medical Students using a Virtual Patient Simulation Technology 6032-6035
Pereira, Daniel *(Faculty of Medicine, University of Porto)*; Ferreira, Maria Amelia *(Faculty of Medicine of the University of Porto)*; Correia, Ricardo *(Faculty of Medicine of the University of Porto)*; Coimbra, Miguel* *(INESC TEC / Universidade do Porto)*

Gender Parity in Biomedical Engineering: Analysis of Admission to the Bachelor's Degree at UAM 6036-6039
Martinez-Licona, Fabiola* *(Universidad Autonoma Metropolitana)*; Jimenez-Alaniz, Juan Ramon *(Universidad Autonoma Metropolitana)*

A Quantitative Measurement of Hand Scaling Motion for Dental Hygienist Training 6040-6043
Yui, Tomoko* *(Nara Institute of Science and Technology)*; Ishikura, Tomoki *(Nara Institute of Science and Technology)*; Cho, Sung-Gwi *(Nara institute of science and technology)*; Ding, Ming *(Nara Institute of Science and Technology)*; Takamatsu, Jun *(Nara Institute of Science and Technology)*; Ogasawara, Tsukasa *(Nara Institute of Science and Technology)*

Theme 12. Medical Technologies – I (Oral Session)

CAD-Based Automatic Modelling of Customized Cutting Templates for Pectus Arcuatum Surgical Correction 6044-6048
Servi, Michaela* *(Dept. of Industrial Engineering, Univ. of Florence)*; Buonamici, Francesco *(Dept. of Industrial Engineering, Univ. of Florence)*; Carfagni, Monica *(Dept. of Industrial Engineering, Univ. of Florence)*; Volpe, Yary *(Dept. of Industrial Engineering, Univ. of Florence)*; Facchini, Flavio *(Meyer Children's Hospital)*; Ghionzoli, Marco *(Meyer Children's Hospital)*; Messineo, Antonio *(Meyer Children's Hospital)*

Scleral Force Evaluation during Vitreoretinal Surgery: In an in Vivo Rabbit Eye Model 6049-6053
Patel, Niravkumar* *(Johns Hopkins Univ.)*; Urias, Muller *(Johns Hopkins Univ.)*; Ebrahimi, Ali *(Johns Hopkins Univ.)*; Gehlbach, Peter *(Johns Hopkins Medical Institute)*; Iordachita, Iulian *(Johns Hopkins Univ.)*

Screen and Virtual Reality-Based Testing of Contrast Sensitivity 6054-6057
Vivas-Mateos, Guillermo* *(University of Strathclyde)*; Boswell, Sarah *(University of Strathclyde)*; Livingstone, Iain *(NHS Greater Glasgow & Clyde)*; Delafield-Butt, Jonathan *(Perception Movement Action Consortium, University of Edinburgh &)*; Giardini, Mario Ettore *(University of Strathclyde)*

Design and Analysis of a Clinical Pressure Cuff Algometer, Compatible with an fMRI Machine 6058-6061
Knox, David* *(uOttawa)*; Sedgwick, Nathalia *(University of Ottawa)*

A Novel Bipolar Cautery Tool for Minimally-Invasive Neuroendoscopic Procedures 6062-6065
Lutfallah, Claudia* *(University of Toronto)*; Looi, Thomas *(CIGITI, Hospital for Sick Children)*; Drake, James *(University of Toronto, CIGITI, Hospital for Sick Children)*

Evaluation of Clinical Infusion Pump Performance through Downstream Microdrop Monitoring: A Preliminary Study 6066-6069
An, Jingzhi* *(MIT)*; Butterfield, Robert *(RDB Consulting)*; Sims, Nat *(MGH)*

Theme 12. Medical Technologies – II (Oral Session)

