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Gerard Cybulski, Edward Koźluk, Agnieszka Piątkowska, Ewa Michalak, Anna Strasz, Anna Gąsiorowska and Wiktor Niewiadomski

Changes in Amplitude Characteristics of Heart Sound Signals during External-cuff-inflation Procedure: A Pilot Study

Xinpei Wang, Yuanyang Li, Chengyu Liu, Changchun Liu, Lizhen Ji and Haibin Zeng

Effect of Autonomic Cardiac Modulation on Speech Perception in Noise

Kang Pei, Fei Chen and Dingchang Zheng

Hemodynamic Modelling in the Calf – A Pilot Study

Magdalena Matejkova, Pavel Jurak, Ladislav Soukup, Josef Halamek, Ivo Viscor, Peter Langer and Vlastimil Vondra

#### **6-5: Baroreflex Sensitivity and Autonomic Regulation**

Effect of Exercise on Baroreflex at Different Altitudes

Sasan Yazdani, Nicolas Bourdillon, AltitudeOmics Group and Jean-Marc Vesin

Effect of Hypoxia and Hyperoxia on Baroreflex Sensitivity  
Sasan Yazdani, Nicolas Bourdillon, AltitudeOmics Group and Jean-Marc Vesin

Instantaneous Response Patterns of Baroreflex Sensitivity, Respiratory Sinus Arrhythmia Sensitivity and Vagal Activity to Cold Face Test and Active Orthostatic Test  
Salvador Carrasco-Sosa, Alejandra Guillén-Mandujano and Aldo R Mejía-Rodríguez

Reflection of Autonomic Regulation Behaviour Using Short-Term Cross-Spectral Analysis on RR and QT Intervals  
Ping Zhan, Chenxi Li, Hongduoer Liu and Yi Peng

## **6-6: PhysioNet Challenge**

Abnormal Heart Sounds Detected from Short Duration Unsegmented Phonocardiograms by Wavelet Entropy  
Philip Langley, Alan Murray

Automated Classification of Normal and Abnormal Heart Sounds using Support Vector Machines  
Anthony Bouril, Darya Aleinikava, Maria de la Salud Guillem Sánchez and Grace Mirsky

Machine Learning Based Identification of Pathological Heart Sounds  
Tanmay Gokhale

Using Spectral Acoustic Features to Identify Abnormal Heart Sounds  
Nicholas Singh-Miller and Natasha Singh-Miller

Recognition of Abnormalities in Phonocardiograms for Computer-Assisted Diagnosis of Heart Failures  
Simon Hofmann, Volker Groß and Andreas Dominik

Heart Sound Classification Using Deep Structured Features  
Michael Tschannen, Thomas Kramer, Gian Marti, Matthias Heinzmann and Thomas Wiatowski

Classification of Acoustic Physiological Signals Based on Deep Learning Neural Networks with Augmented Features  
Te-Chung Yang and Haowei Hsieh

Time-Frequency Analysis of Phonocardiogram for Classifying Heart Disease  
Rohan Banerjee, Swagata Biswas, Snehasis Banerjee, Anirban Dutta Choudhury, Tanushyam Chattopadhyay, Arpan Pal, Kayapanda M Mandana and Parijat Deshpande

Time and Frequency -Based Approach to Heart Sound Segmentation and Classification  
Jarno Mäkelä and Heikki Väänänen



Can Electrocardiogram Classification be Applied to Phonocardiogram Data? -- An Analysis Using Recurrent Neural Networks  
Christopher Schölzel and Andreas Dominik

Normal / Abnormal Heart Sound Recordings Classification Using Convolutional Neural Network  
Tanachat Nilanon, Sanjay Purushotham and Yan Liu

Heart Sound Classification Based on Temporal Alignment Techniques  
Jose Javier Gonzalez Ortiz, Cheng Perng Phoo and Jenna Wiens

Classification of Normal/Abnormal Heart Sound Recordings based on Multi-Domain Features and Back Propagation Neural Network  
Hong Tang, Huaming Chen, Ting Li and Mingjun Zhong

Heart Sound Classification from Wavelet Decomposed Signal Using Morphological and Statistical Features  
Tamanna Tabassum Khan Munia, Kouhyar Tavakolian, Ajay Verma, Vahid Zakeri, Farzad Khosrow-Khavar, Reza Fazel-Rezai and Alireza Akhbardeh

Cycle Selection and Neuro-Voting System for Classifying Heart Sound Recordings  
Ali Ghaffari, Mostafa Abdollahpur, Shadi Ghiasi and Mohammad Javad Mollakazemi

Classification of Heart Sound Signals Based on AR Model  
Runnan He, Kuanquan Wang, Qince Li, Zhiqiang Sheng, Na Zhao and Henggui Zhang

