## CONFERENCE PROGRAM

### WEDNESDAY, 25 APRIL 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>1530-1830</td>
<td>PRE-CONFERENCE TUTORIAL - SERIAL ECG ANALYSIS</td>
</tr>
<tr>
<td>Chair:</td>
<td>Cees A. Swenne, Leiden University Medical Center, Leiden, The Netherlands</td>
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<tr>
<td>1530-1550</td>
<td>Chair</td>
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<tr>
<td>1550-1625</td>
<td>Daniel Guldenring, School of Engineering, Ulster University, Belfast, United Kingdom</td>
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<tr>
<td></td>
<td><em>Lead interchanges and electrode misplacements, diagnostic consequences and automated correction strategies</em></td>
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<tr>
<td>1625-1700</td>
<td>Arie C. Maan, Leiden University Medical Center, Leiden, The Netherlands</td>
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<tr>
<td></td>
<td><em>Diagnostic consequences of analyzing Mason-Likar ECGs, as single ECG and as serial ECG</em></td>
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<tr>
<td>1700-1720</td>
<td>Break</td>
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<tr>
<td>1720-1755</td>
<td>Cees A. Swenne, Leiden University Medical Center, Leiden, The Netherlands</td>
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<td><em>Spontaneous ECG Variability</em></td>
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<tr>
<td>1755-1830</td>
<td>Barry Brown, Mortara, a Hill-Rom Company, Milwaukee, Wisconsin, USA</td>
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<td><em>Could universal ECG comparison be practical in the future?</em></td>
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<tr>
<td>1830-2030</td>
<td>OPENING RECEPTION, Cash Bar, 1 hosted drink</td>
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### THURSDAY, 26 APRIL 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>0815-0830</td>
<td>Welcome and Opening Remarks</td>
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<tr>
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<td>Conference Chair - David Strauss, U.S. Food and Drug Administration, Silver Spring, Maryland, USA</td>
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<tr>
<td>0830-1035</td>
<td>Session I: Selected abstracts</td>
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<tr>
<td>Chair</td>
<td>Cees Swenne, Leiden University Medical Center, Leiden, The Netherlands</td>
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<tr>
<td>0830-0835</td>
<td>Chair</td>
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<tr>
<td></td>
<td><em>Overview</em></td>
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<tr>
<td>0835-0850</td>
<td>Teri Kozik, St. Joseph’s Medical Center, Stockton, California, USA</td>
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<tr>
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<td><em>Repolarization Changes in response to ENERGY drinks in a healthy adults during exercise: The C-Energy-X Study</em></td>
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</tbody>
</table>
0850-0905 Discussion
0905-0920 Raymond Bond, Ulster University, Belfast, United Kingdom
  Automation Bias and Interpreter Uncertainty when Reading 12-lead Electrocardiograms
0920-0935 Discussion
0935-0950 John Wang, Philips Healthcare, Andover, Massachusetts, USA
  Criteria for ECG detection of acute Myocardial Ischemia: Sensitivity versus specificity
0950-1005 Discussion
1005-1020 Daniel Guldenring, School of Engineering, Ulster University, Belfast, United Kingdom
  A method to transform 12-lead ECGs to non-standard short-distance ECG leads
1020-1035 Discussion
1035-1055 Break
1055-1230 Session II: Big data, Artificial Intelligence and Machine Learning in Electrocardiography
  Chair Jean-Philippe Couderc, University of Rochester, Rochester, New York, USA
1055-1100 Chair
  Overview
1100-1115 Long Yu, GE Healthcare, Wauwatosa, Wisconsin, USA
  P-QRS in machine learning: from raw data understanding to hybrid decision making
1115-1130 Discussion
1130-1145 D. Masoumeh Haghpanahi, iRhythm Technologies, San Francisco, California, USA
  Cardiologist-Level Arrhythmia detection with deep neural networks
1145-1200 Discussion
1200-1215 Jonathan Rubin, Philips Healthcare, Cambridge, Massachusetts, USA
  Densely connected convolutional networks for detection of atrial fibrillation from short single-lead ECG recordings
1215-1230 Discussion
1230-1700 Lunch and Afternoon Discussions
1700-1800 Poster Session 1 – cash bar, 1 hosted drink
  Salah Al-Zaiti, University of Pittsburgh, Pittsburgh, Pennsylvania, USA
  Beyond the ST-Segment: Novel Methods to Quantify Acute Myocardial Ischemia in Patients with Suspected Acute Coronary Syndrome
  Jimo Borjigin, University of Michigan, Ann Arbor, Michigan, USA
  Accurate detection of atrial fibrillation and atrial flutter using the electrocardiomatrix technique
  Jaume Coll-Font, Northeastern University, Boston, Massachusetts, USA
  Spatiotemporal Estimation of Activation Times in Cardiac Electrograms
  Reza Firoozabadi, Philips Healthcare, Thousand Oaks, California, USA
  Assessment of Signal Quality Algorithms in Distributed Systems
  Shrvanni Gangidi, University of Rochester, Rochester, New York, USA
  Impact of Pulse Deficit on Detection of AF Rhythms Using Photoplethysmographic Signals in Reference to ECG
  Wilson Good, SCI Institute, Salt Lake City, Utah, USA
  Novel Metric for Evaluating Ischemic Stress in Electrograms Using a Data-Driven Approach
  Richard Gregg, Philips Healthcare, Andover, Massachusetts, USA
  Reducing the impact of low sampling frequency on heart rate variability
Rohit Hadia, Ulster University, Newtownabbey, United Kingdom
*K-Nearest Neighbor based QRS delineator for single lead ECGs recorded in lifestyle monitoring Applications*
Thomas Hilbel, Dept. of Cardiology, University Hospital, Heidelberg, Germany
*Medical and Safety Issues for Wearable Activity and Heart Rate Trackers*
Michele Pelter, University of California San Francisco, San Francisco, California, USA
*Is Ischemic Pre-Conditioning Present in Acute Coronary Syndrome Patients with Moderate to Severe Sleep Disordered Breathing?*
Sukardi Suba, University of California San Francisco, San Francisco, California, USA
*Are True Accelerated Ventricular Rhythm Alarms Clinically Actionable or Lead to Untoward Patient Outcomes?*
Mercedes Weir, Virginia Commonwealth University, North Lauderdale, Florida, USA
*ECG Characteristics of Sleep Apnea Patients Undergoing Endoscopy with Deep Sedation*
Yu-Ching Yang, University of Rochester, Rochester, New York, USA
*Heart Rate Recovery, Blood Pressure Recovery, and 24-hour Heart Rate among Firefighters*
Brian Zenger, University of Utah, Salt Lake City, Utah, USA
*PFEIFER: A MATLAB Based Platform for Preprocessing and Autofiducializing Experimental Electrogram Recordings*

