

19th International Joint Conference on Biomedical Engineering Systems and Technologies (BIOSTEC 2026)

Volume 2: BIODEVICES, BIOIMAGING, BIOINFORMATICS

Marbella, Spain
2-4 March 2026

ISBN: 979-8-3313-3336-2

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2026) by SCITEPRESS – Science and Technology Publications, Lda.
All rights reserved.

Printed with permission by Curran Associates, Inc. (2026)

For permission requests, please contact SCITEPRESS – Science and Technology Publications, Lda.
at the address below.

SCITEPRESS – Science and Technology Publications, Lda.
Avenida de S. Francisco Xavier, Lote 7 Cv. C,
2900-616 Setúbal, Portugal

Phone: +351 265 520 185
Fax: +351 265520 186

info@scitepress.org

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
Email: curran@proceedings.com
Web: www.proceedings.com

CONTENTS

INVITED SPEAKERS

KEYNOTE SPEAKERS

From Signals to Meaning: Biosignals as a Language for Health, Emotion, and Connection <i>Antonio Lanatà</i>	3
Extended Reality in Healthcare <i>Kavitha Anandan, S. Pravin Kumar, B. Divya, S. Saranya and S. Raja Lakshmi</i>	5
AI in Medicine: Progress, Perils, and Perspectives <i>Tim Hahn</i>	17
Neuro-Acoustic Intelligence: A Unified Phonation-Encephalography Framework for Multi-Disorder Monitoring via Explainable AI <i>Pedro Gómez Vilda</i>	19

19TH INTERNATIONAL CONFERENCE ON BIOMEDICAL ELECTRONICS AND DEVICES

FULL PAPERS

Seismocardiography (SCG) Signal Classification of Valvular Heart Diseases with Convolutional Neural Network <i>Mahsa Raeiati Banadkooki and Martin Bogdan</i>	25
Prototype UV-A Source for Evaluating Sunglass Frame Efficacy in Blocking Environmental Radiation <i>Pedro Guedes and Liliane Ventura</i>	33
Impedance Spectroscopy-Based Monitoring of Cellular Adhesion and Stimulus Response on a Sensorized Multi-Well Plate <i>Ludovica Pradetto Battel, Lara Franchin, Alberto Zuanon, Girolamo Calò, Davide Malfacini, Alessandro Paccagnella and Stefano Bonaldo</i>	39
Ring-Magnet-Based Module for Efficient Magnetic Bead Mixing in a Closed Digital Microfluidic Chamber <i>Chuan Lyu, Huaqing Zhang, Yuping Zhu, Jing Wang, Xuesong Ye and Congcong Zhou</i>	51
A Validated Computational Workflow for 2D PTV: From Images to Eulerian Fields for Biofluid Analysis <i>Raissa Ré, Andrews Souza, Rui Lima, Maurício Ferreira, Carlos E. Baccin and Ana S. Moita</i>	60
Mapping of Electrode Positions in the Capture of Myoelectric Signals from the Cervical Region to Optimize the Application of Machine Learning <i>Vitor Ferreira Paschoal, Elizangela Almeida de Carvalho and Alberto Cliquet Jr</i>	69
Non-Invasive Detection of Diabetes: An SVM and Wavelet-Based Approach Using the CBmeter Methodology <i>Clara Ribeiro Neves, Rafael Fernandes Pinheiro, Maria Pedro Guarino and Rui Fonseca-Pinto</i>	79
From Person-Dependent to Person-Independent EMG-Based Action Unit Recognition of Subtle and Intense Expressions <i>Dennis Küster, Rathi Adarshi Rammohan, Yvo Muskulus, Romina Razeghi Oskouei, Eva G. Krumhuber, Tanja Schultz and Rainer Koschke</i>	87

