



The Third IEEE/ACM Conference on Connected Health: Applications, Systems and Engineering Technologies

Washington, D.C., Sep. 26-28, 2018

ACM/IEEE CHASE 2018 Program

Day 1 (September 26, 2018) – Conference

Room	Potomac Ballroom
8:00 – 8:20	Open Remarks Chairs: Weisong Shi (Wayne State University), Anwar Walid (Nokia Bell Labs), Gang Zhou (William & Mary), Kevin Hall (Yale School of Medicine)
8:20-9:20	Keynote Speech 1: The Elusive Target of Smart Health By Wendy Nilsen (Program Director, Smart and Connected Health, NSF; Health Scientist Administrator, NIH Office of Behavioral and Social Sciences Research) Session Chair: Weisong Shi (Wayne State University)
9:20-9:40	Coffee Break
Room	Potomac Ballroom
9:40-12:40	Conference Session 1: Application I Session Chair: Kevin Hall (Yale School of Medicine)
12:40-13:40	Lunch (Outside Potomac 1 & 2)
13:40 - 15:10	Panel: Bringing Patients, Clinicians, Researchers, and Technologists Together: The Value of Connected Health Panelists: <ol style="list-style-type: none"> 1. Sanjay Aneja MD, Assistant Professor, Therapeutic Radiology, Yale School of Medicine, New Haven, CT 2. Richard Conroy PhD, Program Leader, Human BioMolecular Atlas Program, National Institutes of Health, Bethesda MD 3. Kevin Hall MD, Assistant Professor of Pediatrics; Director, Pediatric Heart Failure Program, Yale School of Medicine, New Haven CT 4. May Wang PhD, Professor of Biomedical Engineering; Director, Biomedical Big Data Initiative, Georgia Institute of Technology and Emory University, Atlanta GA 5. Li-Qun Xu PhD, Chief Scientist, China Mobile Research Institute Moderator: Srinivasan Suresh MD, MBA, Chief Medical Information Officer, Professor of Pediatrics, UPMC Children’s Hospital of Pittsburgh
15:10 - 15:30	Coffee Break
15:30 – 18:30	Conference Session 2: Algorithms & Models Session Chair: Song Han (University of Connecticut)

Day 2 (September 27, 2018) - Conference

Room	Potomac Ballroom
8:00-9:00	Keynote Speech 2: Transforming Healthcare and Biomedicine Using AI and Big Data By May Wang (Professor, Kavli Fellow, Georgia Research Alliance Distinguished Cancer Scholar) Session Chair: Kevin Hall (Yale School of Medicine)
9:00-9:20	Coffee Break
Room	Potomac Ballroom
9:20-12:20	Conference Session 3: Application II Session Chair: James Weimer (University of Pennsylvania)
12:20-13:30	Lunch (Outside Potomac 1 & 2)
13:30 – 16:30	Conference Session 4: System & Technology Session Chair: Xiaofan Jiang (Columbia University)
Room	Salon 4
17:00 – 19:00	Reception and Demo/Poster

Day 3 (September 28, 2018) - Workshops

Room	Potomac 1	Studio D	Studio C
9:00-10:30	Workshop Session 1 (BIGDATA4HEALTH)	Workshop Session 3 (DL-EDGE-IOT)	Workshop Session 5 (MEDSPT)
10:30-11:00	Coffee Break		
11:00-12:30	Workshop Session 2 (BIGDATA4HEALTH)	Workshop Session 4 (DL-EDGE-IOT)	Workshop Session 6 (MEDSPT)
12:30-13:30	Lunch (Outside Potomac 1 & 2)		

Conference Session 1: Application I

1. A Low-Cost, Camera-based Continuous PPG Monitoring System Using Laplacian Pyramid, Omkar Patil (State University of New York at Binghamton, USA); Wei Wang and Yang Gao (State University of New York at Buffalo, USA); Wenyao Xu (SUNY Buffalo, USA); Zhanpeng Jin (State University of New York at Buffalo, USA)
2. Restoring the Sense of Bladder Fullness for Spinal Cord Injury Patients, Daniel D Fong (University of California, Davis, USA); Xiaofan Yu (Peking University, P.R. China); Jiageng Mao (Zhejiang University, P.R. China); Mahya Saffarpour, Prashant Gupta, Rami Abueshsheikh, Alejandro Velazquez Alcantar, Eric Kurzrock and Soheil Ghiasi (University of California, Davis, USA)
3. Recovering the Fetal Signal in Transabdominal Fetal Pulse Oximetry, Daniel D Fong (University of California, Davis, USA); Andre Knoesen (UC Davis, USA); Mohammad Motamedi, Terry O'Neill and Soheil Ghiasi (University of California, Davis, USA)
4. Non-Contact Tidal Volume Measurement through Thin Medium Thermal Imaging, Breawn Schoun and Shane Transue (University of Colorado Denver, USA); Ann Halbower (University