1800-1900  
**Dinner**

1900-2050  
**Session III: Device Therapies for Heart Failure and Sudden Cardiac Death**  
(Part 1 - Academic/FDA Perspective and LBBB Challenge)
*Chair*  
Robbert Zusterzeel, U.S. Food and Drug Administration, Silver Spring, Maryland, USA
*Co-Chair*  
Brett Atwater, Duke University Hospital, Durham, North Carolina, USA

1900-1905  
**Chair**  
*Overview of heart failure and overview of session*

1905-1920  
Brett Atwater, Duke University Hospital, Durham, North Carolina, USA
*Cardiac Resynchronization Therapy: Life-Extending Therapy for Heart Failure Patients*

1920-1935  
**Discussion**

1935-1950  
Kimberly Selzman, U.S. Food and Drug Administration, Silver Spring, Maryland, USA
*FDA Perspective on Assessing the Clinical Benefit of ICD and CRT Devices*

1950-2005  
**Discussion**

2005-2020  
Robbert Zusterzeel, U.S. Food and Drug Administration, Silver Spring, Maryland, USA
*The 2018 ISCE LBBB ECG Initiative*

2020-2035  
TBD: Winner of LBBB Initiative (*identified on April 2nd*)

2035-2050  
**Discussion**

2050-2100  
**Break**

2100-2205  
**Session IV: Device Therapies for Heart Failure and Sudden Cardiac Death**  
(Part 2 – Industry Perspective)
*Chair*  
Robbert Zusterzeel, U.S. Food and Drug Administration, Silver Spring, Maryland, USA
*Co-Chair*  
Brett Atwater, Duke University Hospital, Durham, North Carolina, USA

2100-2105  
**Overview**

2105-2120  
**Chair**

2120  
Mark Brown, Medtronic, Mounds View, Minnesota, USA
*What do we mean when we say an ICD is undersensing VF?*
Amy Brisben, Boston Scientific, Marlborough, Massachusetts, USA

How the S-ICD senses cardiac signals to maximize VF sensitivity and minimize cardiac oversensing

POSTER SESSION 1 – Continuing Discussion, cash bar

FRIDAY, 27 APRIL 2018

0830-1200 Session V: Predictive Analytics for Patient Monitoring in Critical Care Medicine: Balancing Alarm Fatigue (part 1) With Novel Predictive Algorithms (part 2)

Part 1 – Alarm Fatigue
Chair Marilyn Hrvnak, University of Pittsburgh, Pittsburgh, Pennsylvania, USA
Co-Chair Christopher Scully, U.S. Food and Drug Administration, Silver Spring, Maryland, USA

