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WORKSHOP PROGRAM

Wednesday, June 3

SPECIAL SESSION: Advanced Measurement Systems for Safety and Security – Part I

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Chairs: Enza Panzardi, *University of Siena, Italy*
Marco Mugnaini, *University of Siena, Italy*

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Tommaso Addabbo, University of Siena, Italy
Stefano De Muro, Rete Ferroviaria Italiana S.p.A., Italy
Giacomo Falaschi, Rete Ferroviaria Italiana S.p.A., Italy
Ada Fort, University of Siena, Italy
Elia Landi, University of Siena, Italy
Riccardo Moretti, University of Siena, Italy
Marco Mugnaini, University of Siena, Italy
Francesco Nicoletti, University of Siena, Italy
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Jack Sinton, Franklin and Marshall College, USA
Fronefield Crawford, Franklin and Marshall College, USA
Tetiana Ogurtsova, National Academy of Sciences of Ukraine, Ukraine
Vadym Ruban, National Academy of Sciences of Ukraine, Ukraine
Lorenzo Capineri, Università degli Studi di Firenze, Italy

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Edoardo Fiorucci, University of L'Aquila, Italy
Simone Mari, University of L'Aquila, Italy

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Mauro Grigioni, Istituto Superiore di Sanità, Italy

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Room: Virtual Room #1

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Giorgio Pennazza, Campus Bio-Medico University of Rome, Italy

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Liam Wright, National Physical Laboratory, UK

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Domenico Formica, Università Campus Bio-Medico di Roma, Italy
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David V. Thiel, Griffith University, Australia
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Stanislao Grazioso, University of Naples Federico II, Italy
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Davide Lanaro, Integris S.p.A, Italy

SPECIAL SESSION: Advanced Measurement Systems for Safety and Security – Part II

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Chairs: Alessandro Pozzebon, *University of Siena, Italy*
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Marina Popolizio, Politecnico di Bari, Italy
Tiziano Politi, Politecnico di Bari, Italy
Vincenzo Di Lecce, Politecnico di Bari, Italy

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Eduard Caizer, Syncode S.c.ar.l., Italy
Carlo Verdini, Syncode S.c.ar.l., Italy
Sauro Longhi, Università Politecnica delle Marche, Italy

SPECIAL SESSION: Measurements and Sensors for Safety and Wellness of Workers

Room: Virtual Room #3

Chairs: *Carla Fanizza, DITSPIA, INAIL, Italy*

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Enzo Pasquale Scilingo, University of Pisa, Italy

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Giuseppe Ferri, University of L'Aquila, Italy

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Chairs: Ivanovich Silva, *Federal University of Rio Grande do Norte, Brazil*
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Felipe Domingues, *São Paulo State University (Unesp), Brazil*
Sergio Luiz Rizzo, *National Service of Industrial Training (Senai), Brazil*
Eduardo P Godoy, *São Paulo State University (Unesp), Brazil*

SPECIAL SESSION: Fiber Optic Sensors for Industry and Healthcare 4.0

Room: Virtual Room #3

Chairs: Taesung Kim, *Sungkyunkwan University, Republic of South Korea*
Daniele Tosi, *Nazarbayev University, Kazakhstan*
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Daniela Lo Presti, Università Campus Bio-Medico di Roma, Italy
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Carlo Massaroni, Università Campus Bio-Medico di Roma, Italy
Domenico Formica, Università Campus Bio-Medico di Roma, Italy
Taesung Kim, Sungkyunkwan University, Republic of South Korea
Donjoo Shin, Sungkyunkwan University, Republic of South Korea

Thursday, June 4

SPECIAL SESSION: Measurements and virtual measurements for Industry 4.0: approaches and solutions for smart manufacturing - Part II

Room: Virtual Room #1

Chairs: *Giulio D'Emilia, University of L'Aquila, Italy*
Antonella Gaspari, University of L'Aquila, Italy
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Giacomo Bianchi, CNR STIIMA, Italy