- of Colorado School of Medicine and Children's Hospital Colorado, USA); Min-Hyung Choi (University of Colorado Denver, USA)
5. Identifying the Impact of Driver Inattention During Naturalistic Driving Using Mel-frequency Cepstrum 2-D Transform and Convolutional Neural Networks, Mojtaba Taherisadr and Priyanka Asnani (University of Michigan, USA); Scott Galster and Omid Dehzangi (West Virginia University, USA)
 6. Smart Home Air Filtering System: A Randomized Controlled Trial for Performance Evaluation, Kyeong T Min, Philip Lundrigan, Katherine Sward, Scott C Collingwood and Neal Patwari (University of Utah, USA)

Conference Session 2: Algorithms & Models

1. Discriminative Subjective Gaussian Mixture Modeling using minimum error training for on-line SSVEP Identification, Omid Dehzangi (West Virginia University, USA); Muhamed Farooq (University of Michigan-Dearborn, USA); Scott Galster (West Virginia University, USA)
2. Drug-Drug Interaction Discovery: Kernel Learning from Heterogeneous Similarities, Devendra Singh Dhami, Gautam Kunapuli and Mayukh Das (The University of Texas at Dallas, USA); David Page (University of Wisconsin-Madison, USA); Sriraam Natarajan (The University of Texas at Dallas, USA)
3. Robustness Analysis of Personalised Delivery Rate Computation for IV Administered Anesthetic, Alena Simalatsar (HES-SO Valais & Institute of Industrial Systems, Switzerland); Monia Guidi (University Hospital of Lausanne (CHUV), Switzerland); Pierre Roudit (HES SO Valais, Switzerland); Thierry Buclin (University Hospital of Lausanne (CHUV), Switzerland)
4. High Rate BCI with Portable Devices based on EEG, Zhengrui Qin (Northwest Missouri State University, USA); Qun Li (College of William and Mary, USA)
5. MobiGesture: Mobility-Aware Hand Gesture Recognition for Healthcare, Hongyang Zhao, Yongsen Ma, Shuangquan Wang, Amanda Watson and Gang Zhou (College of William and Mary, USA)
6. New Attacks on RNN based Healthcare Learning System and Their Detections, Qinghan Xue and Mooi Choo Chuah (Lehigh University, USA)

Conference Session 3: Application II

1. Are You Smoking? Automatic Alert System Helping People Keep Away from Cigarettes, Taiyu Chen, Xiaoliang Zhang, Haotian Jiang and Golnoush Asaeikheybari (Case Western Reserve University, USA); Nikhil Goel (Hawken School, USA); Monica Webb Hooper and Ming-Chun Huang (Case Western Reserve University, USA)
2. InDetector - Automatic detection of infected driveline regions, Shravan Aras, Chris Gniady, Thienne Johnson, Rinku Skaria and Zain Khalpey (University of Arizona, USA)
3. Eating Detection and Chews Counting through Sensing Mastication Muscle Contraction, Shuangquan Wang, Gang Zhou and Yongsen Ma (College of William and Mary, USA); Lisha Hu (Hebei University of Economics and Business, P.R. China); Zhenyu Chen (China Electric Power Research Institute, P.R. China); Yiqiang Chen (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China); Hongyang Zhao and Woosub Jung (College of William and Mary, USA)

4. DemonicSalmon: Monitoring Mental Health and Social Interactions of College Students Using Smartphones, Mehdi Boukhechba, Alexander R. Daros, Karl Fua, Philip Chow, Bethany Teachman and Laura E Barnes (University of Virginia, USA)
5. SPINDLES+: An Adaptive and Personalized System for Leg Shake Detection, Stephen Xia, Peter Wei, Jordan Vega and Xiaofan Jiang (Columbia University, USA)
6. Improving Momentary Stress Measurement and Prediction with Bluetooth Encounter Networks, Congyu Wu, Mehdi Boukhechba, Lihua Cai, Laura E Barnes and Matthew Gerber (University of Virginia, USA)

