

# **2025 IEEE 8th Portuguese Meeting on Bioengineering (ENBENG 2025)**

**Aveiro, Portugal  
25-26 September 2025**



**IEEE Catalog Number: CFP2515P-POD  
ISBN: 979-8-3315-9889-1**

**Copyright © 2025 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:	CFP2515P-POD
ISBN (Print-On-Demand):	979-8-3315-9889-1
ISBN (Online):	979-8-3315-9888-4
ISSN:	2377-8563

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

## TABLE OF CONTENTS

Impact of Epigallocatechin-3-Gallate on Staphylococcus Aureus Molecular Profile.....	1
<i>Raquel Inácio, Edna Ribeiro, Cecília R. C. Calado</i>	
A Review of Segmentation Algorithms for Gastrointestinal Images: Datasets, Annotations and Architectures .....	5
<i>Tomás Ferreira, David Marques, Mário Dinis-Ribeiro, Miguel Coimbra</i>	
Optimizing Acoustic Pressure Fields in SAW Microfluidic Devices: A Numerical Study on Material Selection .....	9
<i>Débora Amorim, Hugo Dinis, Graça Minas, Patrícia C. Sousa, Carlos Abreu, Susana O. Catarino</i>	
An Optimized Decision Support System for Maintenance Strategy for Radiology Devices.....	13
<i>Neven Saleh</i>	
A Radiomics-Based Approach to Gastric Imaging Biomarker Extraction in Upper GI Endoscopy .....	17
<i>Nuno Teixeira, Eduarda Almeida, Mario Dinis-Ribeiro, Miguel Coimbra</i>	
Numerical and Experimental Analysis of Mixing Efficiency in Passive Micromixers Under Laminar Flow .....	21
<i>Filipe Ferreira, Paulo J. Sousa, Graça Minas, Rui A. Lima, Vânia C. Pinto, Susana O. Catarino</i>	
Validation of Multi-Subject Whole-Body COM Dynamics Based on 3D Anatomical Kinematics.....	25
<i>Carlos Rodrigues, Miguel Correia, João Abrantes, Marco Rodrigues, Jurandir Nadal</i>	
Synergic Effect of Brain Stimulation, Functional Electrical Stimulation and Electrical Stimulation and Mirror Therapy on Stroke Rehabilitation – a Feasibility Study .....	29
<i>Cassandra D Solomons, Vivekanandan Shanmugasundaram, Samuelkamaleshkumar Selvaraj, Annpatriciacatherine Suresh, Henry Prakash Magimairaj, Sivakumar Balasubramanian</i>	
Synthetic Data Generation Using Machine Learning Algorithms for Enhanced Type 2 Diabetes Prediction .....	33
<i>Ahmed Fadlelmoula, Helena Torres, Susana O. Catarino, Graça Minas, Vítor Carvalho</i>	
Development and Initial Validation of a Millimeter-Wave System for Dielectric-Based Differentiation of Biological Tissues.....	37
<i>Hugo Lopes, Hugo Dinis, Paulo M. Mendes</i>	
Toilet-Seat ECG as a Gateway to Stress Monitoring: Non-Invasive Stress Index Extraction in Subjects with and Without Cardiovascular Disease .....	41
<i>Aline Dos Santos Silva, Miguel Velhote Correia, Andreia Gonçalves Da Costa, Hugo Plácido Da Silva</i>	
Impact of Preprocessing on the Performance of Heart Sound Segmentation .....	45
<i>Daniel Proaño-Guevara, Hugo Plácido Da Silva, Francesco Renna</i>	
Real-Time Tracking of Germination of Kiwi Fruit Pollen in Microcapillary Strips.....	49
<i>André Caeiro, Jorge Canhoto, Nuno M. Reis, Paulo R.F. Rocha</i>	

