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Editor's Notes & Ethics Statement

The IEEE-EMBS International Conference on Biomedical and Health Informatics (BHI'21) jointly organised with the 17th IEEE-EMBS International Conference on Wearable and Implantable Body Sensor Networks (BSN'21) of the IEEE Engineering in Medicine and Biology Society hosted an electronic paper submission process for the conference. It was the responsibility of the submitting Author to ensure the document was viewable and without errors that would prevent the Conference from including the paper in the Digital Proceedings or Website. In the event a paper was submitted that could not be viewed or printed properly, the Conference elected to only publish the abstract of the paper in the Proceedings. All conference papers were peer-reviewed by experts chosen by the BHI/BSN Conference Editorial Board for all contributed and Special Session papers.

The EMBS AdCom approved the following Code of Ethics to provide a guideline of ethical consideration for all members and to establish its support for ethical conduct in research.

Patients and Human Subjects

1. Respect human dignity and privacy of patients and human subjects.

Information

2. Ensure proper safeguarding of all confidential information, including information pertinent to patients, subjects, commercial entities, and trade secrets.

Environment

- 3. Promote a culture of cost-effectiveness.
- 4. Support the preservation of a healthy environment.

Research

- 5. Engage in research aimed at advancing the contribution of science and technology to improving healthcare provision.
- 6. Report research results with scientific integrity and proper due credit.
- 7. Observe the rights of human research subjects and strive for a balance between benefits and potential harm.
- 8. Ensure a responsible and humane use of animals in research.
- 9. Conduct clinical research studies in accordance with Good Laboratory Practices (GLP) and Good Clinical Practices (GCP).

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Welcome Letter

Dear Colleagues:

On behalf of the Organizing Committee, we are honored and delighted to welcome you to two flagship conferences of the IEEE Engineering in Medicine and Biology Society (EMBS), the IEEE-EMBS International Conference of Biomedical and Health Informatics (BHI 2021) and the IEEE-EMBS International Conference on Wearable and Implantable Body Sensor Networks (BSN 2021). This is the 3rd time that these two conferences are coorganized with the vision that jointly, they provide a better forum for exchanging exciting ideas and advances in the field of digital health.

Due to COVID-19, this year the two conferences are held as virtual events. As we prepared the conference program, we looked at this format - forced upon us by the pandemic - as a challenge that motivated us to assemble an outstanding program. In addition, we put a great deal of effort toward attracting more attendees than in the past, so as not only to keep in touch with our colleagues who regularly attend the BHI and BSN meetings, but also to reach out to others in the field. We are delighted to see you joining our virtual conferences on July 27-30, 2021 https://www.bhi-bsn-2021.org/.

Biomedical and Health Informatics (BHI) encompasses methods and systems that allow one to collect and analyze data with the objective of deriving information relevant to health, healthcare, life sciences, and medicine. After a series of successful meetings in Hong Kong (Asia), Valencia (Spain), as well as Las Vegas, Orlando and Chicago (US), in 2021 a virtual platform will provide the opportunity to members from around the world to participate in a meeting that we are confident will be as stimulating as an in-person meeting.

The theme of BHI2021 is: "Reshaping healthcare through advanced Al-enabled health informatics for a better quality of life". BHI 2021 has oral and poster sessions on topics that include: bioinformatics; imaging informatics; biomedical signal processing informatics; sensor informatics; behavioral informatics; big data analytics; machine learning and deep learning; clinical informatics; public health informatics; precision medicine informatics; and disease oriented informatics.

After a successful series of **Wearable and Implantable Body Sensor Networks (BSN)** meetings held at Imperial College London, MIT Media Lab, RWTH Aachen, CU Hong Kong, UC Berkeley, Singapore NUS, UT Dallas, ICL London, MIT Lincoln Lab, ETH Zurich, MIT, UC San Francisco, Philips Eindhoven, Las Vegas and Chicago, in 2021 a virtual platform will provide the opportunity to members of the BSN community from around the world to participate in an exciting meeting where the latest advances in wearable and implantable body sensors will be presented.

BSN 2021 has focus on <u>wearable as well as implantable sensors and systems to monitor patients' health status.</u> BSN 2021 has oral and poster sessions on topics that include: prototyping of body-worn, ingestible and implantable sensor networks; novel chemical, biological and textile body sensors; flexible and/or stretchable electronic sensors and systems; ultra-low-power or battery-less solutions for longitudinal studies; machine learning, deep learning and decision support algorithms; body area communication protocols, models and theories; security, privacy and trust in body sensor network; and medical/wellness applications from pre-natal health to elderly care.

This year, the technical program committee of BHI 2021 and BSN 2021 have co-organized 9 workshops on innovative research areas such as:

- · assessing credibility of in silico trials for regulatory purposes,
- trends, challenges, and opportunities for the hospital of the future,
- · big data and artificial intelligence in cancer imaging,
- integrating gender perspective in science, technology and innovation,
- · machine learning based decision support system for early-stage prediction of complications and risk stratification of COVID 19 patients,
- AI4US: unlocking the potential of artificial intelligence for ultrasound image processing.
- real-world digital mobility assessment,
- soldier digital phenotyping, and
- · predicting quality of life with multimodal data.

In addition, the BHI-BSN 2021 program includes the following:

Seven (7) distinguished plenary keynote speakers from academia and the corporate world who will share their insights and accomplishments as well as their vision for future of the field.

Three (3) panels on the following topics:

- "clinical/translational panel"
- "Industry panel"
- "Regulatory issues for medical devices"

Furthermore, we have done the following to promote knowledge sharing, innovation, and networking among conference attendees:

- 1. all the papers and posters complying with the conference guidelines are eligible for the "Best Paper" and "Best Poster" selection;
- the authors of selected papers presented at the two conferences will have the opportunity to submit a full paper (with a publication fee waiver)
 to one of two flagship journals of the IEEE Engineering in Medicine and Biology Society: the IEEE Journal of Biomedical and Health Informatics
 and the IEEE Open Journal of Engineering in Medicine and Biology;
- 3. selected four-page papers will be published in IEEE Xplore;
- 4. all accepted papers will be included in the online digital proceedings (although not necessarily in IEEE Xplore).

We want to express our deepest appreciation to all the members of the **BHI-BSN** steering committee, **BHI 2021** and **BSN 2021** organizing committees and technical program committees, the associate editors, as well as all the reviewers for their dedication and hard work in creating an excellent scientific program. We want to thank all the authors who submitted their papers for presentation at the meeting, and all of you for being here to take part in BHI-BSN 2021 and share your work.

We look forward to meeting you all during this exciting and memorable event!

Dimitris I. Fotiadis, BHI Chair Paolo Bonato, BSN Chair



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Tuesday, July 27, 2021 Workshops				
	Virtual Room 1	Virtual Room 2	Virtual Room 3	Virtual Room 4
TIME (CET)	Workshop Sessions: 13:00 - 18:15 (CET)			
13:00 - 14:15	Trends, challenges and opportunities for the Hospital of the Future Organisers: Maria Teresa Arredondo & Giuseppe Fico, Universidad Politécnica de Madrid	Big Data and Artificial Intelligence in Cancer Imaging Organisers: Karim Lekadir, Universitat de Barcelona; Luis Martí-Bonmatí, La Fe University; Manolis Tsiknakis, FORTH; Gianna Tsakou, Athens R&D Lab of Maggioli S.P.A.	Real-world Digital Mobility Assessment Organisers: Andrea Cereatti, Politecnico di Torino; Silvia Del Din, Newcastle University; Felix Kluge, Friedrich-Alexander University Erlangen-Nürnberg	Soldier Digital Phenotyping Organisers: Karl E. Friedl & Reed W. Hoyt, U.S. Army Research Institute of Environmental Medicine, Natick, Massachusetts
14:15 – 14:20	Break			
14:20 – 15:35	Trends, challenges and opportunities for the Hospital of the Future Organisers: Maria Teresa Arredondo & Giuseppe Fico, Universidad Politécnica de Madrid	Big Data and Artificial Intelligence in Cancer Imaging Organisers: Karim Lekadir, Universitat de Barcelona; Luis Martí-Bonmatí, La Fe University; Manolis Tsiknakis, FORTH; Gianna Tsakou, Athens R&D Lab of Maggioli S.P.A.	Real-world Digital Mobility Assessment Organisers: Andrea Cereatti, Politecnico di Torino; Silvia Del Din, Newcastle University; Felix Kluge, Friedrich-Alexander University Erlangen-Nürnberg	Soldier Digital Phenotyping Organisers: Karl E. Friedl & Reed W. Hoyt, U.S. Army Research Institute of Environmental Medicine, Natick, Massachusetts
15:35 – 15:40	Break			
15:40 – 16:55	Assessing Credibility of in Silico Trials for Regulatory Purposes Organisers: Marco Viceconti, University of Bologna; Liesbet Geris, University of Liege	Al4US: Unlocking the Potential of Artificial Intelligence for Ultrasound image processing Organisers: Sara Moccia, Scuola Superiore Sant'Anna; Emilio Filippucci, "Carlo Urbani" Hospital; Maria Chiara Fiorentino, Università Politecnica delle Marche; Emanuele Frontoni, Università Politecnica delle Marche	Predicting Quality of Life with Multimodal Data Organisers: Valeria De Luca, Novartis Institutes for Biomedical Research; leuan Clay, Evidation Health	Integrating Gender perspective in Science, Technology and Innovation Organisers: Maria Fernanda Cabrera- Umpierrez, Universidad Politecnica de Madrid; Yolanda Ursa, INMARK
16:55 – 17:00	Break			
17:00 – 18:15	Assessing Credibility of in Silico Trials for Regulatory Purposes Organisers: Marco Viceconti, University of Bologna; Liesbet Geris, University of Liege	Machine Learning based Decision support systems for early-stage Prediction of Complications and Risk stratification of COVID 19 Patients Organisers: Luca Romeo, Michele Bernardini, Emanuele Frontoni, Università Politecnica delle Marche, Ancona; Jonathan Montomoli, Hospital Infermi; Maggie Cheng, Illinois Institute of Technology; Farshad Firouzi, Duke University	Predicting Quality of Life with Multimodal Data Organisers: Valeria De Luca, Novartis Institutes for Biomedical Research; Ieuan Clay, Evidation Health	Integrating Gender perspective in Science, Technology and Innovation Organisers: Maria Fernanda Cabrera- Umpierrez, Universidad Politecnica de Madrid; Yolanda Ursa, INMARK