**7-1: PhysioNet Challenge I**  
Chairs: Gari Clifford, Roger Mark

Classification of Normal/Abnormal Heart Sound Recordings: the PhysioNet/Computing in Cardiology Challenge 2016  
Gari Clifford, Chengyu Liu, David Springer, Benjamin Moody, Qiao Li, Ricardo Abad, Jose Millet, Ikaro Silva, Alistair Johnson and Roger Mark

Heart Sound Anomaly and Quality Detection using Ensemble of Neural Networks without Segmentation  
Morteza Zabihi, Ali Bahrami Rad, Serkan Kiranyaz, Moncef Gabbouj and Aggelos K Katsaggelos

Drop Connected Neural Network Trained with Diverse Features for Classifying Heart Sounds  
Edmund Kay and Anurag Agarwal

Ensemble of Feature-based and Deep learning-based Classifiers for Detection of Abnormal Heart Sounds  
Cristhian Potes, Saman Parvaneh, Asif Rahman, Bryan Conroy, Daniel Schulman and John Ames

Using Deep Gated RNN with a Convolutional Front End for End-to-End Classification of Heart Sound

Christian Thomae and Andreas Dominik

A Tensor Approach to Heart Sound Classification

Ignacio Diaz Bobillo

**7-2: ECG Signal Processing I**

Chairs: Peter Macfarlane, Marianna Meo

A Novel Preprocessing Tool to Enhance ECG R-wave Extraction

Sasan Yazdani and Jean-Marc Vesin

Phase-Rectified Signal Averaging for Automatic Detection of QRS Fragmentation

Griet Goovaerts, Bert Vandenberk, Carolina Varon, Rik Willems and Sabine Van Huffel

Clinical Severity of Noise in ECG

Estrella Everss Villalba, Francisco Manuel Melgarejo-Meseguer, Francisco Javier Gimeno-Blanes, Salvador Sala-Pla, Manuel Blanco-Velasco, Jose Luis Rojo-Alvarez and Arcadio García-Alberola

QRS Loop Folding Phenomenon in Vectorcardiogram of Healthy Individuals

Golriz Sedaghat, Muammar Kabir and Larisa Tereshchenko

Paced ECG Analysis in Mobile Cardiac Monitor

Alexander Kalinichenko, Maria Chaykovskaya and Daria Danilova

**7-3: Cardiac Mechanics**

Chairs: Kouhyar Tavakolian, Johannes Jan Stuijk

The Relationship between Mechanical and Electrical Dyssynchrony

Pavel Leinveber, Josef Halamek, Pavel Jurak, Jaroslav Meluzin, Filip Plesinger, Jolana Lipoldova and Miroslav Novak

Statistical Left Ventricular Deformation Analysis

Si Yong Yeo, Xulei Yang, Like Gobeawan, Soo Kng Teo, Liang Zhong, Ru San Tan and Yi Su

Body Surface Mapping of the Mechanical Cardiac Activity

Kim Munck, Bolette Dybkjær Hansen, Nina Jacobsen, Louise Pedersen Pilgaard, Samuel Emil Schmidt, Kasper Sørensen and Johannes Jan Stuijk

Measuring Left Ventricular Ejection Time Using Under-the-Mattress Sensor

Itamar Sela, Zvika Shinar and Kouhyar Tavakolian

Detection of Congestive Heart Failure using Renyi Entropy  
David Cornforth and Herbert F Jelinek

**7-4: Atrial Fibrillation Clinical**  
Chairs: Steven Swiryn, Olivier Meste

Time-Frequency Analysis for Early Classification of Persistent and Long-Standing Persistent Atrial Fibrillation  
Nuria Ortigosa, Óscar Cano, Antonio Galbis and Carmen Fernández

Noninvasive Recurrence Quantification Analysis Predicts Atrial Fibrillation Recurrence in Persistent Patients Undergoing Electrical Cardioversion  
Olivier Meste, Stef Zeemering, Joel Karel, Theo Lankveld, Ulrich Schotten, Harry Crijns, Ralf Peeters and Pietro Bonizzi

Wrist-Located Optical Device for Atrial Fibrillation Screening: a Clinical Study on Twenty Patients  
Mathieu Lemay, Sibylle Fallet, Philippe Renevey, Celestin Leupi, Etienne Pruvot and Jean-Marc Vesin

Beat-to-Beat Analysis of P-Waves in Patient with Atrial Fibrillation History  
Valentina Corino, Federica Censi, Marianna Tesoro, Ivan Corazza, Elisa Reggiani, Giuseppe Boriani and Luca Mainardi

Contributing Factors Concerning Inconsistencies in Persistent Atrial Fibrillation Ablation Outcomes  
Tiago Almeida, Gavin Chu, Xin Li, João Salinet, Nawshin Dastagir, Michael Bell, Frederique Vanheusden, Jiun Tuan, Peter Stafford, G André Ng and Fernando Schlindwein