0830-0835 Chair
0835-0850 Marilyn Hrvnak, University of Pittsburgh, Pittsburgh, Pennsylvania, USA

A Call to Alarms: Current State and Future Directions in the Battle Against Alarm Fatigue

0850-0905 Discussion
0905-0920 Brad Winters, Johns Hopkins University, Baltimore, Maryland, USA

Clinical Approaches and Assessment Metrics for Alarm Fatigue

0920-0935 Discussion
0935-0950 Xiao Hu, University of California San Francisco, San Francisco, California, USA

Precise Patient Monitoring with Few False Alarms

0950-1005 Discussion

1005-1025 Break

1025-1200 Session VI: Predictive Analytics for Patient Monitoring in Critical Care Medicine: Balancing Alarm Fatigue (part 1) With Novel Predictive Algorithms (part 2)

Part 2 – Novel Predictive Algorithms
Chair Randall Moorman, University of Virginia, Charlottesville, Virginia, USA
Co-Chair Christopher Scully, U.S. Food and Drug Administration, Silver Spring, Maryland, USA

1025-1030 Chair

Overview
1030-1045 Randall Moorman, University of Virginia, Charlottesville, Virginia, USA

Predictive analytics monitoring at the bedside: Principles and practice

1045-1100 Discussion
1100-1115 Artur Dubrawski, Carnegie Mellon University, Pittsburgh, Pennsylvania, USA

Reducing data annotation efforts needed for building predictive models at bedside

1115-1130 Discussion
1130-1145 Christopher Scully, U.S. Food and Drug Administration, Silver Spring, Maryland, USA

Regulatory Science for Patient Monitoring Predictive Analytics

1145-1200 Discussion

1200-1700 Lunch and Afternoon Discussions
1700-1800  
**Poster Session 2 – cash bar, 1 hosted drink**

Brittany Bogle, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA  
*Predicted Outcomes and Cost-Effectiveness of Optimally Designed Drone-Delivered AED Networks in North Carolina: Predicted Outcomes and Cost-Effectiveness*

Werner Bystricky, AbbVie, Inc., Clinical Pharmacology, North Chicago, Illinois, USA  
*T vector velocity distribution: A new biomarker for identifying drug effects on cardiac myocyte ion channels*

Willem Dassen, Maastricht University Medical Center, Maastricht, Limburg, The Netherlands  
*Training the Electrophysiologist of the Future*

Dillon Dzikowicz, University of Rochester, Rochester, New York, USA  
*Predicting Heart Rate Recovery Based on Depression, Sleep Quality and Vagal Tone in On-Duty Firefighters*

Dillon Dzikowicz, University of Rochester, Rochester, New York, USA  
*Relation between QRS-T Angle and Blood Pressure during Exercise Stress Test in On-Duty Firefighters*

Ziad Faramand, University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania, USA  
*Understanding the Demographic and Clinical Correlates of Quantitative Repolarization Parameters in Patients with Cardiovascular Risk Factors*

Jorgen Kanters, University of Copenhagen, Copenhagen N, Denmark  
*Genetical component of the QT interval is associated with increased mortality in the general population*

Aaron Peace, Department of Cardiology, Altnagelvin Hospital, Western Health and Social Care Trust, United Kingdom  
*Decision Making Analysis of Patients ‘Turned Down’ for Primary Percutaneous Coronary Interventions Due to Inapplicable Referrals: A Need for Enhanced Performance in Human and Machine ECG Interpretation*

Dimitrios Poulikakos, Salford Royal NHS Foundation Trust, University of Manchester, Manchester, England  
*Associations of T Wave Morphology and Heart Rate Variability with Major Cardiac Events and Mortality in Hemodialysis patients*

Adelita Tinoco, University of California San Francisco, San Francisco, California, USA  
*ECG Derived Cheyne-Stokes Respirations and Periodic Breathing a Comparison of 12 versus 7 Leads in Hospitalized Patients*

Peter van Dam, Lucerne University, Institute for Medical Engineering, Lucerne, Switzerland  
*The Anatomical View on Mean QRS Axis*

John Wang, Philips Healthcare, Andover, Massachusetts, USA  
*Basic Statistical Concepts Used in Clinical Tests Interpretation and Decision Support: A Review*

Yu-Ching Yang, University of Rochester, Rochester, New York, USA  
*Heart Rate Recovery and Cardiovascular Risk Factors among Firefighters*

Jessica Zegre-Hemsey, University of North Carolina, Chapel Hill, Chapel Hill, North Carolina, USA  
*Methods of Interpreting Prehospital Electrocardiograms in North Carolina: A Statewide Report*