		Wednesday, Jul		
TIME (CET)	Schedule TIME (CET) Conference Sessions: 12:30 - 19:35 (CET)			
TIME (CET)	Poster Session # 1			
12:30-13:00				
	Chair: Misha Pavel (Northeastern University)			
13:00-14:00	BHI Special Session Leveraging big data, machine learning and computable knowledge technologies to build learning health systems Chairs: Guilan Kong (Peking University); Allen Flynn (University of Michigan)	BHI Special Session Contactless Vital Signs Monitoring for Al Healthcare Chairs: Wenjin Wang (Philips Research, Eindhoven University of Technology); Xuyu Wang (California State University)	BSN Special Session Digital Biomarkers for Movement Disorders Chair: Federico Parisi (Harvard Medical School)	BSN Special Session Body-interfaced Flexible Sensors and Actuators: recent developments, challenges and opportunities Chair: Hongliang Ren, (CUHK (HK) & NUS (SG))
14:00-15:00	BHI Special Session Advanced Sensing and Computing Techniques for Sleep Monitoring Chairs: Wei Chen (Fudan University); Amara Amara (Geneva University)	BHI Session Al and Big Data Analytics (I) Chairs: George Matsopoulos (National Technical University of Athens), Amira S. Ashour (Tanta University)	BSN Special Session Body Sensor Networks in the era of pandemic Chair: Raffaele Gravina (University of Calabria)	BSN Session Monitoring Pulmonary Function Using Wearable Technology Chair: Canan Dagdeviren (Massachusetts Institute of Technology); Ivan Lee (University of Massachusetts Amherst)
15:00-15:05	Opening Welcome Chairs: Metin AkayEMBS President, University of Houston; Dimitrios I. Fotiadis (JBHI EiC, University of Ioannina/ FORTH), Paolo Bonato (Harvard Medical School)			
15:05-15:35	Keynote Lecture: "Wearable "SUPER-MINDS" for the Precision Control of CVDs and COVIDs" Yuan-Ting Zhang, Hong Kong Center for Cerebro-cardiovascular Health Engineering (COCHE), HK Chair: Carmen Poon (GMed IT Ltd)			
15:35-16:00	BHI-BSN Roadmap: The Celebration Chair: May D. Wang, Georgia Tech and Emory University Guests: Metin Akay, EMBS President, University of Houston, USA; Dimitrios I. Fotiadis, JBHI EiC, University of Ioannina/ FORTH, Greece; Andrew Laine, EMBS Past President; Stephen Wong, BHI-TC Past Chair; Paolo Bonato, Harvard Medical School, USA; Yuan-Ting Zhang, JBHI Past EiC, BHI Conf. Past Chair; Jeff Palmer, BSN-TC Chair, MIT Lincoln Lab, USA			
16:00-16:25		"Simplifying interpretation Alison Noble	eynote Lecture: n and acquisition of ultrasound s e, University of Oxford, UK rassi (Oak Ridge National), USA	scans"
16:25-16:30		Olidii. Odolgid 10d	Break	
16:30-17:30	Clinical/Translational panel Topic: "Advances and Trends in use of Informatics in Clinical Practice" Chair: Athanasios Tzioufas, National and Kapodistrian University of Athens, Greece Guests: Maria Teresa Arredondo, Universidad Politécnica de Madrid, Spain; Doris Bamiou, University College of London, UK; Elazer R. Edelman, MIT, US; Norbert Graf, University of the Saarland, Germany; Peter Stone, Harvard Medical School, US			
17:30-18:00	Featured Session Topic: "Pandemic Mitigation by Modeling and Informatics: Lesson Learned from COVID-19" Chair: Constantinos S. Pattichis, Univ. of Cyprus, Cyprus Featured Speakers: George Panos, University of Cyprus & Nicosia General Hospital Internal Medicine Clinic, Cyprus; Joshua S Weitz, Georgia Institute of Technology, USA			
18:00-18:05	DI II O		Break	
18:05-19:05	BHI Special Session Opportunities for Machine Learning and Noninvasive Sensing to Impact Emergency Cardiovascular Care Chairs: Omer T. Inan (Georgia Institute of Technology); Jin-Oh Hahn (University of Maryland); Jacob Kimball (Georgia Institute of	BHI Session Al and Big Data Analytics (II) Chairs: George Matsopoulos (National Technical University of Athens), Amira S. Ashour (Tanta University)		BSN Session Machine Learning for the Analysis of Wearable Sensor Data Chairs: Benny Lo (Imperial College London); Rita Paradiso (Smartex s.r.l.)
19:05-19:35	Technology)		ster Session # 2 cy Bamberg (Veristride)	

		Thursday, July 29, 2021 Schedule		
TIME (CET)		Conference Sessions:		
40.00.40.00	Poster Session # 3			
12:30-13:00	Chair: Paolo De Carvalho (University of Coimbra)			
13:00-14:00	BHI Special Session In silico clinical trials: AI and biomechanical modeling of heart disease Chair: Nenad Filipovic (University of Kragujevac)	BHI Session Biomedical Signal Processing and Disease Oriented Informatics Chairs: Winston Wu (Pharmaco- Kinesis Corporation); Zhiqiang Zhang (University of Leeds)	BSN Special Session Advancements in Sensors, Algorithms and Clinical Trials for Non-invasive and Cuffless Blood Pressure Monitoring Chair: Yali Zheng (Shenzhen Technology University)	BSN Session Medical and Wellness Applications Chairs: Christina Chase (Massachusetts Institute of Technology); Giancarlo Fortino (University of Calabria)
14:00-14:30	Keynote Lecture: "Improving Consideration of Social and Cognitive Behaviors in Advancing Informatics Technologies for Health Care" Vimla L Patel, Center for Cognitive Studies in Medicine and Public Health at the New York Academy of Medicine, US Chair: Daniela Giordano (University of Catania)			
14:30-15:00	"Soft, Wearable Sys	Keynote I tems with Integrated Microfluidi Roozbeh Ghaffari, North Chair: Omer Inan (G	cs and Biosensors for Remote western University, USA	e Health Monitoring"
15:00-15:05	Break			
15:05-16:05	Regulatory panel Topic: "Regulatory issues for medical devices panel" Chair: Nenad Filipovic, University of Kragujevac, Serbia Guests: Kevin Fu, US FDA Acting Director for Medical Device Cybersecurity; Andreas Melzer, University of Leipzig, Germany; Nick Petrick, OHT7: Office of In Vitro Diagnostics and Radiological Health; Yiannos Tolias, Legal Lead AI and AI liability in healthcare, European Commission, Belgium			
16:05-16:10		Brea	ak	
16:10-17:10	BHI Special Session Personalized Dietary Informatics for Precision Nutrition Chairs: Edward Sazonov (The University of Alabama); Oliver Amft (Friedrich Alexander University Erlangen- Nuremberg (FAU); Benny Lo (Imperial College London)	BHI Special Session Sensor-based behavioral informatics in support of Health Management and Care Chairs: Manolis Tsiknakis (Foundation for Research and Technology – Hellas); Nikolaos Tachos (University of Ioannina)	BSN Special Session Non-Contact Technologies for Pervasive Healthcare Chair: Sarah Sun, (Michigan Technological University)	BSN Special Session Digital Biomarkers for Monitoring and Predicting Upper Limb Recovery After Stroke Chair: Christoph M. Kanzler (Singapore-ETH Centre and ETH Zurich)
17:10-18:10	BHI Session Bioinformatics Chairs: Barbara Di Camillo (University of Padova), Konstantinos Marias (Hellenic Mediterranean University and Foundation for Research & Technology Hellas)	BHI Special Session Al-driven Informatics and Technologies for Cardiovascular Care using multi-modal data from EMRs and/or Wearables Chairs: Bobak Mortazavi (Texas A&M University); Wenyao Xu (University at Buffalo)	BSN Special Session New Technologies for the Future of Prenatal Health Chair: Julien Penders (Bloomlife)	BSN Special Session Wearable solutions for continuous, efficient and accurate lung monitoring for innovative diagnostics in lung related chronic diseases Chair: Rita Paradiso (Smartex S.r.l.)
18:10-18:40		Poster Ses Chair: Ivan lee (University o		
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Friday, July 30, 2021 Schedule				
TIME (CET) Conference Sessions: 12:30 - 19:00 (CET)				
40.00.40.00	Poster Session # 5			
12:30-13:00	Chair: Shyamal Patel (Oura Health)			
13:00-14:00	BHI Special Session Real World Data analytics supporting High Value Care	BHI Session Sensor Informatics and Machine Learning	BSN Special Session Wearable Sensing for Detecting and Monitoring Shock	BSN Session Novel Sensing Solutions for Long-Term Monitoring
	Chairs: Fernando Seoane (Karolinska Institutet); Vicente Traver (Universitat Politècnica de Valencia)	Chairs: Themis Exarchos (Ionian Univ), Fahmi Khalifa (Mansoura University)	Chair: Brian Telfer (MIT Lincoln Laboratory)	Chairs: Valeria De Luca (Novartis); Jeffrey Palmer (MIT Lincoln Laboratory)
14:00-14:30	Keynote Lecture: "Digital Health Technology – leveraging real-world insights in mobility" Lynn Rochester, Newcastle University, UK Chair: Paolo Bonato (Harvard Medical School), USA			
14:30-15:00	Keynote Lecture: "Leveraging Electronic Health Records for Precision Health" Marylyn D. Ritchie, University of Pennsylvania School of Medicine, USA Chair: Benny Lo (Imperial College London), UK			
15:00-15:05			Break	
15:05-16:05	Industry panel Topic: "The Evolution of AI products/services in medical informatics" Chair: Julien Penders, Bloomlife, USA Guests: Ilkka Korhonen, CTO at Firstbeat Technologies, Tampere Area, Finland; Christine Miyachi, IEEE Future Directions Committee Chair and Nuance Communications, USA; Andreas Persidis, Biovista, Greece; Ming Jack Po, Ansible Health, USA; Hosain Rahman, Jawbone Health, USA			
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16:05-16:10			Break	whome Health, OOA
16:05-16:10 16:10-17:10	BHI Special Session Mobile Digital Solutions in Patient Care Chairs: Galina Ivanova (University of Leipzig, Medical Faculty, ICCAS); Georgios Raptis OTH Regensburg, University of		Break BSN Special Session Recent Advances in Wearable and Implantable Electronics and Circuits Chairs: Wen Li (Michigan State University); Yaoyao Jia (North Carolina State	BSN Special Session Toward Artificial General Intelligence for Wearable Systems Chair: Hassan Ghasemzadeh (Washington State University)
	Mobile Digital Solutions in Patient Care Chairs: Galina Ivanova (University of Leipzig, Medical Faculty, ICCAS); Georgios Raptis OTH Regensburg, University of Applied Sciences) BHI Special Session Healthcare Analytics. Improving Healthcare outcomes using Multimedia Big Data Analytics Chairs: Imran Razzak (Deakin University); Guandong Xu, (University of Technology, Sydney); Peter	BHI Session Imaging Informatics Chairs: Ehsan Adeli, (Stanford University); Huazhu Fu (Inception Institute of Artificial	Break BSN Special Session Recent Advances in Wearable and Implantable Electronics and Circuits Chairs: Wen Li (Michigan State University); Yaoyao Jia	BSN Special Session Toward Artificial General Intelligence for Wearable Systems Chair: Hassan Ghasemzadeh
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Keynote Speakers