- 283 **Compensation of Temperature Effects on an Automatic System for Diameter Measurement**
Valerio Marcotuli, Politecnico di Milano, Italy
Stefano Marelli, Politecnico di Milano, Italy
Renato Casartelli, Casartelli Antonio S.r.l., Italy
Diego Scaccabarozzi, Politecnico di Milano, Italy
Bortolino Saggini, Politecnico di Milano, Italy
Marco Tarabini, Politecnico di Milano, Italy
- 288 **A Vision-based Measurement System for Semi-finished Cylindrical Geometries**
Valerio Marcotuli, Politecnico di Milano, Italy
Nitin Lal, Politecnico di Milano, Italy
Diego Scaccabarozzi, Politecnico di Milano, Italy
Marco Tarabini, Politecnico di Milano, Italy
- 293 **A flexible method to detect the fault of components in an injection group of a diecasting machine.**
Luca Provezza, University of Study of Brescia, Italy
Alberto Marini, Italpresse Gauss, Italy
Giovanna Sansoni, University of Study of Brescia, Italy
Matteo Lancini, University of Study of Brescia, Italy
- 299 **Assessment of the measurements contribution on composites thermoforming processes: a case study of an automotive component**
Antonios G. Stamopoulos, University of L'Aquila, Italy
Pierfrancesco Spitilli, University of L'Aquila, Italy
Giulio D'Emilia, University of L'Aquila, Italy
Antonella Gaspari, University of L'Aquila, Italy
Emanuela Natale, University of L'Aquila, Italy
Antoniomaria Di Ilio, University of L'Aquila, Italy

SPECIAL SESSION: Gender-inspired approaches to the design of innovative measurement systems and IoT applications

Room: Virtual Room #2

- Chairs:** Paola Saccomandi, *Politecnico di Milano, Italy*
Cristina Emilia Costa, *Fondazione Bruno Kessler, Italy*
Monica La Mura, *University of Salerno, Italy*
Dajana Cassioli, *University of L'Aquila, Italy*
- 304 **A non-invasive system for epidural space detection: comparison with Compufflo®**
Riccardo Sabbadini, Università Campus Bio-Medico di Roma, Italy
Carlo Massaroni, Università Campus Bio-Medico di Roma, Italy
Joshua Di Tocco, Università Campus Bio-Medico di Roma, Italy
Emiliano Schena, Università Campus Bio-Medico di Roma, Italy
Domenico Formica, Università Campus Bio-Medico di Roma, Italy
Alessia Mattei, Università Campus Bio-Medico di Roma, Italy
Rita Cataldo, Università Campus Bio-Medico di Roma, Italy
Francesca Gargano, Università Campus Bio-Medico di Roma, Italy
Massimiliano Carassiti, Università Campus Bio-Medico di Roma, Italy
- 309 **Digital Signage by Real-Time Gender Recognition From Face Images**
Antonio Greco, University of Salerno, Italy
Alessia Saggese, University of Salerno, Italy
Mario Vento, University of Salerno, Italy
- 314 **VITAL-ECG : a de-bias algorithm embedded in a gender-immune device**
Annunziata Paviglianiti, Politecnico di Torino, Italy
Eros Pasero, Politecnico di Torino, Italy
- 319 **Human-Machine Interaction Personalization: a Review on Gender and Emotion Recognition Through Speech Analysis**
Monica La Mura, University of Salerno, Italy
Patrizia Lamberti, University of Salerno, Italy

324 Is Really IoT Technology Gender Neutral?

Dajana Cassioli, University of L'Aquila, Italy
Antiniscia Di Marco, University of L'Aquila, Italy
Tania Di Mascio, University of L'Aquila, Italy
Laura Tarantino, University of L'Aquila, Italy
Paola Inverardi, University of L'Aquila, Italy

SPECIAL SESSION: Computational sensing for IoT industrial and medical applications - Part I

Room: Virtual Room #3

Chairs: Luca Vollero, *Università Campus Bio-Medico di Roma, Italy*
Samuel W. Oluwarotimi, *Shenzhen Institutes of Advanced Technology, China*

329 AWC C. elegans neuron: a biological sensor model

Martina Nicoletti, Campus Bio-Medico University of Rome, Italy
Alessandro Loppini, Campus Bio-Medico University of Rome, Italy
Letizia Chiodo, Campus Bio-Medico University of Rome, Italy
Viola Folli, CLNS@Sapienza, Istituto Italiano di Tecnologia, Italy
Giancarlo Ruocco, CLNS@Sapienza, Istituto Italiano di Tecnologia, Italy
Simonetta Filippi, Campus Bio-Medico University of Rome, Italy

334 Optical CO2 detectors for smart packaging of food in modified atmosphere

Simone Grasso, Campus Bio-Medico University of Rome, Italy
Alessandro Zompanti, Campus Bio-Medico University of Rome, Italy
Anna Sabatini, Campus Bio-Medico University of Rome, Italy
Ilaria Pazzaglia, Campus Bio-Medico University of Rome, Italy
Marco Santonico, Campus Bio-Medico University of Rome, Italy
Giorgio Pennazza, Campus Bio-Medico University of Rome, Italy