Using Operative Features to Identify Surgical Complexity: A Case in Breast Surgery Practice 6070-6073
Kilinc, Derya* *(Mayo Clinic)*; Shahraki, Narges *(Mayo Clinic)*; Gel, Esma *(Arizona State University)*; Degnim, Amy *(Mayo Clinic)*; Hoskin, Tanya *(Mayo Clinic)*; Sir, Mustafa *(Mayo Clinic)*; Pasupathy, Kalyan *(Mayo Clinic)*

Mixed Reality for Veterinary Medicine: Case Study of a Canine Femoral Nerve Block 6074-6077
Wilkie, Nicholas* *(Univ. of Prince Edward Island)*; McSorley, Grant *(Univ. of Prince Edward Island)*; Creighton, Catherine *(Univ. of Prince Edward Island)*; Sanderson, Dana *(Univ. of Prince Edward Island)*; Muirhead, Tammy *(Univ. of Prince Edward Island)*; Bressan, Nadja *(Univ. of Prince Edward Island)*

Designing a Flexible Tool for Rapid Implementation of Brain-Computer Interfaces (BCI) in Game Development 6078-6081
Kinney-Lang, Eli* *(Univ. of Calgary)*; Murji, Shaheed *(Western Univ.)*; Kelly, Dion *(Univ. of Calgary)*; Paffrath, Brett *(Univ. of Calgary)*; Zewdie, Ephrem *(Univ. of Calgary)*; Kirton, Adam *(Univ. of Calgary)*

Breast Tumor Malignancy Classification using Smartphone Compression-Induced Sensing System and Deformation Index Ratio 6082-6085
Choi, Sung In* *(Temple University)*; Oleksyuk, Vira *(Temple University)*; Caroline, Dina *(Temple University Hospital)*; Pascarella, Suzanne *(Temple University Hospital)*; Kendzierski, Renee *(Temple University Hospital)*; Won, Chang-Hee *(Temple University)*

Preliminary Laboratory Vibration Testing of a Complete Neonatal Patient Transport System 6086-6089
Darwaish, Fadwa *(Carleton University)*; Selzler, Roger *(Carleton University)*; Law, Andrew *(National Research Council Canada)*; Chen, Eric *(National Research Council of Canada)*; Ibey, Andrew *(The Ottawa Hospital)*; Aubertin, Cheryl *(Children's Hospital of Eastern Ontario)*; Greenwood, Kim *(The Children's Hospital of Eastern Ontario (CHEO))*; Redpath, Stephanie *(Children's Hospital of Eastern Ontario, Ottawa)*; Chan, Adrian D. C. *(Carleton University)*; Green, James R. *(Carleton University)*; Langlois, Robert* *(Carleton University)*

A Method for Segmenting the Process of Needle Insertion during Simulated Cannulation using Sensor Data 6090-6094
Liu, Zhanhe *(Clemson University)*; Petersen, Lydia *(Clemson University)*; Zhang, Ziyang *(Clemson University)*; Singapogu, Ravikiran* *(Clemson University)*

Theme 12. Personalized Medicine (Oral Session)

Multi-Instance Multi-Label Learning for Gene Mutation Prediction in Hepatocellular Carcinoma 6095-6098
Xu, Kaixin *(National University of Singapore)*; Zhao, Ziyuan* *(Institute for Infocomm Research (I2R), Agency for Science, Technology)*; Gu, Jiapan *(Institute for Infocomm Research (I2R), Agency for Science, Technology)*; Zeng, Zeng *(I2R, A*STAR)*; Chan, Wan Ying *(National Cancer Centre Singapore)*; Lim, Kheng Choon *(Singapore General Hospital)*; Thng, Choon Hua *(National Cancer Centre)*; Chow, Pierce *(Senior Consultant)*

A Child's Right to Play: Results from the Brain-Computer Interface Game Jam 2019 (Calgary Competition) ... 6099-6102
Kelly, Dion* *(University of Calgary)*; Jadavji, Zeanna *(University of Calgary)*; Zewdie, Ephrem *(University of Calgary)*; Mitchell, Erik *(Neural Matrix Entertainment LLC)*; Summerfield, Kyle *(Neural Matrix Entertainment LLC)*; Kirton, Adam *(University of Calgary)*; Kinney-Lang, Eli *(University of Calgary)*