Conference Session 4: System & Technology

1. Virtual Tai-Chi System: A Smart-Connected Modality for Rehabilitation, Yu Liang (University of Tennessee at Chattanooga, USA)
2. Intelligent and Privacy-Preserving Medication Adherence System, Ji Jia, Jinyang Yu, Raghavendra Hanumesh, Stephen Xia and Peter Wei (Columbia University, USA); Hyumi Choi (Columbia University Medical Center, USA); Xiaofan Jiang (Columbia University, USA)
3. Early Hospital Mortality Prediction using Vital Signals, Reza Sadeghi, Tanvi Banerjee and William Romine (Wright State University, USA)
4. A Scalable Realtime Analytics Pipeline and Storage Architecture for Physiological Monitoring Big Data, Valentina Baljak, Adis Ljubovic and Jonathan Michel (UVA Health System, USA); Mason Montgomery (University of Virginia, USA); Richard Salaway (UVA Health System, USA)
5. Reducing Pulse Oximetry False Alarms Without Missing Life-Threatening Events, Hung Nguyen, Sooyong Jang and Radoslav Ivanov (University of Pennsylvania, USA); Christopher Bonafide (The Children's Hospital of Philadelphia, USA); James Weimer and Insup Lee (University of Pennsylvania, USA)
6. Mind the Gaps: Edge-based Monitoring for Continuous Room-level Location Tracking, Nutta Homdee, Ridwan Alam and John Lach (University of Virginia, USA)

Demo/Poster Session

1. Estimating Caloric Intake In Bed-ridden Hospital Patients With Audio and Neck-worn Sensors, Shibo Zhang, Dzung Tri Nguyen, Gan Zhang, Runsheng Xu, Nikolaos Maglaveras, and Nabil Alshurafa (Northwestern University, USA)
2. An Informed Consent Tool Starting with the Patient, Fuad Abujarad, Sandra Alfano (Yale School of Medicine, USA); Peter Peduzzi (Yale University, USA); Geoffrey Chupp (Yale School of Medicine, USA)
3. An Innovative App for the Management of Chronic Wound Treatment, Adam Yee (TJHSST & Xyken, LLC, USA); Frank Meng (Xyken, LLC, USA); Steven Yi (Xyken, LLC, USA); John Harmon (Johns Hopkins University School of Medicine, USA)
4. Motor skill Improvement Tool for Apraxia, Malaka Shanthakumara, Kahandawa Arachchige Dona Chathurangika Kahandawaarachchi (Sri Lanka Institute of Information Technology, Sri Lanka)
5. WEARABLE in CLOUD, Amleset Kelati, Hannu Tenhunen (Royal Institute of technology, Sweden & University of Turku, Finland)
6. AccuWiSe: Accurate Wireless Vital Sensing System for a Group of Exercisers - Hardware Configuration, Takuma Hamagami, Yasutaka Kawamoto (Oki Electric Industry Co., Ltd.,