**8-1: ECG Imaging II**  
Chairs: Craig Testrow, Willem Dassen

Performance of Inverse Problem Regularization Methods for Driver Location during Atrial Fibrillation  
Carlos Figuera, Víctor Suárez-Gutiérrez, Óscar Barquero-Pérez, Rebeca Goya-Esteban, Miguel Rodrigo, Ismael Hernández-Romero, Felipe Atienza, Maria de la Salud Guillem Sánchez, Andreu M Climent and Felipe Alonso-Atienza

Source Localization Probability Maps for Uncertainty Quantification in Electrocardiographic Imaging  
Jessie France and Chris Johnson

Reconstruction of Atrial Ectopic Focal and Re-entrant Excitations from Body Surface Potentials: Insights from 3D Virtual Human Atria and Torso  
Erick Andres Perez Alday, Michael A Colman and Henggui Zhang

Adaptive placement of the pseudo-boundaries improves the conditioning of the inverse problem  
Judith Chamorro-Servent, Laura Bear, Josselin Duchateau, Corentin Dallet, Yves Coudière and Remi Dubois

Assessing Endocardial Activation from Bipolar Intra-Ventricular Electrodes: A Simulation Study  
Peter Johnston and Gerald Fischer

Computational ECG reconstructive and validation from high-resolution optical mapping  
Conner Herndon, ILIJA Uzelac, James Farmer and flavio fenton

## **8-2: Novel Techniques for Heart Rate Variability**

Chairs: Alejandra Mandujano, Alfredo Hernandez

Heart Rate Variability Estimation with Joint Accelerometer and Gyroscope Sensing  
Olli Lahdenoja, Tero Hurnanen, Mojtaba Jafari Tadi, Mikko Pänkäälä and Tero Koivisto

Extraction and Analysis of Short-Time Excursions in RR-interval Time Series  
Jean-Marc Vesin, Sasan Yazdani, Leila Mirmohamadsadeghi and Nicolas Bourdillon

Mental Stress Detection Using Cardiorespiratory Wavelet Cross-Bispectrum  
Spyridon Kontaxis, Jesus Lazaro, Alberto Hernando, Adriana Arza, Jorge Mario Garzón, Eduardo Gil, Pablo Laguna, Jordi Aguiló and Raquel Bailón

Mobile Based Study Links Insomnia and Sympathovagal Balance  
Shuli Eyal and Anda Baharav

Network Analysis of Heart Beat Intervals Using Horizontal Visibility Graphs  
Tamas Madl

## **8-3: Multi-scale Modelling**

Chairs: Rob MacLeod, Andreu Climent

Mechanism behind Hyperkalemic Brugada Phenocopy: A Computational Study  
Ismael Hernández-Romero, Paula Giménez, Allan Rivera, Carlos Figuera, Maria de la Salud Guillem Sánchez, Francisco Fernández-Avilés, Andreu M Climent and Felipe Atienza

Effect of Heart Failure-induced Electrical Remodeling on the Initiation of Atrial Arrhythmias  
Na Zhao, Qince Li, Kuanquan Wang, Yong Xia, Runnan He, Xiangyun Bai and Henggui Zhang

Analysis of in-silico Body Surface P-wave Integral Maps show important differences depending on the connections between Coronary Sinus and Left Atrium

Ana Ferrer-Albero, Eduardo J Godoy, Rafael Sebastian, Laura Martínez and Javier Saiz

Role of Substrate Flexibility on Cardiac Cell Culture Electrophysiological Properties  
Lidia Gomez, Lucia Fuentes, Ismael Hernández-Romero, Maria de la Salud Guillem Sánchez, Felipe Atienza, Francisco Fernández-Avilés and Andreu M Climent

#### **8-4: Intrinsic and Electronic Pacing**

Chairs: Steven Niederer, Larissa Tereshchenko

Predictive Analysis of Cardiac Resynchronization Therapy Response by means of the ECG  
Nuria Ortigosa, Joaquín Osca, Carmen Fernández, Antonio Galbis, Rebeca Jiménez and Ydelise Rodríguez

Personalised Biophysical Model to Optimise Left Ventricle Pacing Location for Cardiac Resynchronisation Therapy Over Time

Angela Lee, Manav Sohal, Jonathan Behar, Simon Claridge, Anoop Shetty, Thomas Jackson, Eoin Hyde, Gernot Plank, Reza Razavi, Pablo Lamata, Christopher Aldo Rinaldi and Steven Niederer

Precise pacing artefact detection

Juraj Jurco, Filip Plesinger, Josef Halamek, Pavel Jurak, Magdalena Matejkova, Pavel Leinveber and Jolana Lipoldova

Dynamic Regulation of Pacemaker Activity by the Na<sup>+</sup>-K<sup>+</sup> Pump

Stefano Morotti, Joshua R St Clair, Catherine Proenza and Eleonora Grandi

#### **8-5: Special Session: Recent Advances in Seismocardiography and Ballistocardiography**

Chairs: Marco Di Rienzo, Omer Inan

Contact-Free Piezo-Electric Sensor Used for Real-Time Analysis of Inter Beat Interval Series  
Yaniv Katz, Roman Karasik and Zvika Shinar