SHORT PAPERS

Microfabricated <i>in Vitro</i> Platform for Characterizing Cellular Calcium Dynamics During Ultrasound Neuromodulation Using Calcium Indicators <i>Runo Kitahara and Takashi Tateno</i>	101
Embedded PPG in a Smartphone Case for non-Invasive Blood Pressure Estimation <i>Alberto Alfonso García, Ricardo Del Rio García and Juan A. González Sánchez</i>	109
Automated Multilabel Classification of Valvular Heart Diseases Using Aortic Valve Opening Variability Features and Wavelet Scattering Transform <i>Mahsa Raeiati Banadkooki and Martin Bogdan</i>	116
Visual Field Light Blocking of Sunglass Frames: A Quantitative Imaging Method <i>Pedro T. X. da Silva and Liliane Ventura</i>	123
Evaluation of Charge Injection Based on Electrode Model in Stem-Cell Electric Stimulation Assays <i>A. Algarín, D. Martín, P. Daza, G. Huertas and A. Yúfera</i>	130
Wearable sEMG Monitoring System toward Axial Symptoms Assessment in Parkinson's Disease: Preliminary Study <i>Michele A. Gazzanti Pugliese di Cotrone, Franco Capone, Martina Patera, Silvia Gallo, Antonio Suppa, Carlo Alberto Artusi, Gabriele Imbalzano and Fernanda Irrera</i>	136
Electrical Stimulation Bystander Effect Promotes Neuronal Differentiation and Neurite Outgrowth: Preliminary Results <i>D. Martín, L. Portillo, A. Algarín, A. Yúfera, N. Pastor, L. Orta and P. Daza</i>	143
Method for Obtaining the Relative Proportions of Ultraviolet Radiation Incident on the Eyes as a Function of Different Sunglasses Frame Geometries Using Electronic Instruments <i>Augusto Perez de Andrade and Liliane Ventura</i>	147
Preliminary Work on the Stratification of Myocardial Ischemia Using a Deep Learning Algorithm on 12-Lead Electrocardiograms <i>Adam Butchy, Michael Leasure, Utkars Jain, Veronica A. Covalesky and Gary S. Mintz</i>	152
Wireless Power Transfer for Neonatal ECG Monitoring: Technologies, Challenges, and Future Prospects <i>Inas El-Aroussi, Purav Shah, Andreas Demosthenous and Richard Bayford</i>	159
Optimizing Channel Geometry for Passive Mixing in Thermal Transfer Printed Paper-Based Microfluidic Devices <i>Aujchara Thepbut, Peeraphan Compiro, Pornchai Keawsapsak and Pimkhuan Hannanta-anan</i>	167
Accelerometer-Based MET Estimation for Wearable Energy Expenditure Monitoring <i>Adam Neulander, Dayyan Chaudhri, Joseph Nash, Nathan Yasnovsky and Delaram Yazdansepar</i>	175
Investigating the Relationship of Functional Electrical Stimulation Signal Parameters to Finger Flexion and Discomfort <i>Danica Marie A. Dumalagan, Klyle Alexandre T. Luchavez, Jun Niel T. Paquibot, Clyde Matthew Y. Condor and Luis Gerardo S. Cañete Jr.</i>	182
Strategies for Low-Cost, High-Quality Artificial Intelligence and Internet of Things Interventions to Promote Women's Health <i>Narasimha Sai Yamanoor and Srihari Yamanoor</i>	190

Development and Integration of a Functional Electrical Stimulation System for Selective Finger Extension	198
<i>Andre Kimberly Trish D. D'Silva and Luis Gerardo S. Cañete Jr.</i>	

Development of an In-Ear Wearable Device for Continuous Monitoring of Elderly Patients with Dementia: A Preliminary Approach	206
<i>José Soares, Ana Rita Freitas, Marcelo Arantes, Inês Rocha, Mariana Carvalho, Marta Pinto, Demétrio Matos, Pedro Morais and Vítor Carvalho</i>	

13TH INTERNATIONAL CONFERENCE ON BIOIMAGING

FULL PAPERS

A Sector-Based Radiomic Approach to Characterize Carotid Plaque Calcification Dynamics from Computer Tomography Angiography	219
<i>Marina De Santis, Aikaterini Tziotziou, Daniel Bos, Luca Mainardi, Valentina D. A. Corino, Ali C. Akyildiz and Anna Corti</i>	

Identifying Statistical Predictors of Borderline Personality Disorder Using fMRI Data	225
<i>Spoorthi Kalkunte, Shubha V. Hegde, Shreya S. Adiga, Riya Jha and Gowri Srinivasa</i>	

Towards Data Quality-Aware Dataset Distillation in Bioimaging	237
<i>Bárbara Capelo, Maria Russo, André Carreiro, Hugo Gamboa and Duarte Folgado</i>	

