2019 IEEE Signal Processing in Medicine and Biology Symposium (SPMB 2019)

Philadelphia, Pennsylvania, USA 7 December 2019



IEEE Catalog Number: CFP1991R-POD ISBN: 978-1-7281-4344-6

Copyright © 2019 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:
 CFP1991R-POD

 ISBN (Print-On-Demand):
 978-1-7281-4344-6

 ISBN (Online):
 978-1-7281-4343-9

ISSN: 2372-7241

Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-040

Phone: (845) 758-0400 Fax: (845) 758-2633

E-mail: curran@proceedings.com Web: www.proceedings.com



TABLE OF CONTENTS

- Plenary Talks: Joseph Picone, Temple University (Chair)
 - SPMB-I1.01: Drug Development Pipeline Running Low, What's Data Got to Do with It?.....1 *Mohammad F. Kiani, Temple University*
 - SPMB-I1.02: A novel way to manage and control chronic respiratory diseases.....2

 Nick Delmonico and Valentin Fauveau, Strados Labs
- **Lecture Session No. 1:** Vincent Stanford, Del Ray Analytics, LLC (Chair)
 - SPMB-L1.01: Machine Learning Approach to Measure Sleep Quality using EEG Signals.....4

 M. Ravan, New York Institute of Technology
 - SPMB-L1.02: A Pilot Study on Predicting Daytime Behavior & Sleep Quality in Children With ASD.....10
 - A. Alivar, C. Carlson, A. Suliman, S. Warren, P. Prakash, D. E. Thompson, and B. Natarajan, Kansas State University
 - SPMB-L1.03: Vascular Stenosis Detection Using Temporal-Spectral Differences In Correlated Acoustic Measurements.....15
 - B. Panda and S. Mandal, Case Western Reserve University
 - S. J.A. Majerus, Louis Stokes Cleveland Veterans Affairs Medical Center
 - SPMB-L1.04: Fast Automatic Artifact Annotator for EEG Signals Using Deep Learning.....19

 D. Kim and S. Keene, The Cooper Union
 - SPMB-L1.05: Nonlinear Smoothing of Data with Random Gaps and Outliers (DRAGO) Improves Estimation of Circadian Rhythm.....24
 - A. Parekh, H. Sanders, A. W. Varga, D. M Rapoport, and I. Ayappa, Icahn School of Medicine at Mount Sinai
 - I. W. Selesnick, New York University
 - A. Baroni, M. Miller, B. Cavedoni, E. Blessing, and R. S. Osorio NYU Langone Health
 - SPMB-L1.06: Predicting Subjective Sleep Quality Using Recurrent Neural Networks.....30 *J. Boussard, M. J. Kochenderfer, and J. M. Zeitzer, Stanford University*
- Poster Session No. 1: Ivan Selesnick, New York University (Chair)
 - SPMB-P1.01: Machine Learning Enabled Wearable Brain Deformation Sensing System.....36 S. Islam and A. Kim, Temple University
 - SPMB-P1.02: Comparison of EMG-Force Calibration Protocols for Myoelectric Control of Prostheses.....39
 - Z. Zhu, J. Li, X. Huang, and E. Clancy, Worcester Polytechnic Institute
 - C. Dai, Fudan University
 - C. Martinez-Luna, B. McDonald, T. Farrell, Liberating Technologies Inc.

- SPMB-P1.03: Modeling Seismocardiographic Signal using Finite Element Modeling and Medical Image Processing.....41
 - P. Gamage, M. Azad, R. Sandler, and H. Mansy, University of Central Florida
- SPMB-P1.04: Spectrum Sharing Strategy for Radio Frequency-based Medical Services.....44

 A. Ahmed, S. Zhang, V. Amin, and Y. Zhang, Temple University
- SPMB-P1.05: Strados Labs: An Efficient Process to Acquire and Characterize Clinically Validated Respiratory System Information Using a Non-Invasive Bio-Sensor.....47
 - N. Capp, V. Fauveau, Y. K. Au, P. Glasser, T. Muqeem, Strados Labs
 - G. Hassen, and A. Cardenas, NYC Health + Hospitals
- SPMB-P1.06: Recent Advances in the Temple University Digital Pathology Corpus.....49