Direct Pulse Transit Time Measurement from an Electronic Weighing Scale

Joan Gomez-Clapers, Ramon Casanella and Ramon Pallas-Areny

Quantification of Posture Induced Changes in Wearable Seismocardiogram Signals for Heart Failure Patients

Abdul Qadir Javaid, Sean Dowling, Mozziyar Etemadi, James Alex Heller, Shuvo Roy, Liviu Klein and Omer Inan

A New Technological Platform for the Multisite Assessment of 3D Seismocardiogram and Pulse Transit Time in Cardiac Patients

Marco Di Rienzo, Prospero Lombardi, Diana Scurati and Emanuele Vaini

#### **9-1: ECG Signal Processing II**

Chairs: Pablo Laguna, Roger Abaecherli

Sparse Coding of Cardiac Signals for Automated Component Selection after Blind Source Separation

Daniel Wedekind, Denis Kleyko, Evgeny Osipov, Hagen Malberg, Sebastian Zaunseder and Urban Wiklund

A Model for Estimation of Noise Tolerance in ECG Parameters  
Reza Firoozabadi, Richard Gregg and Saeed Babaeizadeh

Motion Artifact Suppression in Ambulatory ECG with Feed Forward Combine Adaptive Filter  
Huanqian Zhang, Shulin Zhang, Qinghui Jin, Xuehua Liu, Qing Li, Jian Yang and Jianlong Zhao

Assessment of the Dynamic Response of Cardiac Depolarization During Stress Test Recovery  
Evaluated in Patients with Brugada Syndrome  
Daniel Romero, Nathalie Behar, Virginie Le Rolle, Philippe Mabo and Alfredo Hernandez

**9-2: PhysioNet Challenge II**  
Chairs: Gari Clifford, Roger Mark

Discrimination of Normal and Abnormal Heart Sounds Using Probability Assessment  
Filip Plesinger, Juraj Jurco, Josef Halamek and Pavel Jurak

Heart Sound Classification via Sparse Coding  
Bradley Whitaker and David Anderson

Nonnegative Matrix Factorization and Random Forest for Classification of Heart Sound  
Recordings in the Spectral Domain  
Christoph Hoog Antink, Julian Becker, Steffen Leonhardt and Marian Walter

Classifying Heart Sound Recordings using Deep Convolutional Neural Networks and Mel-  
Frequency Cepstral Coefficients  
Jonathan Rubin, Rui Abreu, Anurag Ganguli, Saigopal Nelaturi, Ion Matei and Kumar Sricharan

Automatic Heart Sound Recording Classification using a Nested Set of Ensemble Algorithms  
Masun Nabhan Homsy, Natasha Medina, Miguel Hernandez, Natacha Quintero, Gilberto  
Perpiñan, Andrea Quintana and Philip Warrick

**9-3: Modelling Ion Channels and Drug Effects**  
Chairs: Eleonora Grandi, Javier Saiz

Sub-Cellular Network Analysis of Ryanodine Receptor Positioning in Control and  
Phosphorylated States  
Ismail M Khater, David RL Scriven, Edwin DW Moore and Ghassan Hamarneh

The Effect of Bioenergetic Impairment of Cytosolic Processes in Spatio-Temporal Ca<sup>2+</sup>  
Dynamics in a Three-Dimensional Cardiomyocyte Model  
Gareth Jones, Henggui Zhang and Michael A Colman

Modelling the Effects of Nifedipine on Ventricular and Myometrial Cells of Pregnant Rats  
Craig P Testrow, Dominic G Whittaker, Arun Holden and Henggui Zhang

In Quest of a Sinoatrial Cell Model to Assess the Functional Effects of Mutations in the HCN4 Funny Current Gene  
Ronald Wilders and Arie Verkerk

Synergistic Anti-arrhythmic Effects of Combining Blockade of Sodium and Ultra-rapid Delayed Rectifier Potassium Channels in Human Atria  
Haibo Ni, Dominic G Whittaker, Wei Wang and Henggui Zhang

**9-4: Respiration, Heart Rate and Sleep Disorders**  
Chairs: Carolina Varon, Jean-Marc Vessin

Closed-loop Kinesthetic Stimulation for the Treatment of Sleep Apnea Syndromes  
Diego Perez, Gustavo Guerrero, Delphine Feuerstein, Laurence Graindorge, Amel Amblard, Lotfi Senhadji and Alfredo Hernandez

Information Transfer Between Respiration and Heart Rate During Sleep Apnea  
Carolina Varon, Luca Faes, Dries Testelmans, Bertien Buyse and Sabine Van Huffel

Sleep Apnea Screening with a Contact-Free Under-the-Mattress Sensor  
Maayan Lia Yizraeli Davidovich, Roman Karasik, Asher Tal and Zvika Shinar