Wearable "SUPER-MINDS" for the Precision Control of CVDs and COVIDs

Date: Wednesday, July 28, 2021

Time: 15:05-15:35



Prof. Yuan-Ting Zhang Hong Kong Center for Cerebro-cardiovascular Health Engineering (COCHE), HK

Abstract: The cardiovascular diseases (CVDs) and coronavirus diseases (COVIDs) are the most current pressing health challenges globally today. This talk will attempt to address the grand challenges through the paradigm shift to Health Informatics and discuss the convergence approach to integrate technologies across multiple scales in the biological hierarchy from molecular, cell, organ to system for diseases prevention. The presentation will focus on the development of wearable 'SUPER-MINDS' technologies and their integrations with unobtrusive sensing, biomarker detection, biomedical imaging and machine learning for the early prediction of acute CVDs. Potential applications in the fast response and precise control of COVID-19 will also be discussed. Using the atherosclerotic plaque assessment as an example, this talk will illustrate that the health convergence approach should allow the practice of 8- P's proactive medicine that is predictive, preventive, precise, pervasive, personalized, participatory, preemptive, and patient-centralized.

Bio: Dr. Yuan-Ting Zhang is currently the Chairman and Director/CEO of Hong Kong Center for Cerebro-cardiovascular Health Engineering (COCHE) at the HKSTP and the Chair Professor of Biomedical Engineering at City University of Hong Kong. He is a LRG member of Karolinska Institutet MWLC. He was the Sensing System Architect in Health Technology and Sensing Hardware Division at Apple Inc., California, USA, and the founding Director of the Key Lab for Health Informatics of Chinese Academy of Sciences. Professor Zhang dedicated his service to the Chinese University of Hong Kong from 1994 to 2015 in the Department of Electronic Engineering, where he served as the first Head of the Division of Biomedical Engineering and the founding Director of the Joint Research Center for Biomedical Engineering and developed the Bachelor, Master and PhD degree Programmes all in Biomedical Engineering.

Simplifying interpretation and acquisition of ultrasound scans

Date: Wednesday, July 28, 2021

Time: 15:55-16:25



Prof. Alison Noble Professor in Biomedical Engineering, University of Oxford, UK

Abstract: With the increased availability of low-cost and handheld ultrasound probes, there is interest in simplifying interpretation and acquisition of ultrasound scans through deep-learning based analysis so that ultrasound can be used more widely in healthcare. However, this is not just "all about the algorithm", and successful innovation requires inter-disciplinary thinking and collaborations.

In this talk I will overview progress in this area drawing on examples of my laboratory's experiences of working with partners on multi-modal ultrasound imaging, and building assistive algorithms and devices for pregnancy health assessment in high-income and low-and-middle-income country settings. Emerging topics in this area will also be discussed.

Bio: Professor Alison Noble FRS is currently the Technikos Professor in Biomedical Engineering, at the University of Oxford, UK and former Director of the Oxford Institute of Biomedical Engineering (2012-16) and a former Associate Head of the Mathematical, Physical and Life Sciences Division (2016-19.)

Alison's research focuses on ultrasound imaging, and computational analysis of images, motivated by unmet clinical needs in global healthcare settings. She received the Royal Society Gabor Medal for her inter-disciplinary research contributions in 2019, and the same year received the MICCAI Society Enduring Impact award. She is a current European Research Council Advanced Grant holder, and has held or currently holds grants from the UKRI, NIHR, Wellcome Trust, NIH, and the Bill and Melinda Gates Foundation. She has supervised 69 graduated PhD students (19 women), and has a sustained track record of mentoring early career researchers at Oxford and on national schemes.

Alison serves on numerous national and international advisory boards. She served on the MICCAI Society board for a decade and is a former President of the MICCAI Society (2013-5). She is an active Fellow of the Royal Academy of Engineering and of the Royal Society, and received an OBE for services to science and engineering in the Queen's Birthday Honours list in June 2013.

Improving Consideration of Social and Cognitive Behaviors in Advancing Informatics Technologies for Health Care

Date: Thursday, July29, 2021

Time: 14:00-14:30



Prof. Vimla L Patel
Director of the Center for Cognitive Studies in Medicine and Public Health at the New York Academy of
Medicine. USA

Abstract: The modern landscape is being shaped by complex converging forces that will cause shifts in how we deliver and use health care. As we embrace inevitable technological advances, social and cognitive factors will need to be a major part of the discussion, with a focus on the users of the technical innovations. Current efforts to advance this goal have already started. However, there is still a disparity between the users' knowledge and expectations of the technical systems being introduced and their lay beliefs, limited mental models of the technology, and their cognitive representations of illness and disease. Social cognition is predicated upon the belief that both patients and clinicians are predisposed to see the world in individualized ways that shape their behavior and decision-making. These factors are too often misunderstood or ignored in the design and evaluation of engineering systems. A major challenge for health informatics in the future will be to generate evidence-based information about how people process medical and health-related information, with and without supporting technologies. There will be a much greater need for collaborative efforts among scientists (biomedical, cognitive, and social), practitioners, and engineers, as they design and implement systems, if we are to offer technologies

that are embraced and thereby reshape the future of our healthcare for a better quality of life. I will address some of these issues with examples from cognitive informatics studies, which influence users' behavior as they interact with health care technology.

Bio: Vimla L Patel is a Senior Research Scientist and Director of the Center for Cognitive Studies in Medicine and Public Health at the New York Academy of Medicine. She is also an adjunct Professor of Biomedical Informatics at Columbia University and the College of Health Solutions at Arizona State University (ASU). A graduate of McGill University in Montreal, Dr. Patel was a Professor of Medicine and Psychology and Director of McGill Cognitive Science Center. From 2007-2009, she served as the Professor and Chair of Biomedical Informatics in the Ira Fulton School of Engineering at ASU. Her early research related to cognitive mechanisms underlying expertise and medical decision-making. Her studies over the past two decades are on decision support technology and errors in complex clinical environments, addressing the role of cognition in biomedical informatics (human-computer interaction, cognitive design, distributed cognition, and team decision making) for a safer clinical workplace.

Soft, Wearable Systems with Integrated Microfluidics and Biosensors for Remote Health Monitoring

Date: Thursday, July 29, 2021

Time: 14:30-15:00



Prof. Roozbeh Ghaffari Northwestern University, USA

Abstract: Soft bio-electronics and microfluidics, enabled by recent advances in materials science and mechanics, can be designed with physical properties that approach the mechanical properties of human skin. These systems are referred to as epidermal electronics and epifluidics by virtue of their stretchable form factors and soft mechanics compared to conventional packaged electronics and sensors. Here, we present an overview of recent advances in novel materials, mechanics, and designs for emerging classes of fully-integrated epidermal electronics and soft microfluidic systems. These devices incorporate arrays of sensors, microfluidic channels and biochemical assays, configured in ultrathin, stretchable formats for continuous monitoring of electro-chemical signals and biophysical metrics. Quantitative analyses of strain distribution and circuit performances under mechanical stress highlight the utility of these wearable systems in clinical and home environments. We will conclude with representative examples of these wearable systems, which have entered the commercialization phase of deployment.

Bio: Dr. Ghaffari is co-founder and CEO of Epicore Biosystems, Inc., a company developing a proprietary wearable microfluidic sensing platform. He also serves as an Associate Research Professor in the Department of Biomedical Engineering at Northwestern University, and is Director of Translational Research at the Querrey-Simpson Institute for Bioelectronics. Dr. Roozbeh Ghaffari holds BS and MEng degrees in electrical engineering from the Massachusetts Institute of Technology. He received his PhD in biomedical engineering from the Harvard Medical School-MIT Program in Health Sciences and Technology. Upon completion of his PhD, Dr. Ghaffari co-founded MC10 Inc (acquired by Medidata Inc), and served as Chief Technology Officer. In this role, Dr. Ghaffari led the development and commercial launch of the BioStamp health monitoring platform. Dr. Ghaffari's contributions in soft bioelectronics, micro/nano-scale systems, and auditory neuroscience research have been recognized with the Helen Carr Peake PhD Research Prize, MIT 100K Grand Prize, and MIT Technology Review Magazine's Top 35 Innovators Under 35. He has published over 100 academic papers and is inventor on over 50 issued patents.