1800-1900  
**Dinner**

1900-1950  
**Kenichi Harumi Plenary Address**

Peter Clemmensen, Region Sjaelland - Nykoebing Falster Hospital, Nykoebing Falster, Denmark  
*The Standard EKG in Acute Coronary Syndrome*
1950-2000  Break

2000-2205  Session VII: Jos Willems Early Career Investigators Competition
Chair  Mary G. Carey, University of Rochester, Rochester, New York, USA
Co-Chair  Shen Luo, StarCare Medical, LLC, Madison, Wisconsin, USA
2000-2010  Chair
Overview
2010-2025  Elien Engels, Maastricht University, Maastricht, The Netherlands
Improved response to cardiac resynchronization therapy using multipoint pacing cannot solely be explained by better resynchronization
2025-2040  Discussion
2040-2055  Elyar Ghafoori, University of Utah, Salt Lake City, Utah, USA
Atrial Fibrillation Observed On Surface ECG Can Be Atrial Flutter
2055-2110  Discussion
2110-2125  Jonas Isaksen, University of Copenhagen, Copenhagen, Denmark
T-wave morphology in type 1 diabetes mellitus
2125-2140  Discussion
2140-2155  Ran Xiao, University of Oklahoma, Norman, Oklahoma, USA
Identification of Ischemic ST Changes through Deep Learning
2155-2205  Discussion
2205-2305  POSTER SESSION 2 – Continuing Discussion, cash bar

SATURDAY, 28 APRIL 2018

0830-1005  Session VIII: Identifying, Diagnosing and Guiding Invasive Treatment for Atrial Fibrillation
From Wearable Devices to Electrocardiographic Imaging to Guide Ablation
Part 1: ECG and Wearable Devices for Detecting Heart Rate, A-fib and Other Waveforms
Chair  Michele Pelter, University of California San Francisco, San Francisco, California, USA
Co-Chair  Loriano Galeotti, U.S. Food and Drug Administration, Silver Spring, Maryland, USA
0830-0835  Chair
Overview
0835-0850  Kais Gadhoumi, University of California San Francisco, San Francisco, California, USA
A comparative study of photoplethysmographic signals in wrist-worn and pulse-oximetry devices for the detection of atrial fibrillation in patients with ischemic stroke
0850-0905  Discussion
0905-0920  Marco Peluso, Quardio, Inc., San Francisco, California, USA
Diagnostic value and convenience of wearable ECG technology - an industry perspective
0920-0935  Discussion
0935-0950  Linda Ricci, U.S. Food and Drug Administration, Silver Spring, Maryland, USA
Updates on wearable medical devices
0950-1005  Discussion
1005-1020  Break
Session IX: Identifying, Diagnosing and Guiding Invasive Treatment for Atrial Fibrillation
From Wearable Devices to Electrocardiographic Imaging to Guide Ablation
Part 2: Electrocardiographic Imaging (inverse solution) – Application to Atrial Fibrillation
Chair
Rob MacLeod, University of Utah, Salt Lake City, Utah, USA
1020-1025 Chair
1025-1040 Overview
1040-1055 Discussion
1055-1110 Maria Guillem, Universitat Politècnica de València, València, Spain,
State of Electrocardiographic Imaging in Atrial Fibrillation
1110-1125 Discussion
1125-1140 Joaquin Azpilicueta, EP Solutions, Yverdon-les-Bains, Switzerland
ECGi in AFIB: A clinician wish list
1140-1155 Discussion
1155-1700 Lunch and Afternoon Discussions
1700-1900 Session X: Update on International Initiatives and Standards
Chair
Fabio Badilini, AMPS LLC, New York, New York, USA and University of California San Francisco, San Francisco, California, USA
Co-Chair
Brian Young, GE Healthcare, Wauwatosa, Wisconsin, USA
1700-1705 Chair
1705-1720 Overview
1720-1735 Discussion
1735-1750 Jose Vicente, U.S. Food and Drug Administration, Silver Spring, Maryland, USA
Update on the ECG component of the CiPA initiative
1750-1805 Discussion
1805-1820 Brian Young, GE Healthcare, Wauwatosa, Wisconsin, USA
Updates to IEC/AAMI ECG standards, a New Hybrid standard
1820-1835 Discussion
1835-1905 Jean-Philippe Couderc, University of Rochester, Rochester, New York, USA
Existing and emerging ECG databases: the good, the bad, and the ugly
1915-2200 Dinner Banquet
- Poster Awards
- Jos Willems Early Career Investigators Competition Awards
- President’s Remarks
- Conference Chair’s Remarks

SUNDAY, 29 APRIL 2018

0730-900 Closing Breakfast