Cerebral Oximetry Versus Pulse Photoplethysmography to Monitor Respiration Rate  
Iraia Isasi, Unai Irusta, Elisabete Aramendi, Goiuri Peralta and Erik Alonso

Beat-To-Beat Autonomic Cardiovascular Response to Short-Term 100% O<sub>2</sub> Breathing: a Time-Frequency Analysis Approach  
Salvador Carrasco-Sosa and Alejandra Guillén-Mandujano

Real-Time Respiratory Rate Estimation using Imaging Photoplethysmography Inter-Beat Intervals  
Leila Mirmohamadsadeghi, Sibylle Fallet, Virginie Moser, Fabian Braun and Jean-Marc Vessin

**10-1: Special Session: QT, Drugs and Computing**  
Chairs: Blanca Rodriguez, Jean-Philippe Couderc

Cell-to-ECG Modeling and Clinical Trial ECG Evaluation of ECG J-to-Tpeak Interval  
Joel Xue

Optimization of an In Silico Cardiac Cell Model for Proarrhythmia Risk Assessment  
Sara Dutta, David Strauss, Thomas Colatsky and Zhihua Li

**10-2: Ultrasound Imaging**  
Chairs: Alan Murray, Enrico Caiani

Automatic Dynamic Quantification of Oesophagus Position from Intra-cardiac Echocardiography During Atrial Fibrillation Ablation

Federica Lauretti, Rachele Angeletti, Alessandro Dal Monte, Corrado Tomasi and Cristiana Corsi

Design of a Multiplexing Scheme for a Matrix Array for 3D Cardiac Imaging  
Carolina Vallecilla and Jan D'hooge

Multicenter Validation of Three-Dimensional Echocardiographic Quantification of the Left Heart Chambers using Automated Adaptive Analytics  
Diego Medvedofsky, Roberto Lang, Mihaela Amzulescu, Covadonga Fernández-Golfín, Rocio Hinojar, Mark Monaghan, Joseph Reiken, Masaaki Takeuchi, Wendy Tsang, Jean-Louis Vanoverschelde, Indrajith Vath, Lynn Weinert, Jose Luis Zamorano and Victor Mor-Avi

Feature Tracking Algorithm for Circumferential Strain using High Frame Rate Echocardiography  
Martin Vandborg Andersen, Cooper Moore, Samuel Schmidt, Peter Søggaard, Johannes Struijk, Joseph Kisslo and Olaf von Ramm

A Combined Multi-scale Deep Learning and Random Forests Approach for Direct Left Ventricular Volumes Estimation in 3D Echocardiography  
Suyu Dong, Gongning Luo, Guanxiong Sun, Kuanquan Wang and Henggui Zhang

### **10-3: Fetal, Antenatal and Neonatal Cardiovascular Control**

Chairs: Laura Burattini, Guy Carrault

Antenatal Fetal Heart Rate Acceleration Detection  
Philip Warrick and Emily Hamilton

Relationship between Deceleration Areas in the Second Stage of Labor and Neonatal Acidemia  
Angela Agostinelli, Flavio Palmieri, Alessandra Biagini, Agnese Sbrollini, Luca Burattini, Francesco Di Nardo, Sandro Fioretti and Laura Burattini

Regularity of Fetal HRV Changes in an In-vivo Sheep Model of Labor  
Massimo W Rivolta, Md Aktaruzzaman, Tamara Stampalija, Daniela Casati, Martin G Frasch, Enrico Ferrazzi and Roberto Sassi

Effects of Postnatal Environmental Tobacco Smoke on Cardiorespiratory Control in Newborn Lambs  
Sally Al Omar, Virginie Le Rolle, Nathalie Samson, Jean-Paul Praud and Guy Carrault

### **10-4: Monitoring**

Chairs: Rich Gregg, Daniel Guldenring

A Multicentric Study of Long-term Rhythm Patterns in Heart Rate  
Rebeca Goya-Esteban, Ó Barquero-Pérez, J Alzueta, X Viñolas, N Basterra, E García, J Villacastín, I Fernández-Lozano, J Brugada, JB Martínez-Ferrer, JL Rojo Álvarez, F Zumalde, M Martín-Méndez, F Chavarría-Asso and A Garcia Alberola



Evaluation of the Accuracy and Noise Response of an Open-source Pulse Onset Detection Algorithm on Pulsatile Waveform Databases

Chengyu Liu, Qiao Li and Gari Clifford

Computational Efficiency and Accuracy for QRS Detection Algorithms on Clinical Long Term Multilead Monitoring

Francisco-Manuel Melgarejo-Meseguer, Estrella Everss-Villalba, Jan Široký, Francisco-Javier Gimeno-Blanes, Jose-Antonio Flores-Yepes, Manuel Blanco-Velasco, Jose Luis Rojo-Alvarez and Arcadi Garcia-Alberola

Assessing Effect of Beat Detector on Detection Dependent Signal Quality Indices

Chathuri Daluwatte, Lars Johannesen, Loriano Galeotti, Jose Vicente, David Strauss and Christopher Scully