- Japan); Shinsuke Hara (Osaka City University, Japan); Hiroyuki Yomo (Kansai University, Japan); Ryusuke Miyamoto (Meiji University & School of Science and Technology, Japan) Takunori Shimazaki (Osaka City University, Japan); Hiroyuki Okuhata (Synthesis Corporation, Japan); Fumie Ono, Kenichi Takizawa (National Institute of Information and Communications Technology, Japan)
7. AccuWise: Accurate Wireless Vital Sensing System for a Group of Exercisers - System Performance, Takuma Hamagami, Yasutaka Kawamoto (Oki Electric Industry Co., Ltd., Japan); Shinsuke Hara (Osaka City University, Japan); Hiroyuki Yomo (Kansai University, Japan); Ryusuke Miyamoto (Meiji University & School of Science and Technology, Japan) Takunori Shimazaki (Osaka City University, Japan); Hiroyuki Okuhata (Synthesis Corporation, Japan); Fumie Ono, Kenichi Takizawa (National Institute of Information and Communications Technology, Japan)
 8. Automated Tremor Detection in Parkinson's Disease using Accelerometer Signals, Ada Zhang, (Carnegie Mellon University, USA); Rubén San Segundo (Universidad Politécnica de Madrid, Spain); Stanislav Panev, Griffin Tabor, Andrew Whitford, Katelyn Stebbins, Fernando De la Torre, and Jessica Hodgins (Carnegie Mellon University, USA)
 9. Model-based Monitoring of Glucose-Insulin Homeostasis for Diabetics in a Mobile Environment, Christian Tolks (University of Augsburg, Germany); Claudia Eberle (Hochschule Fulda - University of Applied Sciences, Germany); Christoph Ament (University of Augsburg, Germany)
 10. Using HRV and Sleep Data from Remote Monitoring to Predict Self-regulation, Matthew Patterson, Bahareh Pourabee, Matthew-Howe Patterson, Eric Reiher, and Frederic Bernard (OMSignal, Canada)
 11. Connected Capacitive Sensor Array for Upper-Extremity Motor Rehabilitation, Haoyan Liu James Parkerson, and Alexander Nelson (University of Arkansas, Fayetteville, USA)
 12. Knee Osteoarthritis Severity Level Classification Using Whole Knee Cartilage Damage Index and ANN, Yaodong Du, Juan Shan, Rania Almajalid (Pace University, USA); Ming Zhang (Tufts University & Tufts Medical Center, USA)
 13. Mobile Website and App for Insurance Clients, Srinivas Vennapureddy (Macy's Inc. Software Engineer, USA)
 14. Detection and Monitoring of Repetitions Using an mHealth-Enabled Resistance Band, Curtis L. Petersena, Emily V. Wechslera, Ryan J. Haltera, George G. Boatenga, Patrick O. Proctora, and David F. Kotza (Dartmouth College, USA); Summer B. Cook (University of New Hampshire, USA); John A. Batsis (Dartmouth College, USA)
 15. A New Approach for ECG Denoising in Dry Contact Wearable Sensor Node, Hui Huang and Ye Sun (Michigan Tech, USA)
 16. A Computational Efficient Fuzzy Clustering Algorithm for Big Incomplete Longitudinal Trial Data, Venkata Sukumar Gurugubell, Zhouzhou Li, and Honggang Wang (University of Massachusetts, Dartmouth, USA); Hua Fang (University of Massachusetts Medical School & Dartmouth, USA)
 17. Improved Ergonomic Risk Factor Assessment Using OpenSim and Inertial Measurement Units, Jonathan Mortensen, Mitja Trkov, and Andrew Merryweather (University of Utah, USA)
 18. Patient Identification Based On Wrist Activity Data, Kewei Sha and Madhu Kumari (University of Houston-Clear Lake, USA)
 19. A Wearable System for Situational Awareness Estimation in Underground Mines, Xian Li, Ye Sun, Zhen Liu, and Matthew Portfleet (Michigan Tech, USA)

Workshop Session 1: BIGDATA4HEALTH

1. Optimal Length-Constrained Segmentation and Subject-Adaptive Learning for Real-time Arrhythmia Detection, Vo Anh Kha (University of Technology Sydney, Australia), Eryk Dutkiewicz (University of Technology Sydney, Australia)
2. Creating Prognostic Systems by the Mann-Whitney Parameter, Huan Wang (The George Washington University, USA), Matthew Hueman (Walter Reed National Military Medical Center, USA), Qing Pan (The George Washington University, USA), Donald Henson (The Uniformed Services University of the Health Sciences, USA), Arnold M. Schwartz (605 Lambertson Dr, USA), Li Sheng (Drexel University, USA), Dechang Chen (Uniformed Services University of the Health Sciences, USA)
3. Modeling Patients' Online Medical Conversations: a Granger Causality Approach, Giovanni Delnevo (Università di Bologna, Italy), Marco Rocchetti (Università di Bologna, Italy), Silvia Mirri (Università di Bologna, Italy)
4. A High-Throughput Interoperability Architecture over Ethereum and Swarm for Big Biomedical Data, Arghya Kusum Das (Louisiana State University), Kisung Lee (Louisiana State University), Seung-Jong Park (Louisiana State University)

Workshop Session 2: BIGDATA4HEALTH

1. Convolutional Neural Networks as Means to Identify Apposite Sensor Combination for Human Activity Recognition, Muhammad U. S. Khan (COMSATS University Islamabad, Abbottabad Campus, Pakistan), Assad Abbas (COMSATS University Islamabad, Islamabad Campus, Pakistan), Mazhar Ali (COMSATS University Islamabad, Abbottabad Campus, Pakistan), Muhammad Jawad (COMSATS University Islamabad, Lahore Campus, Pakistan), Samee U. Khan (North Dakota State University, Fargo, ND, USA)
2. The Healthcare IoT Ecosystem: Advantages of Fog Computing Near the Edge, Karen Thurston (University of Idaho & Base Two Solutions, USA); Daniel Conte de Leon (University of Idaho, USA)
3. State Affect Recognition Using Smartphone Sensing Data, Lihua Cai, Mehdi Boukhechba, Congyu Wu, Laura E Barnes, Matthew Gerber, Bethany Teachman and Philip Chow (University of Virginia, USA)
4. Healthcare Solution on Blockchain with Patient Mediated Consent, Faezeh Vaseghiamiri (Wayne State University, USA); Ramani Routray (IBM Almaden Research Center, USA); Jiang Li (Howard University, USA); Weisong Shi (Wayne State University, USA)