From Scan to Plan: Organ-Specific Deep Learning Networks for Brachytherapy	249
<i>Nirmalya Gayen, Aditya Kumar, Bhuneshwar Singh Netam, Nithin Shivashankar, Kirthi A. S. Koushik and Vijay Natarajan</i>	

PCA-Based Identification of Soft Tissue Regions with Irradiation-Induced CT-Density Changes for Image-Guided Radiotherapy	261
<i>Greta Karpavičienė, Algimantas Kriščiukaitis, Reda Čerapaitė-Trušinskienė, Robertas Petrolis, Diana Meilutytė-Lukauskienė and Renata Paukštaitienė</i>	

Partial Volume Correction with/out Spillover Correction in Postsurgical SPECT/CT Thyroid Imaging	267
<i>Elena Ttofi, Theodoros Leontiou, Costas Kyriacou and Yiannis Parpottas</i>	

A Framework for Assessing and Optimising Data Sufficiency in Ultrasound Tongue Imaging	279
<i>Saja Al Ani, Joanne Cleland and Ahmed Zoha</i>	

HistoKit: Fast and Accurate Tissue and Artifact Detection and Data Processing for Whole Slide Histopathological Imaging	287
<i>Julia Merta and Michał Marczyk</i>	

SHORT PAPERS

Three-Dimensional Visualization of Inadequate Adhesive Placement under Dental Restorations: A Synchrotron Radiation Micro-CT Study	299
<i>Assem Hedayat</i>	

Classifying Post-COVID-19 Motor and Vocal Tics Using Texture Analysis in Magnetic Resonance Images	308
<i>Murilo Costa de Barros, Kaue Tartarotti Nepomuceno Duarte, Yen-Ju Chu, Wang-Tso Lee and Marco Antonio Garcia de Carvalho</i>	

DDPM-Based Histopathology Data Augmentation for Blood Vessel Segmentation	316
<i>Tomas Tanczos, Wanda Benesova, Jarmila Pavlovicova and Andrea Vajsova</i>	

A Method for Privacy-Preserving and Explainable Pneumonia Detection and Localisation <i>Miriam Di Renzo, Filomena Niro, Desirè Menditto, Patrizia Agnello, Marta Petyx, Mario Cesarelli, Fabio Martinelli, Antonella Santone and Francesco Mercaldo</i>	324
Efficient Diabetic Foot Ulcer Classification: A Comparative Study of Derivative-Free Methods for Resource-Constrained Clinical Environments <i>Mohammed A. B. Mahmoud</i>	332
Reproducible PINN Framework for Patient-Specific Modeling and Biophysical Parameter Inference in Glioblastoma <i>Juliette Vanderhaeghen, Cyril Corbet, François P. Duhoux, Christophe Pierreux and Sébastien Jodogne</i>	342
Using Multi-Task Learning and CAM-Based Ensembles for Detection of Abnormalities in X-Rays <i>Ahana Roy Choudhury, Rebanto Nath and Akshat Sharma</i>	350
Contrast Comparison and Enhancement of Images from Different Digital Mammography Equipment by Converting Imaging Systems Characteristic Curves <i>Homero Schiabel, Matheus T. Pereira and Ana Cláudia Patrocínio</i>	359
Assessing Modern Deep Vision Models for Chest X-Ray Diagnostics in Emergency Care <i>Ferran Soler-Guiral, Manuel F. Dolz, José I. Aliaga and Katty Delgado-Barriga</i>	367
Anatomy-Preserving Diffusion-Based Data Augmentation for Medical Image Segmentation <i>Hiroki Tominari, Natsuki Nakayama, Naoko Arakawa and Hiroyasu Usami</i>	375
Multi-Backend Deep Learning Framework for Multimodal Microscopy <i>Inés Varona-Peña, Sara Cruz-Adrados, Rosa-María Menchón-Lara and Biagio Mandracchia</i>	382
Towards an Efficient Morphological Characterization of Naturally-Derived Hydroxyapatite Scaffolds: Preliminary Outcomes <i>Elisabetta Salerno, Alice Betti, Simone Borghi, Claudio Ongaro, Barbara Zardin, Diego Angeli, Melania Maglio, Gregorio Marchiori, Margherita Peruzzini and Jessika Bertacchini</i>	388
Robust Segmentation of the Lungs Using Active Shape Models Combined with Neural Networks on PA Chest X-ray Images <i>Adam Tumay, Daniel Hadhazi and Gabor Hullam</i>	396
A Hybrid Dimensionality Reduction and Clustering Framework for Early Parkinson's Disease Characterization Using Clinical and DaTSCAN Features <i>Malak Elghali and Wafa Moualhi</i>	405
Optimized U-Net Convolutional Autoencoder for Low-Dose CT Denoising: Technical Improvements and Clinical Validation <i>Simone Damiani, Patrizio Barca, Marco Giannelli, Francesca Lizzi, Emanuele Neri, Alessandra Retico, Chiara Romei, Camilla Scapicchio, Maria Irene Tenerani, Antonio Traino, Arman Zafaranchi and Maria Evelina Fantacci</i>	413
Comparison of Colour Normalization Techniques for Skin Optical Imaging in Digital Tissue Phantoms <i>Leah DeVos, Guennadi Saiko and Alexandre Douplik</i>	421
Attention-Guided U-Net for Cell Nucleus Segmentation in Microscopy Images <i>Saqib Nazir and Ardhendu Behera</i>	428