### **11-1: Ventricular Arrhythmias**

A Novel Method for Automated Fractionation Detection in Ventricular Tachycardia

Divyanshu Gupta, Damian Redfearn, Javad Hashemi and Selim Akl

Modulation of Effective Refractory Period at the Infarct Border-Zone Provides a Mechanism for Focal Arrhythmogenesis

Adam Connolly, Pawel Gawenda, Gernot Plank and Martin Bishop

Functional Effects of Island-distribution of Mid-cardiomyocytes on Re-entrant Excitation Waves in the KCNQ1-linked Short QT Syndrome

Cunjin Luo, Kuanquan Wang and Henggui Zhang

Computational Investigation of Pro-arrhythmogenesis of Heart Failure Induced Electrical Remodelling in Ventricles

Kun Jian, Chen Li, Gareth Jones and Henggui Zhang

Nonuniform Interpolation of Cardiac Navigation Maps Using Support Vector Machines

Beatriz Castro-García, Margarita Sanromán-Junquera, Alicia Guerrero-Curieses, Beatriz Trenor-Gomis, Arcadi García-Alberola and Jose Luis Rojo-Alvarez

Calcium Calmodulin Dependent Protein Kinase II (CaMKII) Contribute to Arrhythmias after Acidosis: A Simulation Study

Huanling Liu, Kuanquan Wang, Jieyun Bai, Suyu Dong and Henggui Zhang

A Quantitative Analysis on the Intracardiac Electrogram Contact During Ventricular

Tachycardia Ablation David Rivas-Lalaleo, Mónica Huerta, Margarita Sanromán-Junquera, Juan José Sánchez-Muñoz, Arcadi García-Alberola and Jose Luis Rojo-Alvarez

In Silico Investigation of Spontaneous Calcium Release on Premature Ventricular Contractions in Human Ventricles

Jieyun Bai, Kuanquan Wang, Gongning Luo and Henggui Zhang

Relationship between EtCO<sub>2</sub> and Quality-Parameters during Cardiopulmonary Resuscitation  
Jesús Ruiz Ojeda, Sofía Ruiz de Gauna, Digna M González-Otero, Mohamud Daya, James K Russell, José Julio Gutiérrez and Mikel Leturiondo

Combined Signal Averaging and Electrocardiographic Imaging Method to Non-Invasively Identify Atrial and Ventricular Tachycardia Mechanisms  
Corentin Dallet, Josselin Duchateau, Mèlèze Hocini, Laura Bear, Marianna Meo, Frédéric Sacher, Michel Haissaguerre and Remi Dubois

### **11-2: Atrial Fibrillation**

An Automatic Framework for the Non-rigid Alignment of Electro-anatomical Maps and Pre-operative Anatomical Scans in Atrial Fibrillation  
Martino Alessandrini, Maddalena Valinoti, Roberto Mantovan, Antonio Pasini, Stefano Severi and Cristiana Corsi

Enabling Atrial Fibrillation Detection using a Weight Scale  
Brian Ayers, Connor Beshaw, Ernesto Serrano-Finetti, Oscar Casas, Ramon Pallas-Areny and Jean-Pilippe Couderc

Prediction of Atrial Fibrillation Termination by Catheter Ablation Using Adaptive Frequency Tracking of Atrial ECG Signals  
Adrian Luca, Andrea Buttu, Jean-Marc Vesin, Patrizio Pascale, Laurent Roten, Christian Sticherling and Etienne Pruvot

ECG-Derived Markers to Identify Patients Prone to Atrial Fibrillation  
Adrian Luca, Sasan Yazdani, Alain Viso, Jean-Marc Vesin, Giulio Conte and Angelo Auricchio

Latent Variable Analysis of Causal Interactions in Atrial Fibrillation Electrograms  
David Luengo and Victor Elvira

Regional Conduction Velocity Calculation based on Local Activation Times: A Simulation Study on Clinical Geometries  
Bhawna Verma, Axel Loewe, Armin Luik, Claus Schmitt and Olaf Doessel

Dominant Atrial Fibrillatory Frequency Estimation using an Extended Kalman Filter  
Ebadollah Kheirati Roonizi and Roberto Sassi

### **11-3: Heart Rate Variability**

Nonlinear Dynamics of Heart Rate Variability after Superoxide Dismutase Inhibition in Rats  
Stanislaw Zajaczkowski and Tomasz Wierzba

Physical Conditioning Status Stratification Based on Heart Rate Variability: Principal Component Analysis of Power Spectrum Density Function  
Olivassé Nasario-Junior, Paulo Roberto Benchimol-Barbosa and Jurandir Nadal

Analysis of Heart Rate Variability Indices with Slowly Changing Heart Rate  
Masaki Hoshiyama and Alan Murray