340 Chinese Sign Language Alphabet Recognition Based On Random Forest Algorithm

Simin Yuan, Chinese Academy of Sciences, China
Yuan Wang, Chinese Academy of Sciences, China
Xin Wang, Chinese Academy of Sciences, China
Hanjie Deng, Chinese Academy of Sciences, China
Shurui Sun, Chinese Academy of Sciences, China
Hui Wang, Chinese Academy of Sciences, China
Pingao Huang, Chinese Academy of Sciences, China
Guanglin Li, Chinese Academy of Sciences, China

345 The Effects of Electrode Locations on Silent Speech Recognition using High-density sEMG

Mingxing Zhu, Chinese Academy of Sciences, China
Xiaochen Wang, Chinese Academy of Sciences, China
Xin Wang, Chinese Academy of Sciences, China
Cheng Wang, Chinese Academy of Sciences, China
Zijian Yang, Chinese Academy of Sciences, China
Oluwarotimi Williams Samuel, Chinese Academy of Sciences, China
Shixiong Chen, Chinese Academy of Sciences, China
Guanglin Li, Chinese Academy of Sciences, China

349 A Pilot Study on Auditory Brainstem Response Evoked with Randomized Stimulation Rate

Xin Wang, Chinese Academy of Sciences, China
Mingxing Zhu, Chinese Academy of Sciences, China
Xiaochen Wang, Chinese Academy of Sciences, China
Shuting Liu, Chinese Academy of Sciences, China
Oluwarotimi Williams Samuel, Chinese Academy of Sciences, China
Wanzhang Yang, Shenzhen Hospital of Southern Medical University, China
Shixiong Chen, Chinese Academy of Sciences, China
Guanglin Li, Chinese Academy of Sciences, China

SPECIAL SESSION: Sensors for Collaborative Robotics in Industry and Healthcare 4.0

Room: Virtual Room #1

Chairs: Luca Massari, *Scuola Superiore Sant'Anna, Italy*

Domenico Camboni, *University of Pisa, Italy*

Federico Bianchi, *Scuola Superiore Sant'Anna, Italy*

354 Proof-of-Concept Millimeter-Wave Free-Space Nondestructive Testing Implemented on Collaborative Mobile Robots

Bilal Daass, University of Lille, France

Denis Pomorski, Université des Sciences et Technologies de Lille, France

Adem Rouibah, University of Lille, France

Kamel Haddadi, University of Lille, France

360 Interaction Force Computation Exploiting Environment Stiffness Estimation for Sensorless Robot Applications

Loris Roveda, Istituto Dalle Molle di Studi sull'Intelligenza Artificiale, Switzerland

Dario Piga, SUPSI-IDSIA, Switzerland

364 Tactile sensing with gesture-controlled collaborative robot

Francesca Sorgini, Scuola Superiore Sant'Anna, Italy

Giuseppe Airò Farulla, Politecnico di Torino, Italy

Nikola Lukic, University of Belgrade, Serbia

Ivan Danilov, University of Belgrade, Serbia

Loris Roveda, Istituto Dalle Molle di Studi sull'Intelligenza Artificiale, Switzerland

Milos Milivojevic, University of Belgrade, Serbia

Terrin Babu Pulikottil, STIIMA CNR, Italy

Maria Chiara Carrozza, The BioRobotics Institute, Italy

Paolo Prinetto, Politecnico di Torino, Italy

Tullio Tolio, Politecnico di Milano, Italy

Calogero Maria Oddo, Scuola Superiore Sant'Anna, Italy

Petar B. Petrovic, University of Belgrade, Serbia

Bozica Bojovic, University of Belgrade, Serbia

369 A Pneumatic Haptic Display for Collaborative Robotics applications

Debadrata Sarkar, National Institute of Technology Durgapur, India

Jessica D'Abbraccio, Scuola Superiore Sant'Anna, Italy

Domenico Camboni, Scuola Superiore Sant'Anna, Italy

Luca Massari, Scuola Superiore Sant'Anna, Italy

Aman Arora, National Institute of Technology Durgapur, India

Calogero Maria Oddo, Scuola Superiore Sant'Anna, Italy

GENERAL SESSION – PART I

Room: Virtual Room #2

Chair: Francesco Lamonaca, *University of Sannio, Italy*

374 Speed detection of battery-free nodes based on RF Wireless Power Transfer

Roberto La Rosa, STMicroelectronics, Italy

Catherine Dehollain, Ecole Polytechnique Federale de Lausanne, Switzerland

Filippo Pellitteri, University of Palermo, Italy

Nicola Campagna, University of Palermo, Italy

Patrizia Livreri, University of Palermo, Italy

379 Novel Piezoelectric Sensor by Aerosol Jet Printing in Industry 4.0

Tiziano Fapanni, University of Brescia, Italy

Michela Borghetti, University of Brescia, Italy

Emilio Sardini, University of Brescia, Italy

Mauro Serpelloni, University of Brescia, Italy

384 3DOPE-DL: Accuracy Evaluation of a Deep Learning Framework for 3D Object Pose Estimation