 I. Hunt, S. Husain, J. Simons, I. Obeid, and J. Picone, Temple University
- SPMB-P1.07: Software and Data Resources to Advance Machine Learning Research in Electroencephalography.....52
 - S. Rahman, M. Miranda, I. Obeid, and J. Picone, Temple University
- SPMB-P1.08: Issues in the Reproducibility of Deep Learning Results.....55 S. Jean-Paul, T. Elseify, I. Obeid, and J. Picone, Temple University
- SPMB-P1.09: A System for Measuring Sound Transmission through Joints.....58

 T. Hassan, L. McKinney, R. Sandler, A. Kassab, C. Price, F. Moslehy, and H. Mansy,
 University of Central Florida
- SPMB-P1.10: Noninvasive Detection Of Elevated Intracranial Pressure Using Tympanic Membrane Pulse.....61
 - R. Dhar, R. Sandler, K. Manwaring, and H. Mansy, University of Central Florida
- SPMB-P1.11: On-demand teleradiology using smartphone photographs as proxies for DICOM images.....64
 - S. Pachhai, R. Warfsman, and R. Mammone, Rutgers University
 - C. Podilchuk, Sonavista

Lecture Session No. 2: Hansen Mansy, University of Central Florida (Chair)

- SPMB-L2.01: Fully Automated, MRI-based Left-Ventricular Contractility Analysis in Breast Cancer Patients Following Chemotherapy.....66
 - B. Baldwin, G. Angus-Barker, S. Joseph, M. Figarola, M. Cohen, C. Malozzi and J. Kar, University of South Alabama
- SPMB-L2.02: A comparative study of end-to-end discriminative deep learning models for knee joint kinematic time series classification.....72
 - M. Abid, Y. Ouakrim, and N. Mezghani, TELUQ University
 - N. Hagemeister, Centre de Recherche du CHUM
 - A. Mitiche, INRS, Centre Énergie, Matériaux et Télécommunications
 - P. Vendittoli, Centre de recherche Hôpital Maisonneuve-Rosemont
 - A. Fuentes, EMOVI

- SPMB-L2.03: Shape Modeling and Atlas-Based Segmentation for Identification of Lower Leg Tissues in pQCT.....78
 - S. Makrogiannis, A. Okorie, and T. Biswas, Delaware State University
 - L. Ferrucci, National Institute on Aging, National Institutes of Health
- SPMB-L2.04: Analyzing Dry Electrodes for Wearable Bioelectrical Impedance Analyzers.....84 *M. Usman, A. Gupta and W. Xue, Rowan University*
- SPMB-L2.05: Seismocardiographic Signal Variability During Regular Breathing and Breath Hold in Healthy Adults.....89
- M. Azad, P. Gamage, R. Sandler and H. Mansy, University of Central Florida N. Raval, Advent Health
- SPMB-L2.06: An Adaptive Search Algorithm for Detecting Respiratory Artifacts Using a Wireless Passive Wearable Device.....96
 - P. O'Neill, W. Mongan, R. Ross, S. Acharya, A. Fontecchio, and K. Dandekar, Drexel University

Lecture Session No. 3: Albert Kim, Temple University (Chair)

- SPMB-L3.01: The Instrumented Multitask Assessment System (IMAS).....102 Z. Kane, E. Stecco, A. Napoli, C. Tucker, and I. Obeid, Temple University
- SPMB-L3.02: Commodity Sensors, Physiological Signals, Research Opportunities, and Practical Issues.....107
 - M. Stanford and V. Stanford, Del Rey Analytics, Inc.
- SPMB-L3.03: Multi-class Classification of Motor Execution Task using fNIRS.....115 F. Shamsi and L. Najafizadeh, Rutgers University
- SPMB-L3.04: Identification of Relevant Diffusion MRI Metrics Impacting Cognitive Functions Using a Novel Feature Selection Method.....120
 - T. Xu, X. Cai, Y. Wang, X. Wang, S. Chung, E. Fieremans, J. Rath, S. Flanagan and Y. Lui, New York University
- SPMB-L3.05: EEG Analysis of the Music Effect on Lecture Comprehension.....126

 V. Diaz de Leon-Esparza, A. Martinez-Cervantes, A. Vargas- Cortes, A. Olivares-Nunez, D. Ibarra-Zarate, and L. Alonso-Valerdi, Tecnologico de Monterrey, Escuela de Ingeniería y Ciencias
- SPMB-L3.06: Total Variation Denoising for Optical Coherence Tomography.....131 *M. Shamouilian, and I. Selesnick, New York University*