Grading the Severity of Hypoxic-Ischemic Encephalopathy in Newborn EEG using a Convolutional Neural Network 6103-6106
Raurale, Sumit Arun* *(University College Cork)*; Boylan, Geraldine *(University College Cork)*; Lightbody, Gordon *(University College Cork)*; O'Toole, John M. *(University College Cork)*

Evaluating Accuracy of Numerical Simulations in Predicting Heating of Wire Implants during MRI at 1.5 T 6107-6110
Vu, Jasmine* *(Northwestern University)*; Bhusal, Bhumi *(Northwestern University)*; Thanh Nguyen, Bach *(Northwestern University, Dept. of Radiology, Feinberg School)*; Rad, Laleh Golestani *(Northwestern University)*

Automatic Assessment of Language Disorders in Children with and without Typical Development 6111-6114
Gale, Robert *(Institute on Development & Disability, Oregon Health & Science U)*; Asgari, Meysam* *(Oregon Health & Science University)*; Dolata, Jill *(Institute on Development & Disability, Oregon Health & Science U)*; Prud'hommeaux, Emily *(Dept. of Computer Science, Boston College, Boston)*; Van Santen, Jan *(Oregon Health and Science University)*

Automatic Nasal PAP Mask Sizing with a Deep Unet 6115-6118
Johnston, Benjamin* *(University of Sydney)*; de Chazal, Philip *(University of Sydney)*

Theme 12. Point of Care Diagnostics (Oral Session)

A New Evaluation Method for Medical Image Information Hiding Techniques 6119-6122
Eze, Peter* *(The University of Melbourne)*; Udaya, Parampalli *(The University of Melbourne)*; Evans, Robin John *(The University of Melbourne)*; Liu, Dongxi *(CSIRO Data61)*

A Novel Near Infrared Spectroscopy based Device for Albumin Estimation 6123-6126
Arora, Yashika* *(Indian Institute of Technology Mandi)*; Mukherjee, Soham *(Indian Institute of Technology, Mandi)*; Biswas, Bidisha *(Indian Institute of Technology, Mandi)*; Bedi, Vaibhav *(Indian Institute of Technology, Mandi)*; Dey, Gourab *(Indian Institute of Technology, Mandi)*; Mondal, Prosenjit *(Institute of Technology, Mandi)*; Ghosh, Subrata *(Indian Institute of Technology, Mandi)*; Roy Chowdhury, Shubhajit *(Indian Institute of Technology Mandi)*

A Dynamometer-Based Wireless Pelvic Floor Muscle Force Monitoring 6127-6130
El-Sayegh, Batoul* *(Polytechnique Montreal)*; Dumoulin, Chantal *(University of Montreal)*; Ali, Mohamed *(Polytechnique Montreal)*; Assaf, Hussein *(Polytechnique Montreal)*; Sawan, Mohamad *(Westlake University)*

iQuant Auto: Automated Rapid Test Platform for Immunodiagnostics 6131-6134
Kumarasami, Ramdayalan *(Healthcare Technology Innovation Centre, IIT Madras)*; Vasan, Jayaraman Kiruthi *(Healthcare Technology Innovation Center)*; Joseph, Jayaraj *(HTIC, Indian Institute of Technology Madras)*; Sithambaram, Prabhakar *(Healthcare Technology Innovation Centre)*; Pandidurai, Sathish *(Healthcare Technology Innovation Center)*; Sivaprakasam, Mohanasankar* *(Indian Institute of Technology Madras)*

Video-Based Neonatal Motion Detection 6135-6138
Souley Dosso, Yasmina* *(Carleton University)*; Aziz, Samreen *(Carleton University)*; Nizami, Shermeen *(Carleton University)*; Greenwood, Kim *(The Children's Hospital of Eastern Ontario (CHEO))*; Harrold, JoAnn *(Children's Hospital of Eastern Ontario)*; Green, James R. *(Carleton University)*