Digital Health Technology - leveraging real-world insights in mobility

Date: Friday, July 30, 2021

Time: 14:00-14:30



Prof. Lynn Rochester Newcastle University, UK

Abstract: Mobility is important – the last year has brought this into sharp focus. Mobility is not only a target for intervention, subtle features of mobility (such as how fast someone walks and how variable their steps are) provide us with a window into the brain and body and an indicator of health. As a clinician, mobility has been my focus. In particular, how do we keep people with neurodegenerative disease such as Parkinson's – mobile and safe? This propelled me towards the scientific study of gait – a key feature of mobility. The last 10 years have seen a revolution in digital technology (such as wearables and mobile devices) advancing the study of mobility. Implementing technology in the real-world allows further insights into health previously unobtainable and a 'living-lab' approach to study and treat mobility loss. Continuous monitoring captures the challenges of mobility that play out in real-time at the intersection between personal, contextual and environmental demands and bring a personalized focus to healthcare. However, large scale implementation of real-world mobility assessment and treatment, although promising, remains tantalizingly out of reach. This talk will focus on experiences and insights using digital technology to quantify mobility in Parkinson's disease, explore challenges to extract meaningful insights from continuous real-world mobility data, and highlight future

possibilities. Throughout I will draw on my own experience using digital technology and leverage insights from the work of the Mobilise-D consortium (https://www.mobilise-d.eu/), a large international effort to translate real-world mobility assessment to research and healthcare.

Bio: Lynn Rochester is Professor of Human Movement Science at Newcastle University. She is the Specialty Cluster Lead for the National Institute for Health Research (NIHR) Clinical Research Network providing strategic oversight of research delivery in ageing, neurodegenerative disease, dementia, genetics and neurological disorders and, oversees the flagship NIHR-INCLUDE Project (https://sites.google.com/nihr.ac.uk/include/home). Lynn's research interests focus on understanding and mitigating mobility loss in ageing and neurodegenerative disease and, conversely, what mobility can tell us about brain health. To deliver these interests she leads the Brain and Movement Research Group (BAM) (https://bam-ncl.co.uk/) – comprised of a multidisciplinary team of clinicians, clinical and data scientists and clinical engineers. In recognition of her research leadership, she holds an NIHR Senior Investigators award.

Leveraging Electronic Health Records for Precision Health

Date: Friday, July 30, 2021

Time: 14:30-15:00



Prof. Marylyn D. Ritchie
Professor in the Department of Genetics, Director of the Center for Translational Bioinformatics, Associate
Director for Bioinformatics in the Institute for Biomedical Informatics, University of Pennsylvania School of
Medicine, USA

Abstract: Biomedical data science has experienced an explosion of new data over the past decade. Abundant genetic and genomic data are increasingly available in large, diverse data sets due to the maturation of modern molecular technologies. Along with these molecular data, dense, rich phenotypic data are also available on comprehensive clinical data sets from health care provider organizations, clinical trials, population health registries, and epidemiologic studies. The methods and approaches for interrogating these large genetic/genomic and clinical data sets continue to evolve rapidly, as our understanding of the questions and challenges continues to develop. Through applying bioinformatics, statistics, and machine learning approaches to the rich phenotypic data of the EHR, these data can be mined to identify new and interesting patterns of disease expression and relationships. We have been exploring various translational bioinformatics technologies for evaluating the phenomic landscape to improve our understanding of complex traits. These techniques show great promise for the future of precision medicine and precision health.

Bio: Marylyn D. Ritchie, PhD is a Professor in the Department of Genetics, Director of the Center for Translational Bioinformatics, Associate Director for Bioinformatics in the Institute for Biomedical Informatics at the University of Pennsylvania School of Medicine. Dr. Ritchie is also Associate Director for the Penn Center for Precision Medicine. Dr. Ritchie is a translational bioinformatics scientist, biomedical informatician, and computational human geneticist with a focus on developing novel approaches for understanding the relationship between our genome and human phenotypes. Dr. Ritchie has over 20 years of experience in the analysis of complex data and has authored over 350 publications. Dr. Ritchie has received several awards and honors including selection as a Genome Technology Rising Young Investigator in 2006, an Alfred P. Sloan Research Fellow in 2010, a KAVLI Frontiers of Science fellow by the National Academy of Science from 2011-2014, and she was inducted as a fellow of the American College of Medical Informatics in 2020. Dr Ritchie is also the host of two podcasts: she co-hosts The Biomedical Informatics Roundtable podcast with Dr. Jason Moore and she is the solo host of The CALM Podcast: Combining Academia and Life with Marylyn.

Large networks of disease-disease interactions at the medical and molecular level

Date: Friday, July 30, 2021

Time: 18:10-18:40



Prof. Alfonso Valencia ICREA Research Professor and Director of the Life Sciences Department, Barcelona Supercomputing Centre, Spain

Abstract: Biomedicine is confronting significant challenges for the handling and analysis of large data sets, among them a particularly relevant one is the interaction between diseases, i.e. disease comorbidities. Comorbidities are an important medical and social problem that demands an interpretation of the underlying physiological causes, as a necessary step to progress in its management and control. As a first step in this direction, we have analysed two complementary data sets, one composed by a large collection of expression data (RNAseq data 72 human diseases analysed by 107 studies, including a total number of 4.267 samples, from the GREIN platform) the other one base on medical records from three different medical systems (Blumenau, Brazil; Catalonia, Spain; and Indianapolis, United States) or from previous publications (Hidalgo *et al.* 2009 and Jensen *et al.* 2014). With this information, we have constructed two disease-disease interaction networks, one reflecting real-world medical associations and the other the similarities of the molecular profiles of patients of different diseases. Interestingly,

the two networks have striking similarities in terms of their organization and characteristics. More importantly, we can show for the first time that most disease interactions have a counterpart at the molecular level. This molecular relationship can be translated into detailed molecular basis of specific disease interactions. I will discuss the implications of these results for the interpretation of diseases interactions at the level of specific genes and pathways, as well as the potential consequences for the management of disease comorbidities.

Based on the work of: Beatriz Urda-García, Jon Sanchez, Rosalba Lepore at BSC.

Bio: Alfonso Valencia is a Biologist by training with a Ph.D. in Biochemistry and Molecular Biology by the Universidad Autónoma de Madrid. He is ICREA Research Professor and Director of the Life Sciences Department at the Barcelona Supercomputing Centre (BSC), Director of the Spanish National Bioinformatics Institute (INB) and head of the Spanish Node of the European Bioinformatics Infrastructure ELIXIR. He is a member of the European Molecular Biology Organisation (EMBO), and former President of the International Society for Computational Biology (ISCB). He was honoured as ISCB-Fellow in 2010.

Clinical/Translational Panel

Advances and Trends in use of Informatics in Clinical Practice

Chair: Athanasios Tzioufas, National and Kapodistrian University of Athens, Greece

Date: Wednesday, July 28, 2021

Time: 16:30-17:30



Doris-Eva Bamiou, Professor in Neuroaudiology – UCL Ear Institute, UK **Title of Presentation**: Trends in telerehabilitation for balance patients



Elazer R. Edelman MD PhD FACC, Edward J. Poitras Professor, Medical Engineering and Science, Director, Institute for Medical Engineering and Science, Massachusetts Institute of Technology, Professor of Medicine, Harvard Medical School, Senior Attending Physician, Brigham and Women's Hospital, USA

Title of Presentation: In Silico Medicine: Al in Cardiovascular Devices – Evolution / Revolution Elazer R. Edelman, is the Director of the Institute of Medical Engineering and Science at the Massachusetts Institute of Technology where he is also Director of the Clinical Research Center, and the current occupant of the Edward J. Poitras Chair as Professor of Medical Engineering and Science. At Harvard Medical School he is Professor of Medicine, and Senior Attending Physician in the cardiac intensive care unit at Brigham and Women's Hospital.



Maria Teresa Arredondo, Universidad Politécnica de Madrid, Spain
Title of Presentation: Towards data driven decision making in clinical practice for better health and well-being



Norbert Graf, Saarland University, Dep. Pediatric Oncology and Hematology, Germany **Title of Presentation:** View on clinical informatics from a clinical perspective



Peter Stone, MD, Director, Vascular Profiling Research Group, Division of Cardiovascular Medicine, Brigham & Women's Hospital, Harvard Medical School, Boston, MA, USA

Title of Presentation: Coronary Plaque Anatomic and Biomechanical Variables Are Synergistic for Prognostication of Individual Plaque Progression, Destabilization, or Quiescence: Mechanisms and Detection

Regulatory Panel

Regulatory issues for medical devices

Chair: Nenad Filipovic, University of Kragujevac, Serbia

Date: Thursday, July 29, 2021

Time: 15:05-16:05



Kevin Fu, Center for Devices and Radiological Health (CDRH), Office of Strategic Partnerships and Technology Innovation (OST), U.S. Food and Drug Administration

Title of Presentation: Medical Device Security, USA

Kevin Fu is Associate Professor of EECS at the University of Michigan where he directs the Security and Privacy Research Group (SPQR.eecs.umich.edu). During 2021, Fu is also Acting Director of Medical Device Cybersecurity at FDA's Center for Devices and Radiological Health (CDRH) and Program Director for Cybersecurity, Digital Health Center of Excellence (DHCoE). He is most known for the original 2008 cybersecurity research paper showing vulnerabilities in an implantable cardiac defibrillator by sending specially crafted radio waves to induce uncontrolled ventricular fibrillation via an unintended wireless control channel. https://www.secure-medicine.org/hubfs/public/publications/icd-study.pdf The prescient research led to over a decade of revolutionary improvements at medical device manufacturers, global regulators, and international healthcare safety standards bodies just as ransomware and other malicious software began

to disrupt clinical workflow at hospitals worldwide.

Kevin was recognized as an IEEE Fellow, Sloan Research Fellow, MIT Technology Review TR35 Innovator of the Year, Fed100 Award recipient, and recipient of an IEEE Security and Privacy Test of Time Award. Fu has testified in the U.S. House and Senate on matters of information security and has written commissioned work on trustworthy medical device software for the U.S. National Academy of Medicine. He co-chaired the AAMI cybersecurity working group to create the first FDA-recognized standards to improve the security of medical device manufacturing. He founded the Archimedes Center for Healthcare and Device Security (secure-medicine.org). He is a founding member of the N95decon.org team for emergency reuse decontamination of N95 masks during PPE shortages. Fu served as a member of the U.S. NIST Information Security and Privacy Advisory Board and federal science advisory groups. Eleven years ago, Fu served as a visiting scientist at the U.S. Food & Drug Administration. Fu received his B.S., M.Eng., and Ph.D. from MIT. He earned a certificate of artisanal bread making from the French Culinary Institute and is an intermediate level salsa dancer.