Electropolymerization of Commercial Printed Circuit Boards with PEDOT:PSS for Biomedical Applications.....	53
<i>Gabriela Moço, Beatriz Brandão, Débora Serrenho, Luís Lopes, Ana Luísa Carvalho, Frank Marken, David Tosh, Paulo R. F. Rocha</i>	
Optimizing BCI Rehabilitation Protocols for Stroke: Exploring Task Design and Training Duration.....	57
<i>Aniana Cruz, Marko Kuzmanoski, Gabriel Pires</i>	
Detecting Interbrain Synchronization in EEG Hyperscanning with MUSE-S EEG Headband.....	61
<i>Tarmo Lipping, Ahmad Sharif, Matin Beiramvand, Jari Turunen</i>	
Real-Time Monitoring of Cyanobacteria Oscillatoria Sp. Growth Combining Electrochemical Impedance Spectroscopy (EIS) with a 3D Porous Electrode.....	65
<i>Francisco C. Cotta, Raquel Amaral, Paulo R. F. Rocha</i>	
Improved Reliability of Driver Drowsiness Ground Truths with Objective Assessment .....	69
<i>Caio F. Dos S. Oliveira, André Lourenço, Leopoldo Yoshioka, Christer Ahlström, Hugo P. Da Silva</i>	
Synchronizing Wearable Motion Data with a Neurostimulator: A Quantitative Approach to Parkinson's Disease Motor Symptoms Evaluation .....	73
<i>Rita Duarte Vieira, Adriana Arrais, Francisco Vieira, Duarte Dias, João Paulo Silva Cunha</i>	
EEG-Based Framework for Reflexive and Perceptual Assessment in CLIS: Preliminary Study in Healthy Volunteers .....	77
<i>Nicoli Leal, Rute Bettencourt, Urbano J. Nunes, Gabriel Pires</i>	
Eye-Tracking and BCI Integration for Assistive Communication in Locked-in Syndrome: Pilot Study with Healthy Participants .....	81
<i>Ana Patricia Pinto, Rute Bettencourt, Urbano J. Nunes, Gabriel Pires</i>	
Feasibility of Electrocardiography (ECG) Sensing Using Aircraft Cockpit Controls .....	85
<i>Ana Sofia Antunes Calado, Tiago Filipe Rodrigues Fernandes, Hugo Humberto Plácido Da Silva, Paulo Sérgio De Brito André</i>	
FTIR Spectroscopy and Machine Learning Methods to Classify the Bioactive Extracts from Macroalgae .....	89
<i>I. Peres, E. Mascarenhas, C. Calado, P. Sampaio</i>	
Screening the Effects of Tissue Electric Conductivity and Anatomical Variability on Computer Models of tsDCS in SOD1 Mice .....	93
<i>Leonor De Oliveira Pires, Alireza Abaei, Francesco Roselli, Marcin Baczyk, Sofia Rita Fernandes</i>	
Method for Predicting METs in Cardiovascular Rehabilitation Patients.....	97
<i>Bernardo Simões, Pinheiro Candjonjo, André Lourenço, Carlos Carreiras, Teresa Magalhães, Miguel Mendes</i>	
Motion Analysis in Autism: Quantification and Classification of Dancing and Walking Tasks.....	101
<i>Lara Pereira, Teresa Sousa, Ricardo Vigário, Miguel Castelo-Branco, João Ruivo Paulo</i>	
Towards Point-Of-Care Infection Diagnosis Tool: A Multi-Spectral Fluorescence Approach for Bacterial Differentiation .....	105
<i>Margarida Conceição, Pedro Farias, Paula V Morais, Miguel Morgado</i>	