Workshop Session 3: DL-EDGE-IOT

1. **Keynote:** "Intelligent ear-level devices for hearing enhancement and health monitoring leveraging edge and cloud computing", Tao Zhang, PhD, Director of the Signal Processing Research, Starkey Hearing Technologies

2. IoT-based Healthcare System for Real-time Maternal Stress Monitoring, Olugbenga Oti (University of Turku, Finland), Iman Azimi (University of Turku, Finland), Arman Anzanpour (University of Turku, Finland), Anna Axelin (University of Turku, Finland), Pasi Liljeberg (University of Turku, Finland), Amir M. Rahmani (University of California, Irvine, USA & TU Wien, Austria)
3. Empowering Healthcare IoT Systems with Hierarchical Edge-based Deep Learning, Iman Azimi (University of Turku, Finland), Janne Takalo-Mattila (VTT Technical Research Centre of Finland, Finland), Arman Anzanpour (University of Turku, Finland), Amir M. Rahmani (University of California, Irvine, USA & TU Wien, Austria), Juha-Pekka Soininen (VTT Technical Research Centre, Finland), Pasi Liljeberg (University of Turku, Finland)

Workshop Session 4: DL-EDGE-IOT

1. **Keynote:** The potential social networking and mobile diabetes self-management in the Middle East and Gulf Region, Robert S.H. Istepanian (Imperial College, UK)
2. Heartbeat Classification in Wearables Using Multi-layer Perceptron and Time-Frequency Joint Distribution of ECG, Anup Das (Drexel University, USA), Francky Catthoor (IMEC, Belgium), Siebren Schaafsma (IMEC, The Netherlands)
3. SmartEAR: Smartwatch-based Unsupervised Learning for Multi-modal Signal Analysis in Opportunistic Sensing Framework, Debanjan Borthakur (University of Rhode Island, India), Andrew Peltier (URI, USA), Harishchandra Dubey (University of Texas at Dallas, USA), Joshua Gyllinsky (University of Rhode Island, USA), Kunal Mankodiya (University of Rhode Island, USA)

Workshop Session 5: MEDSPT

1. A Novel Authentication Biometric for Pacemakers, Kenedi Heather (Worcester Polytechnic Institute, USA), Kunal Shah (Worcester Polytechnic Institute, USA), Krishna Kumar Venkatasubramanian (Worcester Polytechnic Institute, USA), Hang Cai (Worcester Polytechnic Institute, USA), Ken Hoyme (Boston Scientific, USA), Michael Seeberger (Boston Scientific, USA), Grace Wiechman (Boston Scientific, USA)
2. Misbehavior Detection of Embedded IoT Devices in Medical Cyber Physical Systems, Ilsun You (Soonchunhyang University, Korea), Kangbin Yim (Soonchunhyang University, Korea), Vishal Sharma (Soonchunhyang University, Korea), Gaurav Choudhary (Soonchunhyang University, Korea), Ing-Ray Chen (Virginia Tech, USA), Jin-Hee Cho (Army Research Laboratory, USA)
3. The Danger of Missing Instructions: A Systematic Analysis of Security Requirements for MCPS, Josephine Lamp (Arizona State University, USA), Carlos Rubio-Medrano (Arizona State University, USA), Ziming Zhao (Arizona State University, USA), Gail-Joon Ahn (Arizona State University, USA)

Workshop Session 6: MEDSPT

1. **Keynote:** Transforming the new era of health with AI and Blockchain, Jia Chen (IBM)

2. An Improved User Authentication Scheme for Telecare Medical Information Systems, R'Madhusudhan (National Institute of Technology Karnataka, India), Chaitanya Nayak (National Institute of Technology Karnataka, India)

3. CyberPDF: Smart and Secure Coordinate-based Automated Health PDF Data Batch Extraction, Reza M. Parizi (Kennesaw State University, USA), Liang Guo (New York Institute of Technology, USA), Yao Bian (New York Institute of Technology, USA), Amin Azmoodeh (Shiraz University, Iran), Ali Dehghantanha (University of Guelph, Canada), Kim-Kwang Raymond Choo (University of Texas at San Antonio, USA)