Nicholas Petrick, U.S. Food and Drug Administration, Center for Device and Radiological Health, USA

Title of Presentation: A brief introduction to medical device regulation

Nicholas Petrick is Deputy Director for the Division of Imaging, Diagnostics and Software Reliability at the Center for Devices and Radiological Health, U.S. Food and Drug Administration and is a member of the FDA Senior Biomedical Research Service. The Division of Imaging, Diagnostics and Software Reliability Division conducts regulatory research in medical imaging physics and image analysis techniques to optimizing medical image interpretation. Dr. Petrick received his Ph.D. from the University of Michigan in Electrical Engineering-Systems and is a Fellow of the Americana Institute of Medical and Biomedical Engineering and SPIE. His current research focuses on quantitative imaging, medical artificial intelligence and the robust assessment methods for a range of medical imaging hardware systems and medical artificial intelligence tools.



Yiannos Tolias, Legal Lead Al and Al liability in healthcare, DG SANTÉ, European Commission, Belgium

Title of Presentation: Challenges in developing and deploying AI in healthcare

Yiannos is a legal lead on Al liability and Al in healthcare in DG SANTE (Health and Food Safety) in the European Commission. He was a Senior Emile Noel Fellow at NYU Law School working on a project on machine learning in medicine and law. Prior to joining the European Commission, he was an Assistant Professor of EU law at the Universities of Edinburgh and Dundee. He holds a Ph.D. in EU Constitutional law from the University of Edinburgh and was a Post-doctoral Research Fellow at the Institute for Advanced Studies in the Humanities (Edinburgh University).



Andreas Melzer, University of Leipzig, Germany

Industry Panel

The Evolution of Al products/services in medical informatics

Chair: Chair: Julien Penders, Bloomlife, USA

Date: Friday, July 30, 2021

Time: 15:05-16:05



Andreas Persidis, CEO, Bioviasta Inc., Greece, USA

Title of Presentation: Augmented Network Intelligence in support of complex medical challenges



www.christinemiyachi.com

Christine Miyachi, IEEE Future Directions Committee Chair, USA

Title of Presentation: Learn how Nuance is using Al to help solve sub-optimal patient care, clinician burnout and missed reimbursement and financial pressures by automating Electronic Health Record creation.

Christine Miyachi is an experienced software architect and technical manager, and her career spans working for large companies like Xerox, and several startups. She is a Software Development Manager at Nuance Communications where she works on AI systems for healthcare. After serving several leadership and editorial roles at the IEEE, she currently is chair of IEEE Future Directions Committee (https://www.ieee.org/about/technologies.html). In addition, she writes a blog about software architecture: http://abstractsoftware.blogspot.com/. Miyachi graduated from the University of Rochester with a BS in electrical engineering. She holds two MIT degrees: an MS in technology and policy/electrical engineering and computer science and an MS in System Design and Management. See more about Chris at



Hosain Rahman, Jawbone Health, USA

Title of Presentation: Integrated Continuous Monitoring

Hosain Rahman is the CEO and Founder of all.health. All.health is delivering the world's leading end-to-end proactive and preventative healthcare platform using continuous health information combined with human and machine intelligence. Previously Hosain was the CEO and Co-Founder of Jawbone, a world-leader in consumer technology products, where he led the creation of several large new categories through the industry defining products including the world's first smart Bluetooth headset, the Jawbone headset, the world's first, mobile wireless smart speaker, the JamBox, and the world's first wrist-based wearables, the UP line of health trackers. Hosain has been honored in: Fast Company's Most Creative People, Vanity Fair's New Establishment, and Fortune's 40 Under 40. In 2014 he was named a Young Global Leader by the World Economic Forum and was named one of Time Magazine's 100 most influential people in the



Ilkka Korhonen, Firstbeat Technologies Oy, Jyväskylä, Finland; and Tampere University, Tampere, Finland

Title of Presentation: Supporting employee health with wearable data and intelligent analytics

CTO at Firstbeat Technologies Ltd. >30y expertise in HealthTech, wearables, algorithms and sensing technology, research and translating research into products, partner relations and business development. Passionate health tech pioneer committed to make the consumer as a central user of health information and to use health tech to transform our behaviors to promote health and happiness. Also, earlier, scientific research as a professor in ICT for health with special focus on personal health systems, eHealth/mHealth, biosignal interpretation, health monitoring and wearable health sensors, and even decision making based on sensor data in critical care and anesthesia. Several patents and inventions, contribution to several product launches and business and concept design of commercialized products even during research years. >20y experience in management of relations to international industrial partners (IT, medical technology, ODM/OEM) and health and social care partners (hospitals, healthcare and research institutions). Special strengths in multidisciplinary collaborating, strong and proven ability to efficiently manage and inspire complex networks of divergent skills. >200 international scientific publications, founding member of IEEE EMBS TC on Wearable Biomedical Sensors and Systems, member of IEEE EMBS TC for Biomedical and Health Informatics, and Senior Member in IEEE EMBS.



Ming Jack Po, MD, PhD, CEO and founder of Ansible Health

Title of Presentation: Does Al matter in medicine?

Ming Jack Po, MD, PhD, is the CEO and founder of Ansible Health, a venture-backed startup focused on home based chronic care management, starting with COPD. Prior to his current role, he was a product manager at Google working in Healthcare and Machine Learning. At Google, he has led teams in Health, Research, Cloud, as well as in Search. Prior to joining Google, Jack spent a decade working in different senior operating and venture capital roles in areas related to medical devices, healthcare delivery, and Global Health. Jack is a respected thought leader in the fields of Healthcare IT, Healthcare Delivery, Machine Learning, and BioDesign and he continues to teach and mentor students at Columbia University and Johns Hopkins University. In addition, Jack is currently a board member of El Camino Health System, a trustee of the Austen Riggs Center, a board member of AcademyHealth, a member of the NIH's National Library of Medicine's Board of Scientific Counselors, and a member of the ONC's Interoperability Standards Priorities Task Force.

Jack received his M.D. and Ph.D. from Columbia College of Physicians and Surgeons and from the Department of Biomedical Engineering at Columbia University's Fu School of Engineering. He received his M.A. in mathematics, and his B.S. in Biomedical Engineering and Computer Science from Johns Hopkins University.

Featured Session

Pandemic Mitigation by Modeling and Informatics: Lesson Learned from COVID-19

Chair: Constantinos S. Pattichis, Univ. of Cyprus, Cyprus

Date: Wednesday, July 28, 2021

Time: 17:30-18:00



Prof George Panos, BSc(Biomed. Eng.), CEng, MIET, MD, PhD, DTM&H(Lon), FRCP. Former Professor, Internal Medicine, School of Medicine of the University of Cyprus and at the Nicosia General Hospital Internal Medicine Clinic, USA

Title of Presentation: Technological Challenges to assist in the clinical management towards the Pandemic Response

Abstract: COVID-19 pandemic created tremendous pressure of patient load on the health systems and especially in hospitals challenging their ability to effectively monitor COVID-19 inpatients disease progression and provide the appropriate treatment in a timely manner. Approximately 4% of COVID 19 positive patients need hospitalization and of these an estimated 2.5% end up in ICUs and Units for Special Care. Technological challenges to record and manage the mounting epidemiological and clinical data which ultimately translated to patients' health, inevitably led to the design and implementation of a unified electronic surveillance and management platform almost immediately by the medical and engineering community that ingeniously utilized technological devices and IT solutions to deliver a real time web based covid-19 electronic health record. This covid-19 eHealth platform is categorized in three main sections a)

Demographics, allergies, comorbidities, symptoms and date of symptoms onset including a self-assessment of symptom severity development by time and date, vital signs, oxymetry, current medication b) Hospital admission details (bed/ward/department), patient summary and continuous cumulative graph depictions of vital signs, oxygen status (oximetry SpO2/FiO2 and/or blood gases pO2/FiO2) and scoring systems (e.g. Acute Respiratory Distress Syndrome, Modified Early Warning System and Glasgow Coma Scale), ECG-QTc estimation c) Daily comprehensive real-time web based COVID-19 electronic health record (patient history, clinical examination, lab exams, treatment regimens) with simple timeline statistical permutation depictions.



Professor Joshua S Weitz, Tom and Marie Patton Professor of Biological Sciences, Georgia Institute of Technology, USA

Title of Presentation: Modeling, Interventions, and the Ongoing Need for Pandemic Response and Mitigation Instruments

Abstract: The Covid-19 pandemic continues to impact the health and well-being of communities all across the globe. From the outset, epidemic theory and models have played a key role in advancing understanding of the potential threat and in shaping public health responses. In this talk, I will highlight both near- and long-term challenges in controlling Covid-19. In doing so, I will focus on efforts to characterize non-canonical features of spread (including gathering-associated risk, behavioral feedback, and the impacts of heterogeneity) as well as efforts to use testing (including PCR and serological tests) as a means to mitigate and control spread. In closing, I will also highlight lessons learned and

ongoing opportunities for use-inspired theory and modeling initiatives to enhance response, decision-making, and mitigation instruments.

IEEE BHI-BSN 2021 Workshops

All workshops will be held on Tuesday, July 27, 2021.

Title: Assessing credibility of in silico trials for regulatory purposes

Organizers: Marco Viceconti, University of Bologna, Italy; Liesbet Geris, University of Liege, Belgium

Short Description: The use of modelling and simulation to evaluate the safety and efficacy of new medical products, usually referred to as In Silico Trials, is moving from the research labs to a concrete industrial reality. Probably the biggest barrier in this translation from research to innovation is the lack of a specific regulatory science to evaluate the credibility of this predictive model when used to assess medical products such as drugs or medical devices. This workshop provides an update on the latest developments in the field, by some of the leading experts.

Title: Trends, challenges and opportunities for the Hospital of the Future

Organizers: Maria Teresa Arredondo and Giuseppe Fico, Universidad Politécnica de Madrid (UPM), Spain

Short Description: New global challenges are demonstrating that high levels of collaboration are required for interconnected societies to face emergencies and crisis. In this context, rethinking and reshaping the role of hospitals as physical and virtual spaces is a fundamental need that National Healthcare System are called to lead. However, hospital management is not data-driven yet, clinical and logistic processes work substantially in silos.