Davide Maria Fabris, Politecnico di Milano, Italy

Remo Sala, Politecnico di Milano, Italy

Marco Tarabini, Politecnico di Milano, Italy

- 390 **A Plain Low Threshold IoT Platform for Enabling New IoT Products from SMEs**
Stefan Forsstrom, Mid Sweden University, Sweden
Ulf Jennehag, Mid Sweden University, Sweden
Xiao Guan, Mid Sweden University, Sweden
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GENERAL SESSION – PART II

Room: Virtual Room #3

Chair: Mauro Serpelloni, *University of Brescia, Italy*

- 395 **Complex Event Processing on the Edge - Bringing Data Consolidation and Processing closer to Wireless Sensor Networks**
David Merkl, Frankfurt University of Applied Sciences, Germany
Henry-Norbert Cocos, Frankfurt University of Applied Sciences, Germany
- 401 **Low cost, low pass Prism filtering**
Manus Henry, University of Oxford, UK, South Ural State University, Russia
- 407 **Quality Assurance of Weld Seams Using Laser Triangulation Imaging and Deep Neural Networks**
Andreas Spruck, University of Erlangen-Nurnberg, Germany
Jurgen Seiler, University of Erlangen-Nurnberg, Germany
Michael Roll, Autotech Engineering Deutschland GmbH, Germany
Thomas Dudziak, Autotech Engineering Deutschland GmbH, Germany
Jurgen Eckstein, Autotech Engineering Deutschland GmbH, Germany
Andre Kaup, University of Erlangen-Nurnberg, Germany
- 413 **Test bench for the measurement of scissors' cutting torque**
Marco Tarabini, Politecnico di Milano, Italy
D. Magnani, Politecnico di Milano, Italy
Hermes Giberti, Università di Pavia, Italy
G. Gianola, Consorzio PREMAX, Italy
Pietro Marzaroli, Politecnico di Milano, Italy
Stefano Marelli, Politecnico di Milano, Italy
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SPECIAL SESSION: Cybersecurity Standards and Technologies for IoT and Industry 4.0 (SecurityStandards)

Room: Virtual Room #1

Chairs: Alan Oliveira de Sá, *Admiral Wandenkolk Instruction Center, Brazil*

Lucila Maria de Souza Bento, Inmetro, Brazil

- 418 **Development of security mechanisms for a remote sensing system based on opportunistic and mesh networks**
Lucas S. dos Santos, Federal University of Rio de Janeiro, Brazil
Paulo R. M. Nascimento, National Institute of Metrology, Brazil
Lucila M. S. Bento, National Institute of Metrology, Brazil
Raphael C. S. Machado, National Institute of Metrology, Brazil
Claudio L. Amorim, Federal University of Rio de Janeiro, Brazil
- 423 **Combining exposure indicators and predictive analytics for threats detection in real industrial IoT sensor networks**
M. A. Brignoli, Vitrociset – a Leonardo Company, Italy
Silvio Mazzaro, Vitrociset – a Leonardo Company, Italy
G. Fortunato, Vitrociset – a Leonardo Company, Italy
A. Corà, Vitrociset – a Leonardo Company, Italy
W. Matta, Vitrociset – a Leonardo Company, Italy
S. P. Romano, University of Naples Federico II, Italy
B. Ruggiero, University of Naples Federico II, Italy
V. Coscia, University of Naples Federico II, Italy
- 429 **Public-Key Infrastructure for Smart Meters using Blockchains**
Wilson Melo Jr., National Institute of Metrology, Brazil
Raphael C. S. Machado, National Institute of Metrology, Brazil
Daniel Peters, Physikalisch-Technische Bundesanstalt, Germany
Mahbuba Moni, Physikalisch-Technische Bundesanstalt, Germany