Optimized Mammography Preprocessing for Tumor Detection with YOLO11-Seg in Young Women from the Bolivian Altiplano.....	109
<i>Leoni Marti Miranda Saravia, Alejandro Rommel Miranda Saravia, Alexandra Jahel Garrido Vargas, Marcelo Molina Silva, Yancarla Mary Conde Canaviri, Mauricio Abdel Mendez Conde, Leonardo Leyva Lamas, Xavier Alexis Murillo Sanchez, Mauricio Javier Murillo Sanchez</i>	
Is Autonomic Dysfunction in Plateau Waves of Intracranial Pressure Mediated by Higher-Order Interactions? .....	113
<i>Helder Pinto, Celeste Dias, Ana Paula Rocha</i>	
Design of a Multi-Sensor Solution for Application in Prosthetic Sockets of Lower Limb Amputees.....	117
<i>Alexandra Ferreira, Sérgio Silva, Paulo Antunes</i>	
Towards Non-Intrusive Blood Pressure Estimation Using Thigh ECG and PPG Signals Acquired from a Smart Toilet Seat .....	121
<i>Aline Dos Santos Silva, Miguel Velhote Correia, Andreia Gonçalves Da Costa, Hugo Plácido Da Silva</i>	
Towards an Explainable Retrieval Approach for Predicting Post-Surgical Aesthetic Outcomes in Breast Cancer .....	125
<i>Pedro Ferreira, Mohammad Hossein Zolfagharnasab, Tiago Gonçalves, Eduard Bonci, Carlos Mavioso, Maria J. Cardoso, Jaime S. Cardoso</i>	
Neurodevelopmental Effects of Learning Programming in Childhood: An Exploratory Study .....	129
<i>C. Jordão, M. Castelo Branco, J. Castelhana, R. Almeida, M. Bigotte Almeida, I. Bernardino, S. Mouga</i>	
Patient-Driven Hybrid Fes-Exoskeleton Control with Adaptive Band-Based Assistance .....	133
<i>Jorge R. Martins, Joana F. Almeida, Leonardo Gizzi, Cristina P. Santos</i>	
Design and Development of a Biomimetic Transtibial Phantom for Testing Limb-Prosthetic Socket Interactions .....	137
<i>Bernardo Santos, Luís Rodrigues, Mariana Neto, Hugo Plácido Da Silva</i>	
The Importance of a Medical Device Surveillance Registry Process.....	141
<i>José Sobral, Miguel Allen, Matilde Nogueira</i>	
Time-Varying Modelling of Muscle Noise in ECG Via Local Autocorrelation Analysis .....	145
<i>Beatriz Guerra, Sónia Gouveia</i>	
Towards Mitigating Trichotomy in Surface Electromyography (sEMG) in Dogs: A Comparative Analysis of Pre-Gelled and Dry Electrodes.....	149
<i>José Caldeira, Leonor Caldeira, Inês Brás, Ana Margarida Ribeiro, Hugo Plácido Da Silva, João Requicha</i>	
Linearity, Recovery Coefficient, Partial Volume Effect and Spill-Over Effect Evaluation for <sup>18</sup> F Imaging in the easyPET.3D .....	153
<i>Ana Guerra, Fabiana Ribeiro, Ana Santos, Tatiana Diogo, Sofia Diogo, João Veloso, Ana Luísa Silva</i>	
EMG Characterization of Lower Limb Muscle Activation in a Child with Fibular Hemimelia.....	157
<i>Afonso Carvalho, Carolina Fitas, David Lopes, Inês Patraquim Godinho, Lilli Anders, Hugo Plácido Da Silva</i>	
Operational and Regulatory Aspects of Sphygmomanometer Use in Healthcare.....	161
<i>Diana Batista, Fernanda Coutinho, David Pinho</i>	

A Feature Survey on Instrumented Cane .....	165
<i>Simão Pereira, Fernanda Coutinho, Marco Silva</i>	
Scaling Personalized Post-Operative Recovery Process Assessment of Total Knee Arthroplasty with Instrumented Implant.....	169
<i>Carlos Rodrigues, Miguel Correia, João Abrantes, Marco Rodrigues, Jurandir Nadal</i>	
EsoNet: A Simple and Robust Network for Esophageal Tumor Segmentation with NBI Endoscopic Images .....	173
<i>Zehao Li, Ken'Ich Morooka, Yuho Ebata, Hirofumi Hasuda, Mitsuhiko Ota, Eiji Oki</i>	

**Author Index**