Title: Big data and artificial intelligence in cancer imaging

Organizers: Prof. Karim Lekadir, Universitat de Barcelona, Spain; Prof. Luis Martí-Bonmatí, La Fe University, Spain; Prof. Manolis Tsiknakis, FORTH, Greece; Mrs. Gianna Tsakou, Athens R&D Lab of Maggioli S.P.A., Italy

Short Description: Artificial Intelligence (AI) offers substantial opportunities for healthcare, supporting better diagnosis, treatment, prevention and personalised care. Analysis of health images is one of the most promising fields for applying AI in healthcare, contributing to better prediction, diagnosis and treatment of cancer. In order to develop and test reliable AI applications in the field, access to large-volume of high- quality data is needed.

The organizers of the workshop are the coordinators of the four projects that have recently been funded by the EC in the context of a relevant H2020 call (H2020-SC1-FA-DTS-2019-1 – AI for Health Imaging) CHAIMELEON (https://chaimeleon.eu/), EuCanImage (https://eucanimage.eu/), INCISIVE (https://incisive-project.eu/), ProCancer-I (https://www.procancer-i.eu/) and the PRIMAGE (https://www.primageproject.eu/) a relevant R&D project funded in a previous H2020 call.

The projects are seeking to establish large interoperable repositories of health images, enabling the development, testing and validation of Al-based health imaging solutions to improve diagnosis, disease prediction and follow-up of the most common forms of cancer. The ongoing collaboration and information exchange among the projects so far has highlighted several areas where common approaches and consensus building should be seeked by the five projects and even beyond by the wider scientific community, in order to achieve interoperability. Similarly, it has led to the identification of significant technical and methodological challenges that need to be addressed in designing and exploiting such interoperable cancer imaging data spaces.

The workshop will provide a detailed report of the collaboration opportunities and challenges identified so far; it will also present current approaches towards consensus building and critically discuss alternatives. Particular emphasis will be given to the issues related to the evaluation of Al-based diagnostic imaging algorithms including robustness, trust and explainability.

Title: Integrating Gender perspective in Science, Technology and Innovation

Organizers: Maria Fernanda Cabrera-Umpierrez, Life Supporting Technologies – Universidad Politecnica de Madrid (Spain); Yolanda Ursa, INMARK, Spain

Short Description: The goal of this workshop is to address the challenge of integrating the gender perspective in science, technology, and innovation (STI) in international cooperation and work towards gender equality discussing about a strategy to promote equality in scientific careers, gender balance in decision making and the integration of the gender dimension in R&I content.

IEEE BHI-BSN 2021 Workshops

All workshops will be held on Tuesday, July 27, 2021.

Title: Machine Learning based decision support system for early-stage prediction of complications and risk stratification of COVID 19 patients

Organizers: Luca Romeo, Michele Bernardini, Emanuele Frontoni, Dep. of Information Engineering (DII), Università Politecnica delle Marche, Ancona (Italy); Jonathan Montomoli, Dep. of Intensive Care, Hospital Infermi, Rimini Dep. of Intensive Care Medicine, Erasmus medical Center, Rotterdam, Netherlands; Maggie Cheng, Illinois Institute of Technology, USA; Farshad Firouzi, Duke University, USA

Short Description: During the COVID-19 emergency, intensive care achieved its limit, and the doctors were forced to choose their ICU patients who have the best chance for survival. This worldwide emergency highlighted the need to define a predictive care model capable of providing an accurate estimate of resources and preventive medicine. The analytical capability of machine learning (ML) methods has proven to be extremely accurate and in some cases superior to classical statistical approaches for solving this task. This WS aims to cover all aspects related to ML methodologies for providing risk profiles of the individual patients from which a different intensity of care can be deduced.

Title: Real-world digital mobility assessment

Organizers: Andrea Cereatti, Politecnico di Torino, Italy; Silvia Del Din, Newcastle University, UK; Felix Kluge, Friedrich-Alexander University Erlangen-Nürnberg, Germany

Short Description: Mobility is impaired in various chronic health conditions. The ongoing development of digital measures for mobility assessment using wearable inertial sensor systems aims at capturing real-world walking performance. This enables monitoring of health status, disease progression, and evaluation of interventions in a patient's ecological environment. However, walking assessment in non-standardized environments poses challenges in terms of technology, usability, and validity of digital measures that can be used for disease stage quantification with the ultimate goal of regulatory approval.

Title: Al4US: Unlocking the potential of Artificial Intelligence for Ultrasound image processing

Organizers: Sara Moccia, PhD – The BioRobotics Institute and Department of Excellence in Robotics and AI, Scuola Superiore Sant'Anna, Pisa, Italy; Prof. Emilio Filippucci, MD, PhD – Rheumatology Unit, Department of Clinical and Molecular Sciences, "Carlo Urbani" Hospital, Jesi, Italy; Maria Chiara Fiorentino – Department of Information Engineering, Università Politecnica delle Marche, Ancona, Italy; Prof. Emanuele Frontoni, PhD – Department of Information Engineering, Università Politecnica delle Marche, Ancona, Italy

Short Description: The goal of the AI4US workshop is to group expert AI researchers in US-image analysis to discuss the most recent research work and highlight current challenges and needs. AI4US aims at bridging the gap among universities, hospitals, enterprises, and stakeholders to draw a roadmap for future AI applications in the field.

The intended audience of AI4US ranges from PhD students and resident doctors that are approaching the challenges of US image analysis with AI, to experienced researchers that may be interested in knowing the latest breakthrough research. Graduate students in biomedical engineering, computer science and medicine may benefit from the invited speakers' presentations highlighting the current research work being done on AI for US image analysis.

Title: Soldier Digital Phenotyping

Organizers: Karl E. Friedl & Reed W. Hoyt, U.S. Army Research Institute of Environmental Medicine, Natick, Massachusetts, USA

Short Description: Real time physiological monitoring of individual soldiers (digital phenotyping) provides actionable information from wearable sensors, standoff detection, and contextual data (internet of soldier things) to inform virtual teammates (humanized technology), protect soldier health and performance, and provide decision support tools. The development of sensor systems and algorithms for use in extreme and austere environments will be discussed

Title: Predicting quality of life with multimodal data

Organizer: Valeria De Luca, Novartis Institutes for Biomedical Research, Switzerland; Ieuan Clay, Evidation Health, USA

Short Description: The field of digital health has become a multi-billion-dollar market, powering a paradigm shift in the continuous capture of multimodal data including activity, sleep, heart rate variability and contextual information. Novel machine learning applications are pioneering the conversion of these multimodal data into measures of quality of life, capturing symptoms like fatigue, stress, and depression. These insights will result in better understanding of the patient's lived experience and better medicines.

Wednesday, July 28

12:30:00 PM - 13:00:00 Poster Session # 1 Chair: Misha Pavel

Towards Explainable Abnormal Infant Movements Identification: A Body-part Based Prediction and Visualisation Framework

Kevin McCay, Edmond S. L. Ho and Dimitrios Sakkos (Northumbria University, United Kingdom (Great Britain)); Wai Lok Woo (Northumbria University & Newcastle University, United Kingdom (Great Britain)); Claire Marcroft, Patricia Dulson and Nicholas Embleton (NUTH NHS Foundation Trust, United Kingdom (Great Britain))

Segmentation of COVID-19 Lesions in CT Images

Joana Rocha (Faculty of Engineering, University of Porto & INESC-TEC, Portugal); Sofia C Pereira (Faculty of Engineering, University of Porto, Portugal & INESC-TEC, Portugal); Aurélio Campilho (Université of Porto, Portugal); Ana Maria Mendonça (INESC TEC, Portugal & Faculty of Engineering, University of Porto, Portugal)

A hybrid data harmonization workflow using word embeddings for the interlinking of heterogeneous cross-domain clinical data structures Vasileios C. Pezoulas (University of Ioannina, Greece); Antonis Sakellarios (Institute of Molecular Biology and Biotechnology, FORTH, Greece); Marcus Kleber (Mannheim Medical Faculty, University of Heidelberg, Germany); Jos Bosch (Faculty of Social and Behavioural Sciences, University of Amsterdam, The Netherlands); Sander van der Laan (Experimental Cardiology and Laboratory of Clinical Chemistry, The Netherlands); Femke Lamers (Amsterdam Public Health Research Institute, Amsterdam UMC, Vrije Universiteit, The Netherlands); Terho Lehtimäki (Faculty of Medicine and Health Technology, Tampere University, Finland); Winfried März (Mannheim Medical Faculty, University of Heidelberg, Germany); Dimitris Fotiadis (Institute of Molecular Biology and Biotechnology, FORTH, Greece & University of Ioannina, Greece)

An improved automatic system for aiding the detection of colon polyps using deep learning

Lishan Cai (The Netherland Cancer Institute, The Netherlands); Regina G.H. Beets-Tan (the Netherlands Cancer Institute, The Netherlands); Sean Benson (The Netherlands Cancer Institute, The Netherlands)

Digital Tools for Handwriting Proficiency Evaluation in Children

Linda G. Dui, Enrica Calogero and Milad Malavolti (Politecnico di Milano, Italy); Cristiano Termine (University of Insubria, Italy); Matteo Matteucci and Simona Ferrante (Politecnico di Milano, Italy)

Improving Automated Tissue Characterization in Optical Coherence Tomography by Melding Attenuation Compensation with Deep Learning Yanan Niu (École Polytechnique Fédérale de Lausanne, Switzerland); Max L Olender and David Marlevi (Massachusetts Institute of Technology, USA); Farhad Nezami (Brigham and Women's Hospital, USA); Elazer Edelman (Massachusetts Institute of Technology, USA)

Learning a reconnecting regularization term for blood vessel variational segmentation

Sophie Carneiro Esteves (Institut Pascal / Creatis, France); Antoine Vacavant (Institut Pascal & Université Clermont Auvergne, France); Odyssée Merveille (Creatis, France)

Towards the development of a unified virtual population model in hypertrophic cardiomyopathy

Grigoris Grigoriadis, Vasileios C. Pezoulas, Maria Roumpi and George Gkois (University of Ioannina, Greece); Nikolaos Tachos (Unit of Medical Technology and Intelligent Information Systems, Greece); Momcilo Prodanovic (University of Kragujevac, Faculty of Engineering & Bioengineering Research and Development Center (BioIRC), Serbia); Danica Prodanović (University of Kragujevac, Faculty of Science & Bioengineering Research and Development Center (BioIRC), Serbia); Boban Stojanovic (University of Kragujevac, Faculty of Science, Serbia); Srboljub M. Mijailovich (Illinois Institute of Technology, USA); Nenad Filipovic (University of Kragujevac, Serbia); Dimitris Fotiadis (Institute of Molecular Biology and Biotechnology, FORTH, Greece & University of Ioannina, Greece)