- 435 **A Digital Twins Approach to Smart Grid Security Testing and Standardization**
Manolya Atalay, Middle East Technical University Ankara, Turkey
Pelin Angin, Middle East Technical University Ankara, Turkey
- 441 **Proficiency Testing for Software Analysis and Cybersecurity Laboratories**
Raphael C. S. Machado, Inmetro, Brazil
Wilson Melo Jr., National Institute of Metrology, Brazil
Lucila M. S. Bento, National Institute of Metrology, Brazil
Sergio Camara, National Institute of Metrology, Brazil
Vinicius da Hora, Fluminense Federal University, Brazil
Thais Barras, National Institute of Metrology, Brazil
Wladimir Chapetta, National Institute of Metrology, Brazil
- 447 **Identification of Data Injection Attacks in Networked Control Systems with Varying Setpoint Condition**
Alan O. de Sa, Admiral Wandenkolk Instruction Center, Naval War College, Brazil
Raphael C. S. Machado, National Institute of Metrology, Fluminense Federal University, Brazil
- 452 **Security vulnerability in Internet of Things sensor networks protected by Advanced Encryption Standard**
Pasquale Arpaia, ARHEMLab, University of Naples Federico II, Italy
Francesco Bonavolontà, University of Naples Federico II, Italy
Antonella Cioffi, University of Naples Federico II, Italy
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SPECIAL SESSION: Metrology for Data Interoperability in Industry 4.0

Room: Virtual Room #2

Chairs: Blair Hall, Measurement Standards Laboratory, New Zealand

Sascha Eichstädt, Physikalisch-Technische Bundesanstalt, Germany

- 458 **Software for calculation with physical quantities**
Blair Hall, Measurement Standards Laboratory of New Zealand, New Zealand
- 464 **Quantifying Metrological Redundancy in an Industry 4.0 Environment**
Gertjan Kok, VSL Dutch Metrology Institute, The Netherlands
Peter Harris, National Physical Laboratory, United Kingdom
- 469 **Semantic Information in Sensor Networks: How to Combine Existing Ontologies, Vocabularies and Data Schemes to Fit a Metrology Use Case**
Maximilian Gruber, Physikalisch-Technische Bundesanstalt, Germany
Sascha Eichstädt, Physikalisch-Technische Bundesanstalt, Germany
Julia Neumann, Physikalisch-Technische Bundesanstalt, Germany
Adrian Paschke, Free University Berlin, Germany
- 474 **Fundamental Physical Constants Ready for Machine Communication in a Digitalized World**
Daniel Hutzschenreuter, Physikalisch-Technische Bundesanstalt, Germany
Henrike Weber, Physikalisch-Technische Bundesanstalt, Germany
Shanna Schönhals, Physikalisch-Technische Bundesanstalt, Germany
Shan Lin, Physikalisch-Technische Bundesanstalt, Germany
Frank Härtig, Physikalisch-Technische Bundesanstalt, Germany
Bojan Ačko, University of Maribor, Slovenia
- 479 **A Measurement Information Infrastructure's Benefits for Industrial Metrology and IoT**
Mark Kuster, Consultant, USA
- 485 **Infrastructure for Digital Calibration Certificates**
Clifford Brown, National Physical Laboratory, UK
Tommi Elo, Aalto University, Finland
Kristine Hovhannisyanyan, Tallinn University of Technology, Estonia
Daniel Hutzschenreuter, Physikalisch-Technische Bundesanstalt, Germany
Petri Kuosmanen, Aalto University, Finland
Olaf Maennel, Tallinn University of Technology, Estonia
Tuukka Mustapaa, Aalto University, Finland
Pekka Nikander, Aalto University, Finland
Thomas Wiedenhofer, Physikalisch-Technische Bundesanstalt, Germany

- 490 **A universal metadata model for metrological complex quantities**
Vincenzo Paciello, University of Salerno, Italy
Laura De Santis, University of Salerno, Italy
Daniel Hutzschenreuter, Physikalisch-Technische Bundesanstalt, Germany
Ian Smith, National Physical Laboratory, UK
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SPECIAL SESSION: Physiological Sensors and Techniques for Monitoring Sport and Physical

Room: Virtual Room #3

Chairs: *Andrea Nicolò, University of Rome "Foro Italico", Italy*
Carlo Massaroni, Università Campus Bio-Medico di Roma, Italy