Looking for Changes in the Heart Rate of Patients with Neurocardiogenic Syncope  
Fatima Maria Helena Simoes Pereira da Silva, Mariana Adami Leite, Julio Cesar Crescencio, Antonio Carlos Silva Filho and Lourenço Gallo Junior

Personalized Sedation Level Monitoring in ICU Patients using Heart Rate Variability  
Sunil Belur Nagaraj, Siddharth Biswal, Valdery Moura Junior, Patrick Purdon and Brandon Westover

#### **11-4: Cardiorespiratory Characterization and Analysis**

Phase Difference between Respiration Signal and Respiratory Modulation Signal from Oscillometric Cuff Pressure Pulses during Blood Pressure Measurement  
Diliang Chen, Fei Chen, Alan Murray and Dingchang Zheng

Cardio-Respiratory Characterization of the Autonomic Balance  
Leila Mirmohamadsadeghi, Nicolas Bourdillon, Grégoire P Millet and Jean-Marc Vesin

Sleep/Wake Classification Using Cardiorespiratory Features Extracted from Photoplethysmogram  
Parastoo Dehkordi, Ainara Garde, Guy A Dumont and J Mark Ansermino

Effect of Chest Compression Leaning on Accelerometry Waveforms  
James Russell, Dana Zive and Mohamud Daya

Comparing ECG Derived Respiratory Signals and Chest Respiratory Signal for the Detection of Obstructive Sleep Apnoea  
Nadi Sadr and Philip de Chazal

Apnoea-Hypopnoea Index Estimation using Craniofacial Photographic Measurements  
Hadis Nosrati, Nadi Sadr and Philip de Chazal

#### **11-5: ECG**

Irregular Heartbeats Detection Using Tensors and Support Vector Machines  
Alexander Suarez and Griet Goovaerts

Changes in Non-Invasive Wave Intensity Parameters with Variations of Savitzky-Golay Filter Settings  
Nicola Pomella, Mark Rakobowchuk, Christina Kolyva and Ashraf W Khir

Denoising and Automated R-peak Detection in the ECG Using Discrete Wavelet Transform  
Jonathan Goodfellow, Omar Escalona, Vivek Kodoth, Ganesh Manoharan and Antonio Bosnjak

Prolonged QT Interval in Neurodevelopmental Rat Model of Schizophrenia  
Tibor Stracina, Marina Ronzhina, Tibor Stark, Jana Ruda, Eva Olsanska, Petr Vesely, Vincenzo Micale and Marie Novakova

Electrocardiographic Measurements of the QT Interval During Embryonic Development in Fertilized Chicken Eggs  
Tanveer A Bhuiyan, Cristian Sevcencu, Johannes J Struijk, Jørgen K Kanters and Claus Graff

Novel Biomarker for Evaluating Ischemic Stress Using an Electrogram Derived Phase Space  
Wilson Good, Burak Erem, Jaume Coll-Font, Dana Brooks and Rob MacLeod

Effect of Sample Rate on saECG Spectrum  
Jacob Melgaard, Claus Graff, Peter Sørensen, Kasper Sørensen, Samuel Emil Schmidt and Johannes Struijk

Applying Quality Index Criterion for Flexible Multi-Detection of Heartbeat Using Features of Multimodal Data  
Mohammad Javad Mollakazemi, Farhad Asadi, Shadi Ghiasi and S Hossein Sadati

Comparison of Intensity-based B-splines and Point-to-Pixel Tracking Techniques for Motion Reduction in Optical Mapping  
Jaime Yagüe-Mayans, Conrado J Calvo, Antonio Cebrián and Jose Millet

## **11-6: Cellular and Tissue Models**

In Silico Assessment of Antiarrhythmic Effects of Drug Ranolazine on Electrical Activity in Human Ventricular Myocardium  
Mitra Abbasi and Sebastian Polak

A New Defibrillation Mechanism: Termination of Reentrant Waves by Propagating Action Potentials Induced by Nearby Heterogeneities  
Shuyue Han, Niels Otani, Valentin Krinski and Stefan Luther

Virtual Reality Visualization of Arrhythmias on a Smartphone  
Joachim Greiner, Tobias Oesterlein, Gustavo Lenis and Olaf Doessel

Effect of Multi-Electrode Configurations on Accuracy of Rotor Detection in the Atria  
Laura Martínez, Lucia Romero, Ana Ferrer, Jose Jalife, Omer Berenfeld and Javier Saiz

Hierarchical Bayesian Modelling of Variability and Uncertainty in Synthetic Action Potential Traces

Ross Johnstone, Rémi Bardenet, David Gavaghan, Liudmila Polonchuk, Mark Davies and Gary Mirams

Combination of Quantitative Changes in Ionic Components to Enhance the Contractile Force during T-tubule Development

Maiko Wakita, Hitomi Sano, Yasuhiro Naito and Masaru Tomita

Computational Modelling of Cardiac Electrophysiological Changes in Malaria Fever

Alan Benson, Michael Colman, Arun Holden, George Kagugube and Eleftheria Pervolaraki