On the Statistical Differences in the Pharmacological Treatment of COVID-19 Patients

Weam Moumouh-Ait Layachi and María Sevilla-García (Universidad Rey Juan Carlos, Spain); Adrián García Romero (Hospital Universitario del Sureste, Spain); Cristina Soguero-Ruiz and Inmaculada Mora-Jiménez (Universidad Rey Juan Carlos, Spain)

A non-relational approach for distributed medical imaging databases

Rui Lebre (University of A Coruña & University of Aveiro, Portugal); Carlos Costa (University of Aveiro, Portugal)

COVID-19 and lockdown: The highs and lows of general practitioner prescribing

Fred G Booth (Ulster University Jordanstown, United Kingdom (Great Britain)); Maurice David Mulvenna (Ulster University, United Kingdom (Great Britain)); Raymond Bond (Ulster University Jordanstown, United Kingdom (Great Britain)); Kieran McGlade (Dunluce Family Practice, United Kingdom (Great Britain)); Brian Cleland (Ulster University Jordanstown, United Kingdom (Great Britain)); Debbie Rankin (Ulster University Magee Campus, United Kingdom (Great Britain)); Johnny Wallace (University of Ulster, United Kingdom (Great Britain)); Michaela M Black (University of Ulster, Coleraine, United Kingdom (Great Britain))

Heart Disease Classification using Novel Heterogeneous Ensemble

Khang Nguyen (Vietnam Academy of Science and Technology, Vietnam); Jerome Wei Yang Lim, Kuo Ping Lee, Terry Lin and Jing Tian (National University of Singapore, Singapore); Trang Do (Wellington Institute of Technology, New Zealand); Matthew Chin Heng Chua (National University of Singapore, Singapore); Binh P. Nguyen (Victoria University of Wellington, New Zealand)

Retinal Nerve Fiber Layer Defect Detection using Machine Learning on Optic Disc Photograph

Anita Manassakorn and Kitiwat Khamwan (Faculty of Medicine, Chulalongkorn University, Thailand); Dhammathat Owasirikul (Faculty of Medical Technology, Mahidol University, Thailand); Rath Itthipanichpong (Faculty of Medicine, Chulalongkorn University, Thailand); Vera Sa-Ing (Faculty of Science, Srinakharinwirot University, Thailand); Supatana Auethavekiat (Chulalongkorn University, Thailand)

AFA-RN: An Abnormal Feature Attention Relation Network for Multi-class Disease Classification in gastrointestinal endoscopic images Qian Zhao and Wenming Yang (Tsinghua University, China); Qingmin Liao (Tsinghua, China)

Synplex: a synthetic simulator of highly multiplexed histological images

Daniel Jimenez-Sanchez, Mikel Ariz and Carlos Ortiz-de-Solórzano (University of Navarra, Spain)

Whole Slide Pathology Image Patch Based Deep Classification: An Investigation of the Effects of the Latent Autoencoder Representation and the Loss Function Form

Ana Lomacenkova and Ognjen Arandjelovic (University of St Andrews, United Kingdom (Great Britain))

Using K-Means Clustering Method with Doc2Vec to Understand the Twitter Users' opinions on COVID-19 Vaccine

Guanjin Wang (Murdoch University, Australia); Wai Hang Kwok (The Hong Kong Polytechnic University, Hong Kong)

Deep Geometric Distillation Network for Compressive Sensing MRI

Xiaohong Fan, Yin Yang and Jianping Zhang (Xiangtan University, China)

Designing a conversational agent for patients with hematologic malignancies: Usability and Usefulness Study

Maria E Chatzimina (Foundation for Research and Technology - Hellas (FORTH), Greece); Helen Papadaki (University of Crete & University Hospital of Heraklion, Greece); Charalampos Pontikoglou (School of Medicine University of Crete, Greece); Lefteris Koumakis (Computational Biomedicine Laboratory, FORTH-ICS, Greece); Kostas Marias (FORTH, Greece); Manolis Tsiknakis (Hellenic Mediterranean University, Greece & FORTH -ICS, Greece)

DeepEpil: Towards an Epileptologist-Friendly Al Enabled Seizure Classification Cloud System based on Deep Learning Analysis of 3D videos Tamás Karácsony (INESC TEC - Institute for Systems and Computer Engineering, Technology and Science, Portugal); Anna Mira Loesch-Biffar, Christian Vollmar and Soheyl Noachtar (University of Munich, Germany); João Paulo S. Cunha (INESC TEC and FEUP, Portugal)

An architecture for decentralized storage in medical imaging repositories

Rui Lebre (University of A Coruña & University of Aveiro, Portugal); Luís Bastião Silva (BMD Software, Portugal); Carlos Costa (University of Aveiro, Portugal)

ProstateAnnotation: Web-Based Application for Medical Imaging

Júlia Romagosa (Universitat Politècnica de Catalunya, Spain); Raul Benitez (Univertistat Politècnica de Catalunya, Spain); Christian Mata (Universitat Politècnica de Catalunya, Spain)

On the segmentation of ultrasound intravascular images utilizing a generalized deep learning approach

Dimitris Zaridis (University of Ioannina, Greece); Antonis Sakellarios (Institute of Molecular Biology and Biotechnology, FORTH, Greece); Ioanna Karanasiou and Panagiota Tsompou (University of Ioannina, Greece); George Rigas, Georgia Karanasiou and Savvas Kyriakidis (Institute of Molecular Biology and Biotechnology, FORTH, Greece); Michael Papafaklis (University Hospital of Ioannina, Greece); Eugenia Mylona (Unit of Medical Technology and Intelligent Information Systems, University of Ioannina & FORTH-IMBB, Greece); Nikolaos Tachos (Unit of Medical Technology and Intelligent Information Systems, Greece); Lampros Michalis (University of Ioannina, Greece); Dimitris Fotiadis (Institute of Molecular Biology and Biotechnology, FORTH, Greece & University of Ioannina, Greece)

A National eHealth Platform for COVID-19 Inpatient Treatment and Monitoring

Andreas Neocleous and Maria Papaioannou (University of Cyprus, Cyprus); Andreas S. Panayides (University of Cyprus, Cyprus & University of New Mexico, USA); Francisco Garcia Miguel, Panayiotis Savva, Zinonas Antoniou and Marios Neofytou (University of Cyprus, Cyprus); Eirini C. Schiza (CYENS - Centre of Excellence & University of Cyprus, Cyprus); Kleanthis Neokleous and Ioannis P Constantinou (University of Cyprus, Cyprus); George Panos (University of Patras School of Medicine, Greece); Paraskevi Chra (National and Kapodistrian University of Athens Medical School & Evaggelismos Hospital, Greece); Costantinos S. Pattichis (University of Cyprus, Cyprus); Christos Schizas (University of Cyprus, Cyprus)

Modeling of Brain Functional Connectivity: A resting-state fMRI study on de-novo PD patients

Dimitris Fotiadis (Institute of Molecular Biology and Biotechnology, FORTH, Greece & University of Ioannina, Greece); Aggeliki Iosif (University of Ioannina & Unit of Medical Technology and Intelligent Information Systems, Greece); Evanthia E Tripoliti (University of Ioannina & Unit of Medical Technology and Intelligent Information Systems, Greece); Leonidas Gergidis and Spiros Konitsiotis (University of Ioannina, Greece)

Curvature Maps for Gait Analysis

Khac Chinh Tran (Danang University of Technology and Science, Canada); Marc Daniel (Ecole Polytech Marseille Département Informatique, France); Jean Meunier (University of Montreal, Canada)

Identification of demographic, socio-economic and health-related factors influencing wellbeing in the elderly population using regression models

Isotta Trescato, Chiara Roversi, Martina Vettoretti and Barbara Di Camillo (University of Padova, Italy); Andrea Facchinetti (Università degli Studi di Padova, Italy)

A multivariate imaging study for decrypting the link between polygenic risk scores and microstructure in Mild Cognitive Impairment
Federica Cruciani, Lorenza Brusini, Giorgio Dolci and Ilaria Boscolo Galazzo (University of Verona, Italy); André Altmann (University College London,
United Kingdom (Great Britain)); Marco Lorenzi (Inria Sophia Antipolis, France); Gloria Menegaz (University of Verona, Italy)

About the combination of vesselness filters and 3-D U-Net architectures for liver vessel extraction

Abir Affane (University of Clermont Auvergne - France, France); Jonas Lamy (Universite Lyon 2, LIRIS, Lyon, France); Marie-Ange Lebre (Universite Clermont Auvergne, CNRS, SIGMA Clermont, Institut Pascal, France); Antoine Vacavant (Institut Pascal & Université Clermont Auvergne, France)

Four dimensional optoacoustic image segmentation for visualizing perfusion within solid tumors

Subhamoy Mandal (German Cancer Research Center, Heidelberg, Germany); Agnieszka Lach (Silesian University of Technology, Poland)

Online Nuclear Emergency Response System for Public Health in the Event of Nuclear Accident

Shivaji Krishna Pawar (Atomic Energy Regulatory Board & Sathyabama Institute of Science and Technology, India); Venkata Srinivas Challa (Indira Gandhi Centre for Atomic Research & Homi Bhabha National Institute, Deemed University under DAE, India); B Venkataraman (Indira Gandhi Centre for Atomic Research, India); Javvathu Bhavani (Vellore Institute of Technology, India)

Classification of Postures with Clothing-mounted Wearable Sensors

Udeni Jayasinghe, Balazs Janko, William S Harwin and Faustina Hwang (University of Reading, United Kingdom (Great Britain))