- 495 **Effect of Running Intensity on Leg Force Asymmetry and its Relationship to Internal Load Biomarkers**
Filipe Sousa, Federal University of Alagoas, Brazil
Natalia Rodrigues, Federal University of Alagoas, Brazil
Fulvia Manchado-Gobatto, University of Campinas, Brazil
Claudio Gobatto, University of Campinas, Brazil
- 501 **Validation of a novel wearable solution for measuring L5/S1 load during manual material handling tasks**
Ilaria Conforti, Sapienza University of Rome, Italy
Ilaria Mileti, Sapienza University of Rome, Italy
Dario Panariello, University of Naples Federico II, Italy
Teodorico Caporaso, University of Naples Federico II, Italy
Stanislao Grazioso, University of Naples Federico II, Italy
Zaccaria Del Prete, Sapienza University of Rome, Italy
Antonio Lanzotti, University of Naples Federico II, Italy
Giuseppe Di Gironimo, University of Naples Federico II, Italy
Eduardo Palermo, Sapienza University of Rome, Italy
- 507 **A Body Hydration Analysis System to improve running performance**
Valerio Lapadula, Università Campus Bio-Medico di Roma, Italy
Anna Sabatini, Università Campus Bio-Medico di Roma, Italy
Alessandro Zompanti, Università Campus Bio-Medico di Roma, Italy
Silvia Buscaglione, Integris S.p.A, Italy
Davide Lanaro, Integris S.p.A, Italy
Mario Merone, Università Campus Bio-Medico di Roma, Italy
- 511 **Comparison among different inertial-based algorithms for the automatic detection of temporal events in sprint tests: a preliminary study on elite athletes with intellectual impairment**
Teodorico Caporaso, University of Naples Federico II, Italy
Angela Palomba, University of Campania Luigi Vanvitelli, Italy
Stanislao Grazioso, University of Naples Federico II, Italy
Alessia Megna, University of Naples Federico II, Italy
Dario Panariello, University of Naples Federico II, Italy
Diego Perez, Don Orione Rehabilitation Center, Italy
Piera Marchettoni, FISDIR, Italy
Giuseppe Di Gironimo, University of Naples Federico II, Italy
Antonio Lanzotti, University of Naples Federico II, Italy
- 516 **Bluetooth Performance Evaluation based on Notify for Real-time Body-Area Sensor Networks**
Olaf Reich, Frankfurt University of Applied Sciences, UK
Erik Hubner, Frankfurt University of Applied Sciences, UK
Bogdan Ghita, Frankfurt University of Applied Sciences, University of Plymouth, UK
Matthias Wagner, Frankfurt University of Applied Sciences, UK
Jorg Schafer, Frankfurt University of Applied Sciences, UK

521 Design and development of an instrumented glove for hand rehabilitation in children suffering from cerebral palsy: a digital manufacturing approach

Giorgia Cusimano, Università Campus Bio-Medico di Roma, Italy
Alessia Longo, Università Campus Bio-Medico di Roma, Italy
Alessio Uffreduzzi, Università Campus Bio-Medico di Roma, Italy
Marco Bravi, Università Campus Bio-Medico di Roma, Italy
Fabrizio Taffoni, Università Campus Bio-Medico di Roma, Italy

526 BEAT: Balance Evaluation Automated Testbed for the standardization of balance assessment in human wearing exoskeleton

Juri Taborri, University of Tuscia, Italy
Stefano Salvatori, University Niccolò Cusano, Italy
Giovanni Mariani, University of Tuscia, Italy
Stefano Rossi, University of Tuscia, Italy
Fabrizio Patanè, University Niccolò Cusano, Italy

Friday, June 5

SPECIAL SESSION: Large-scale traceability of digital MEMS sensor: statistical methods and in-line control systems

Room: Virtual Room #1

Chairs: Alessandro Schiavi, *INRIM, Italy*
Francesca Romana Pennecchi, *INRIM, Italy*
Andrea Prato, *INRIM, Italy*

532 Traceability Chain for Acoustic Sensors Based on the Direct Definition of the Acoustic Pascal by Optical Method

Wan-Ho Cho, Korea Research Institute of Standards and Science, Republic of Korea
Triantafillos Koukoulas, National Research Council Canada, Canada

537 A reliable sampling method to reduce large sets of measurements: a case study on the calibration of digital 3-axis MEMS accelerometers

Andrea Prato, INRiM – National Institute of Metrological Research, Italy
Alessandro Schiavi, INRiM – National Institute of Metrological Research, Italy
Fabrizio Mazzoleni, INRiM – National Institute of Metrological Research, Italy
Amara Touré, Politecnico di Torino, Italy
Gianfranco Genta, Politecnico di Torino, Italy
Maurizio Galetto, Politecnico di Torino, Italy

542 Calibration of digital 3-axis MEMS accelerometers: A double-blind «multi-bilateral» comparison

Alessandro Schiavi, INRiM – National Institute of Metrological Research, Italy
Andrea Prato, INRiM – National Institute of Metrological Research, Italy
Fabrizio Mazzoleni, INRiM – National Institute of Metrological Research, Italy
Giulio D'Emilia, University of L'Aquila, Italy
Antonella Gaspari, University of L'Aquila, Italy
Emanuela Natale, University of L'Aquila, Italy