Two Aspects of Cardiac Alternans – Difference and Correlation between them

Wei Wang, Dominic G Whittaker, Haibo Ni, Kuanquan Wang and Henggui Zhang

Comparison of Ion Channel Gene Expression in the Sinus Node of the Human, Rabbit, Rat and Mouse

Jue Li, Halina Dobrzynski, Ming Lei and Mark Boyett

Computer Model for Determining the Localized Changes in Ventricle Wall Thickness as a Function of Changing Wall Stress as Determined by Laplace's Law

Richard Summers

#### **11-7: ECG Miscellaneous**

Design and Implementation of a 2.45 GHz RF Sensor for Non-contacting Monitoring Vital Signs

Hongrui Bo, Qiang Fu, Lisheng Xu, Yuanzhu Dou and Fleming Lure

Computational Model for Prediction the Occurrence of Steam Pops during Irrigated Radiofrequency Catheter Ablation

Ana González-Suárez, Enrique Berjano, Jose M Guerra and Luca Gerardo-Giorda

Monitoring the Heart Rate in Cerebral Oximetry Signals

Iraia Isasi, Unai Irusta, Elisabete Aramendi, Goiuri Peralta and Erik Alonso

#### **11-8: PhysioNet Challenge**

Classification of Normal and Abnormal Heart Sound Recordings through Robust Feature Selection

Chetanya Puri, Arijit Ukil, Soma Bandyopadhyay, Rituraj Singh, Arpan Pal, Ayan Mukherjee and Debayan Mukherjee

PCG Classification Using a Neural Network Approach

Iga Grzegorzczuk, Mateusz Soliński, Michał Łeppek, Anna Perka, Jacek Rosiński, Joanna Rymko, Katarzyna Stępień and Jan Gierałtowski

Morphological Determination of Pathological PCG signals by Time and Frequency Domain Analysis

Márton Áron Goda and Péter Hajas

A Novel Approach for Robust Detection of Heart Beats in Multimodal Data using Neural Networks and Boosted Trees

Sachin Vernekar, Deepu Vijayasenan and Rohit Ranjan

A Novel Approach for Classification of Normal/Abnormal Phonocardiogram Recordings using Temporal Signal Analysis and Machine Learning

Sachin Vernekar, saurabh nair, Deepu Vijayasenan and Rohit Ranjan

Using Time-Frequency Features to Recognize Abnormal Heart Sounds Hsuan-Lin Her and Hung-Wen Chiu

Improving Classification Accuracy of Heart Sound Recordings by Wavelet Filter and Multiple Features

Xinpei Wang and Yuanyang Li

Classification of Heart Sound Recordings Using Convolution Neural Network

Heechang Ryu, Jinkyoo Park and Hayong Shin

Identification of Abnormal Heart Sounds

Sasan Yazdani, Silas Schlatter, Seyyed Abbas Atyabi and Jean-Marc Vesin

Analysis of the Clinical Utility of Algorithms in the 2009 PhysioNet/Computing in Cardiology Challenge for the Prediction of Acute Hypotensive Episodes

Grace Mirsky and Maria de la Salud Guillem Sánchez

A Multi-Modal Classifier for Heart Sound Recordings

Xulei Yang, Feng Yang, Like Gobeawan, Si Yong Yeo, Shuang Leng, Liang Zhong and Yi Su

Power Spectrum Analysis for Classification of Heart Sound Recording

Soo Kng Teo, Bo Yang, Ling Feng and Yi Su

Characteristics of Phonocardiography Waveforms that Influence Automatic Feature Recognition

Scott Stainton, Charalampos Tsimenidis and Alan Murray

Abnormal Heart Sounds detection based on the Scaled Time-Frequency Representation and Feature Selection

Wenjie Zhang, Shiwen Deng and Jiqing Han

## **12: Plenary**

Chairs: Guy Carrault, Andrew Blaber

Using Machine Learning to Predict if a Profiled Lay Rescuer can Successfully Deliver a Shock using a Public Access Automated External Defibrillator?

Raymond Bond, Peter O'Hare, Hannah Torney, Laura Davis, Bruno Delafont, Hannah McReynolds, Anna McLister, Ben McCartney, Rebecca Di Maio, Dewar Finlay, Daniel Guldenring, James McLaughlin and David McEneaney

Spatiotemporal Activation Time Estimation Improves Noninvasive Localization of Cardiac Electrical Activity

Matthijs Cluitmans, Jaume Coll-Font, Burak Erem, Dana Brooks, Pietro Bonizzi, Joël Karel, Paul Volders, Ralf Peeters and Ronald Westra

A Population of In Silico Models to Face the Variability of Human Induced Pluripotent Stem Cell-derived Cardiomyocytes: the hERG Block Case Study

Michelangelo Paci, Elisa Passini, Stefano Severi, Jari Hyttinen and Blanca Rodriguez