Erosion–Dilation Trajectory Radiomics for Classifying 3D High-Resolution Breast Microcalcifications <i>Redona Braihmetaj, Jan Cornelis and Bart Jansen</i>	436
Blood Typing with Computer Vision and Machine Learning: A Preliminary Approach <i>Bruno Silva, Enmanuel Abilheira, Ljiljana Dukanovic, Afonso Pinheiro and Vítor Carvalho</i>	446
AI-Based Classification of Rapid Plasma Reagin Test Reactions for Syphilis Detection: A Preliminary Approach <i>Enmanuel Abilheira, Bruno Silva, Ljiljana Dukanovic, Afonso Pinheiro and Vítor Carvalho</i>	453
17TH INTERNATIONAL CONFERENCE ON BIOINFORMATICS MODELS, METHODS AND ALGORITHMS	
FULL PAPERS	
MonoPredict-MI: Predicting Post-Myocardial Infarction Complications from Flow Cytometry–Derived Monocyte Subsets Using Neural Networks <i>Nada Al-Dausari, Frans Coenen, Anh Nguyen and Eduard Shantsila</i>	463
Quantum Coherence Analytics with Molecular Dynamics to Identify Protein Receptors Allosteric Pockets and Repurposing Candidates <i>Don Roosan, Mohmmad Masudur Rahman and Rubayat Khan</i>	475
Kit-Specific and Other Non-Biological-Based Biases in Germline Whole-Exome Analysis at the Gene Level <i>Laura Jarosz, Jiawei Dai, Marcel Ochocki, Julia Merta, Lajos Pusztai and Michał Marczyk</i>	487
A Unified and Interpretable Framework for Evaluating Fluorescence Trace Quality in Transcription Kinetics <i>Yiwen Xing, Wei-Tung Lu, Jinhao Liu, Zhiyong Zou, Rui Zhou, Hao Wang, Yusheng Yang, Yabing Yao, Qian Yang, Xiaomin Xu and Hongpeng Zhou</i>	497
Statistical Inference and Probabilistic Model Checking on Uncertain Continuous-Time Markov Chains Representing Biochemical Pathways <i>Hailey Sparks and Krishnendu Ghosh</i>	505
A Machine Learning Approach to Predict Biological Age and Its Longitudinal Drivers <i>Nazira Dunbayeva, Yulong Li, Yutong Xie and Imran Razzak</i>	517
Entropy and Stemness Index–Based Quantification of Epigenetic Dysregulation for Machine Learning–Driven Stratification of Representative Cancer Types <i>Djansel Bukovec, Goran Kungulovski, Sonja Gievska and Monika Simjanoska Misheva</i>	527
Modeling Cadmium Induced Metabolic Shifts in Human Pulmonary Cells <i>Valentin Vigeant, Jean-Paul Comet, Gilles Bernot and Jean-Yves Trosset</i>	539
Integrative Comparison of GeneHancer and Single-Cell Co-Accessibility Reveals Active Enhancer–Gene Interactions <i>Lorenzo Martini, Roberta Bardini, Alessandro Savino and Stefano Di Carlo</i>	551