548 Big Data management: A Vibration Monitoring point of view

Alessandro Paolo Daga, Politecnico di Torino, Italy
Alessandro Fasana, Politecnico di Torino, Italy
Luigi Garibaldi, Politecnico di Torino, Italy
Stefano Marchesiello, Politecnico di Torino, Italy

SPECIAL SESSION: Electronic and Mechatronics in Industry

Room: Virtual Room #2

Chair: Alessandro Massaro, *Dyrecta Lab srl, Italy*

554 Infrared Thermography applied on Fresh Food Monitoring in Automated Alerting Systems

Alessandro Massaro, Dyrecta Lab srl, Italy
Antonio Panarese, Dyrecta Lab srl, Italy
Angelo Galiano, Dyrecta Lab srl, Italy

559 Infrared Thermography and Image Processing applied on Weldings Quality Monitoring

Alessandro Massaro, Dyrecta Lab srl, Italy
Antonio Panarese, Dyrecta Lab srl, Italy
Giovanni Dipierro, Dyrecta Lab srl, Italy
Emanuele Cannella, Dyrecta Lab srl, Italy
Angelo Galiano, Dyrecta Lab srl, Italy

565 Image Processing Segmentation applied on Defect Estimation in Production Processes

Alessandro Massaro, Dyrecta Lab srl, Italy
Antonio Panarese, Dyrecta Lab srl, Italy
Giovanni Dipierro, Dyrecta Lab srl, Italy
Emanuele Cannella, Dyrecta Lab srl, Italy
Angelo Galiano, Dyrecta Lab srl, Italy
Valeria Vitti, Dyrecta Lab srl, Italy

570 Production Optimization Monitoring System Implementing Artificial Intelligence and Big Data

Alessandro Massaro, Dyrecta Lab srl, Italy
Sergio Selicato, Dyrecta Lab srl, Italy
Roberto Miraglia, Dyrecta Lab srl, Italy
Antonio Panarese, Dyrecta Lab srl, Italy
Angelo Calicchio, Dyrecta Lab srl, Italy
Angelo Galiano, Dyrecta Lab srl, Italy

576 Low Cost IoT Sensor System for Real-time Remote Monitoring

Matteo D'Aloia, MASVIS srl, Italy
Annalisa Longo, MASVIS srl, Italy
Gianluca Guadagno, MASVIS srl, Italy
Mariano Pulpito, MASVIS srl, Italy
Paolo Fornarelli, MASVIS srl, Italy
Pietro Nicola Laera, MASVIS srl, Italy
Dario Manni, MASVIS srl, Italy
Maria Rizzi, Politecnico di Bari, Italy

SPECIAL SESSION: Computational sensing for IoT industrial and medical applications - Part II

Room: Virtual Room #3

Chairs: Luca Vollero, *Università Campus Bio-Medico di Roma, Italy*
Samuel W. Oluwarotimi, *Shenzhen Institutes of Advanced Technology, China*

581 The Performance Evaluation of SSVEP-BCI Actuated Wheelchair with Parameter Setting of Time-Window Length and Stimulation Layout

Jun Xie, Xi'an Jiaotong University, China
Xiaojun Wu, Science and Technology on Electrooptic Control Laboratory, China
Peng Fang, Shenzhen Institutes of Advanced Technology, China
Guanglin Li, Shenzhen Institutes of Advanced Technology, China
Guozhi Cao, Xi'an Jiaotong University, China
Tao Xue, Xi'an Jiaotong University, China