Theme 12. Point of Care Technologies for Global Healthcare Challenges (Oral Session)

Influence of Raman Spectrometer Collection Efficiency on Performance of Noninvasive Blood Glucose Detection for Device Miniaturization 6139-6142
Park, Yun Sang *(Samsung Electronics Co., Ltd.)*; AHN, Sungmo *(Samsung Advanced Institute of Technology)*; Chang, Hojun *(Samsung Advance Institute of Technology)*; Lee, Woochang *(Samsung Advanced Institute of Technology)*; Nam, Sung Hyun* *(Samsung Advanced Institute of Technology, Samsung Electronics)*

RF Heating of Deep Brain Stimulation Implants during MRI in 1.2 T Vertical Scanners versus 1.5 T Horizontal Systems: A Simulation Study with Realistic Lead Configurations 6143-6146
Kazemivalipour, Ehsan *(Bilkent Univ., Dept. of Electrical and Electronics Eng)*; Vu, Jasmine *(Northwestern Univ.)*; Lin, Stella *(Northwestern Univ., Dept. of Radiology, Feinberg Schoo)*; Bhusal, Bhumi *(Northwestern Univ.)*; Thanh Nguyen, Bach *(Northwestern Univ., Dept. of Radiology, Feinberg School)*; Kirsch, John *(A. A. Martinos Center for Biomedical Imaging, Massachusetts Gene)*; Elahi, Behzad *(Northwestern Univ., Dept. of Physical Therapy and Huma)*; Rosenow, Joshua *(Northwestern Univ.)*; Atalar, Ergin *(Bilkent Univ., Dept. of Electrical and Electronics Eng)*; Rad, Laleh Golestani* *(Northwestern Univ.)*

A Portable Nucleic Acid Extraction System based on Gigahertz Acoustic Tweezers 6147-6150
Li, Tiechuan *(Tianjin University)*; Shen, Xiaotian *(Tianjin University)*; Duan, Xuexin* *(Tianjin University)*

Novel Electrodes for Reliable EEG Recordings on Coarse and Curly Hair 6151-6154
Etienne, Arnelle *(CMU)*; Laroia, Tarana *(Carnegie Mellon University)*; Weigle, Harper *(Carnegie Mellon University)*; Afelin, Amber *(Wesleyan University)*; Kelly, Shawn *(Carnegie Mellon University)*; Krishnan, Ashwati* *(Carnegie Mellon University)*; Grover, Pulkit *(Carnegie Mellon University)*

Detection of Counterfeit Medicines using Hyperspectral Sensing 6155-6158
Shinde, Sujit *(Tata Consultancy Services Limited)*; Bhavsar, Karan *(Tata Consultancy Services Limited)*; Kimbahune, Sanjay* *(TCS Innovation Labs - Mumbai)*; Khandelwal, Sundeep *(Tata Consultancy Services)*; Ghose, Avik *(TCS Research & Innovation)*; Pal, Arpan *(Tata Consultancy Services)*

Development of Computerized Tool for Screening Thai Children at Risk for Learning Disabilities 6159-6162
Munthuli, Adirek *(Thammasat Univ.)*; Anansiripinyo, Thanaporn *(Thammasat Univ.)*; Nittayapa, Klangpornkun *(Thammasat Univ.)*; Chutamanee, Onsuwan *(Thammasat Univ.)*; Chonchaiya, Weerasak *(Chulalongkorn Univ.)*; Trairatvorakul, Pon *(Chulalongkorn Univ.)*; Jitrotjanarak, Jeerasak *(Chulalongkorn Univ. Demonstration School)*; Worajaratrangsri, Patcharee *(Chulalongkorn Univ. Demonstration School)*; Atichartthanin, Natchaya *(Thammasat Univ.)*; Tantibundhit, Charturong* *(Thammasat Univ.)*