SHORT PAPERS

User-Centred Wearables: Position-Independent Edge Computing for Flexible ADL Recognition <i>Ekgari Kasawala, Antonio Fratini and Surej Mouli</i>	563
Labeling the Unlabelable: A Pilot Study on Breast Density <i>Simona Correra, Ida Maruotto, Giulia Varriano, Dalila De Lucia, Maria Chiara Brunese, Corrado Caiazzo, Antonella Santone, Paolo Gargiulo and Francesco Mercaldo</i>	568
Biomotors Share the Same Mechanism of ATP Binding <i>Liqiang Dai and Yao-Gen Shu</i>	576
Quantum-Enhanced Multi-Omics Data Harmonization for Breast Cancer Subtype Classification <i>Don Roosan, Mohmmad Masudur Rahman and Rubayat Khan</i>	583
Quantum Tunneling in Adenine Deamination Using Variational Quantum Eigensolver <i>Don Roosan, Rubayat Khan, Saif Nirzhor and Brian Provenchar</i>	591
Quantum Enhanced Modeling of Enzyme Inhibition and Drug Behavior Integrating Tunneling Kinetics and Molecular Dynamics <i>Don Roosan, Md Rahatul Ashakin and Rubayat Khan</i>	600
A logicGP Trainer for Classification of Biomedical Data <i>Robin Nunkesser</i>	609
Large-Scale Gene Regulatory Network Inference for in vivo Drosophila Gene Expression Data Using Genetic Algorithms <i>Youchuan Wang, Yasir Ahmed-Braimah, Garrett Ethan Katz and Chilukuri K. Mohan</i>	617
Deep Learning Strategies for Molecular Structure Inference from Mass Spectra: A Comparative Study of Transformer Generation and Siamese Metric Learning <i>Ivan Carrera, Pablo del Hierro, Fernando Cardenas, Dylan Villarroel, Ines Dutra and Eduardo Tejera</i>	625
Drug Repurposing for COVID-19 <i>Angela Kravlevska, Ivana Vichentijevikj and Monika Simjanoska Misheva</i>	633
A Public Dataset of Visible Reflectance and Transmittance Spectra for Machine Learning in Colour Science <i>Marcio Mello and Liliane Ventura</i>	641
A Data Quality-Centric Approach for Predicting Radiology Report Delays <i>Daniela Martins Silva, Pedro Fernandes, Daniel Madureira, Ana M. Freire, Hélder P. Oliveira and Jorge Araújo</i>	645
A Bioinformatics Methodological Approach for the Construction and Analysis of a <i>bos indicus</i> Pangenome <i>Chiria Jorotiana, Jean-Claude Richard Rakotozafy, Aimé Richard Hajalalaina, Annie Chateau and Anne-Muriel Arigon</i>	655
AMP-zGSM: A z-Scoring Enhanced Grouping–Scoring–Modeling Framework for Antimicrobial Peptide Prediction <i>Demet Parlak Sönmez, Burcu Bakir-Gungor and Malik Yousef</i>	663
Chromatin States Prediction and Comparison across BRCA Cell Lines Using Deep Learning Provide Insights for Cell State Transitions <i>Xuejing Lyu, Jing Zhang, Rui Cao and Greg Tucker-Kellogg</i>	672

Leveraging Self-Attention for Heterogeneous Data Integration: A TabTransformer Validation on a Biomedical Case Study <i>Kaiyan Shi and James Li</i>	680
A Matrix Factorization and Generative Modeling Framework for Drug–Target Interaction Prediction <i>Vitor Magalhaes Silva, Khadidja Henni, Neila Mezghani and Youcef Abdelliche</i>	688
A Causal Framework for Interpretable Estimation of Treatment Effects in Heart Failure from Observational Data <i>Carolina Carvalho, Ricardo Santos and Vânia Guimarães</i>	696
Using Machine Learning Approaches for Predicting Time of Death of Human Postmortem Samples Based on Transcriptomic Data <i>Olivia Liao, Tillie Slosser, Ivan Betancourt, Qiaochu Liu, Chun-Kit Ngan, Chen Fu, Ryan W. Logan and Nitya Phani Santosh Oruganty</i>	704
AUTHOR INDEX	717