- 586 A New Approach for Hand Gesture Recognition Based on the Fusion of sEMG and Impedance Information**
Yuan Wang, Chinese Academy of Sciences, China
Simin Yuan, Chinese Academy of Sciences, China
Pingao Huang, Chinese Academy of Sciences, China
Hui Wang, Chinese Academy of Sciences, China
Wenlong Yu, Chinese Academy of Sciences, China
Menglong Fu, Chinese Academy of Sciences, China
Xin Wang, Chinese Academy of Sciences, China
Oluwarotimi Williams Samuel, Chinese Academy of Sciences, China
Guanglin Li, Chinese Academy of Sciences, China
- 591 A Smart Solution for Proprioceptive Rehabilitation through M-IMU Sensors**
Martina Lapresa, Campus Bio-Medico University of Rome, Italy
Christian Tamantini, Campus Bio-Medico University of Rome, Italy
Francesco Scotto di Luzio, Campus Bio-Medico University of Rome, Italy
Francesca Cordella, Campus Bio-Medico University of Rome, Italy
Marco Bravi, Campus Bio-Medico University of Rome, Italy
Sandra Miccinilli, Campus Bio-Medico University of Rome, Italy
Loredana Zollo, Campus Bio-Medico University of Rome, Italy
- 596 IoT Gateways for Industrial and Medical Applications: Architecture and Performance Assessment**
Claudio Botta, Everis
Leonardo Pierangelini, Università Campus Bio-Medico di Roma, Italy
Luca Vollero, Università Campus Bio-Medico di Roma, Italy
- 600 Efficient Classification of Motor Imagery using Particle Swarm Optimization-based Neural Network for IoT Applications**
Oluwagbenga Paul Idowu, Chinese Academy of Sciences, China
Oluwarotimi Williams Samuel, Chinese Academy of Sciences, China
Xiangxin Li, Chinese Academy of Sciences, China
Mojisola Grace Asogbon, Chinese Academy of Sciences, China
Peng Fang, Chinese Academy of Sciences, China
Guanglin Li, Chinese Academy of Sciences, China

GENERAL SESSION - Part III

Room: Virtual Room #1

Chair: Luca De Vito, *University of Sannio, Italy*

- 605 Deploying Wifi, RF and BLE sensors for pervasive monitoring and control**
Alberto Faro, CPS Research Lab Deepsensing srl, Italy
Daniela Giordano, University of Catania, ISAFOM-CNR, Italy
Mario Venticinque, ISAFOM-CNR, Italy
- 611 ISO/IEC 15189 Implementation in Microbiology Laboratory – General Concepts**
Faris Hrvat, International Burch University, Bosnia and Herzegovina
Selma Cifric, International Burch University, Bosnia and Herzegovina
Amina Aleta, International Burch University, Bosnia and Herzegovina
Amra Dzuho, International Burch University, Bosnia and Herzegovina
Leja Gurbeta Pokvic, International Burch University, Bosnia and Herzegovina
Almir Badnjevic, International Burch University, Bosnia and Herzegovina
- 617 Informational Space and Messages Interaction Models for Smart Factory Concept**
Maria Usova, ITMO University, Russia
Sergey Chuprov, ITMO University, Russia
Ilya Viksnin, ITMO University, Russia

622 SPIRIT - A Software Framework for the Efficient Setup of Industrial Inspection Robots

Daniele Evangelista, University of Padua, Italy
Marco Antonelli, IT+Robotics srl, Padua, Italy
Alberto Pretto, IT+Robotics srl, Padua, Italy
Christian Eitzinger, PROFACTOR GmbH, Steyr-Gleink, Austria
Michele Moro, University of Padua, Italy
Carlo Ferrari, University of Padua, Italy
Emanuele Menegatti, University of Padua, Italy

**SPECIAL SESSION: Uncertainty Evaluation in Signal Processing for Industrial Applications
– Part II**

Room: Virtual Room #2

Chairs: *Yuhui Luo, National Physical Laboratory, UK*
Liam Wright, National Physical Laboratory, UK
Kavya Jagan, National Physical Laboratory, UK

627 Bayesian Autoencoders for Drift Detection in Industrial Environments

Bang Xiang Yong, University of Cambridge, United Kingdom
Yasmin Fathy, University of Cambridge, United Kingdom
Alexandra Brintrup, University of Cambridge, United Kingdom

632 From dynamic measurement uncertainty to the Internet of Things and Industry 4.0

Sascha Eichstädt, Physikalisch-Technische Bundesanstalt, Germany

636 Stochastic approach for controllable measurement uncertainty in Industry 4.0 applications

Marjan Urekar, University of Novi Sad, Serbia

GENERAL SESSION - Part IV

Room: Virtual Room #3

Chair: *Sergio Rapuano, University of Sannio, Italy*

642 Evaluation of the bounding box uncertainty of deeplearning object detection in HALCON software

Daniele Marchisotti, Politecnico di Milano, Italy
Vittorio Sala, iMAGE S SPA, Italy

648 Analysis of reproducibility and repeatability of a hand-held laser scanner for gap&flush measurement in car-assembly line

Alessia Baleani, Università Politecnica delle Marche, Italy
Paolo Castellini, Università Politecnica delle Marche, Italy
Paolo Chiariotti, Università Politecnica delle Marche, Italy
Nicola Paone, Università Politecnica delle Marche, Italy
Luca Violini, Università Politecnica delle Marche, Italy

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