Digital health to support head and neck cancer survivors

Laura Lopez-Perez, Rebeca Isabel García-Betances and Juan Carlos Martin Guirado (Universidad Politécnica de Madrid, Spain); Aritz Bilbao (DEUSTO, Spain); Aitor Almeida (DeustoTech - Deusto Institute of Technology, Spain); Stefano Cavalieri (Fondazione IRCCS - INT, Italy); Despina Elizabeth Filippidou (R&D ICT Products DOTSOFT, SA, Greece); Anastasios Manos (Dotsoft SA, Greece); Elena Martinelli (Università degli Studi di Milano, Italy); Moises Sanchez (IBM Innovation Exchange. IBM Ireland Ltd, Spain); Piotr T. Poliwoda (IBM Innovation Exchange. IBM Ireland Ltd, Ireland); Franco Mercalli (MultiMed Engineers srls, Italy); Maria Fernanda Cabrera-Umpierrez and Maria Teresa Arredondo (Life Supporting Technologies; Technical University of Madrid, Spain); Lisa Licitra (Fondazione IRCCS - INT & University of Milan, Italy); Giuseppe Fico (Universidad Politécnica de Madrid, Spain)

13:00-14:00

BHI Special Session: Contactless Vital Signs Monitoring for Al Healthcare

Session Chairs: Xuyu Wang & Wenjin Wang

Camera-Based Blood Pressure Monitoring

Keerthana Natarajan and Mohammad Yavarimanesh (Michigan State University, USA); Wenjin Wang (Philips Co, The Netherlands); Ramakrishna Mukkamala (University of Pittsburgh, USA)

RFID-based Vital Sign Monitoring

Chao Yang (Auburn University, USA); Xuyu Wang (California State University, Sacramento, USA); Shiwen Mao (Auburn University, USA)

Camera-based Cardio-respiratory Monitoring for Contactless Healthcare

Wenjin Wang (Eindhoven University of Technology, The Netherlands); Albertus den Brinker (Philips Research, The Netherlands)

Acoustic-based Vital Sign Monitoring

Xuyu Wang (California State University, Sacramento, USA); Shiwen Mao (Auburn University, USA)

Machine Learning Approach to Detection of Atrial Fibrillation Using High Quality Facial Videos

Cigdem Polat Dautov and Ruslan Dautov (Rochester Institute of Technology, USA); Jean Philippe Couderc (University of Rochester Medical Center, USA); Gill R Tsouri (Rochester Institute of Technology, USA)

Rapid and Scalable COVID-19 Screening using Speech, Breath, and Cough Recordings

Drew E Grant, Ian McLane and James West (Johns Hopkins University, USA)

13:00-14:00

BHI Special Session: Leveraging big data, machine learning and computable knowledge technologies to build learning health systems Session Chairs: Allen Flynn & Guilan Kong

Building an learning health system in China

Guilan Kong (National Institute of Health Data Science, Peking University, China); Yangfan Chai (National Institute of Health Data Science, Peking University, China); Hong Chu (Peking University First Hospital, China); Pengfei Li and Qing Li (Advanced Institute of Information Technology, Peking University, China); Luxia Zhang (National Institute of Health Data Science, Peking University, China)

Scaling Data and Analytic Infrastructure

John Ainsworth and Philip Couch (The University of Manchester, United Kingdom (Great Britain))

Towards Scalable Approaches to Computable Knowledge Artifact Management and Deployment

Allen Flynn (University of Michigan, USA)

Risk Prediction for the Learning Health System

Niels Peek, Matthew Sperrin, Glen Martin, David Jenkins and Rose Sisk (The University of Manchester, United Kingdom (Great Britain))

Combing domain knowledge and data-driven prediction models for clinical decision support

Guilan Kong (National Institute of Health Data Science, Peking University, China); Yangfan Chai (National Institute of Health Data Science, Peking University, China); Huaiyu Wang (National Institute of Health Data Science, Peking University, China); Pengfei Li and Qing Li (Advanced Institute of Information Technology, Peking University, China); Luxia Zhang (National Institute of Health Data Science, Peking University, China)

Machine-learning Models to Predict Mortality following Acute Myocardial

Julian S Haimovich (Massachusetts General Hospital, USA)

13:00-14:00

BSN Special Session: Body-interfaced Flexible Sensors and Actuators: recent developments, challenges and opportunities

Session Chair: Hongliang Ren

Digitally-embroidered Liquid Metal Textiles for Near-field Wireless Body Sensor Networks

Rongzhou Lin, Han-Joon Kim, Sippanat Achavananthadith and John Ho (National University of Singapore, Singapore)

Kirigami strain sensing on balloon catheters with temporary tattoo paper

Jia Li, Godwin Ponraj, Bok Seng Yeow, Catherine Jiayi Cai and Kirthika Senthil Kumar (National University of Singapore, Singapore); Hongliang Ren (NUS, Singapore)

Soft self-powered body sensor networks for human posture and health monitoring

Wentao Dong (East China Jiaotong University, China); Lin Yang (Huazhong Agricultural University, China & New York University, USA); Giancarlo Fortino (University of Calabria, Italy)

Skin-interfaced soft strain sensors using printable conductive ink and radio frequency estimation

Godwin Ponraj, Catherine Jiayi Cai and Bok Seng Yeow (National University of Singapore, Singapore); Hongliang Ren (NUS, Singapore)

Effect of Noise on Generic Cough Models

Sayanton V. Dibbo (Dartmouth College, USA); Yugyeong Kim and Sudip Vhaduri (Fordham University, USA)

13:00-14:00

BSN Special Session: Digital Biomarkers for Movement Disorders

Session Chair: Federico Parisi

Quantitative motor testing in rare movement disorders

Christopher D Stephen (Massachusetts General Hospital, Harvard Medical School, USA)

Wearable Computing, Machine Learning, and Biomechanical Modeling for Movement Disorder Research

Bjoern M Eskofier (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany)

Cognitive-motor interference in the dual task paradigm

Jelena Curcic and Jennifer Sorinas (Novartis Institutes for Biomedical Research, Switzerland); Kristin Hannesdottir (Novartis Institutes for Biomedical Research, USA)

Detecting sensitive mobility features for Parkinson's disease stages via machine learning

Anat Mirelman (Sourasky Medical Center, Israel); Jeffrey M Hausdorff (Tel Aviv Medical Center, Israel)

14:00-15:00

BHI Session: Al and Big Data Analytics (I)

Session Chairs: Amira Ashour & George Matsopoulos

Pediatric Bone Age Assessment based on Detection of Ossification Regions

Esteban Vaca (AGFA NV, Germany); Adriyana Danudibroto (AGFA NV, Belgium)

Cold-start Hospital Length of Stay Prediction using Positive-Unlabeled Learning

Tom Arjannikov and George Tzanetakis (University of Victoria, Canada)

Machine Learning Prediction of Hospitalization due to COVID-19 based on Self-Reported Symptoms: A Study for Brazil

Igor Miranda (Universidade Federal do Reconcavo da Bahia, Brazil); Gildeberto Cardoso (Universidade Federal do Recôncavo da Bahia, Brazil); Madhurananda Pahar (University of Stellenbosch, South Africa); Gabriel Oliveira (Universidade Federal do Recôncavo da Bahia, Brazil); Thomas Niesler (Stellenbosch University, South Africa)

Chatsum: An Intelligent Medical Chat Summarization Tool

Hasan Zafari (Queens University, Canada); Farhana H. Zulkernine (Queen's University & CA Canada, Canada)

Applying Problem Transformation Methods for Predicting 3-Days All-Cause Readmission in the Emergency Department

Jia-Da Li and Yi-Kuan Liu (National Taiwan University, Taiwan); Cheng-Chung Fang (National Taiwan University Hospital, Taiwan); Chen Chu-Song (National Taiwan University, Taiwan)

14:00-15:00

BHI Special Session: Advanced Sensing and Computing Techniques for Sleep Monitoring

Session Chairs: Amara Amara & Wei Chen

Feature Matching: A Novel Domain Adaptation Technique for Sleep Staging

Elisabeth Heremans (KU Leuven, Belgium); Huy Phan (Queen Mary University of London, United Kingdom (Great Britain)); Amir Ansari and Maarten De Vos (KU Leuven, Belgium)

Unobtrusive Miniature Scale and Deep learning-based Smart Mat System for Sleep Posture Recognition

Chen Chen and Haikang Diao (Fudan University, China); Amara Amara (Terre des Hommes Foundation, China); Wei Chen (Fudan University, China)

A Gearing Toward An Intelligent Ecosystem For Sleep Monitoring

Theerawit Wilaiprasitporn (Vidyasirimedhi Institute of Science and Technology (VISTEC), Thailand)

Smart Sleep Sensing Technology Based on Noncontact Multi-modal Sensor Fusion

Hong Hong (Nanjing University of Science and Technology, China)

Feasibility Analysis of Transformer Model for EEG-Based Sleep Scoring

Zheng Chen (Nara Institute of Science and Technology, Japan); Koki Odani (NARA Institute of Science and Technology, Japan); Pei Gao, Naoaki Ono, Md. Altaf-Ul-Amin, Shigehiko Kanaya and Ming Huang (Nara Institute of Science and Technology, Japan)

Sleep Medicine Data Encryption (ASCLEPIOS) for Secure Sleep Study Exchange

Thomas Penzel (Charité - Universitätsmedizin Berlin, Germany)

Ultra-Wide Band Radar is a Promising Non-Contact Technology for Sleep Stage Classification in Children

Robbin de Goederen (Erasmus MC – Sophia Children's Hospital, Rotterdam, The Netherlands); Shijing Pu (Eindhoven University of Technology, The Netherlands); Maria Silos Viu (Delft University of Technology, The Netherlands); Dan Doan (Wilhelmina Children's Hospital, UMC Utrecht, The Netherlands); Sebastiaan Overeem (Eindhoven University of Technology, The Netherlands); Wouter Serdijn (Delft University of Technology, The Netherlands); Koen Joosten (Erasmus MC, The Netherlands); Xi Long (Eindhoven University of Technology & Philips Research, The Netherlands); Jeroen Dudink (UMC Utrecht, The Netherlands)

14:00-15:00

BSN Session: Monitoring Pulmonary Function Using Wearable Technology

Session Chair: Canan Dagdeviren

CoughBuddy: Multi-Modal Cough Event Detection Using Earbuds Platform

Ebrahim Nemati (Samsung Research America, USA); Shibo Zhang (Northwestern University, USA); Tousif Ahmed (Samsung Research America Inc., USA); Md Mahbubur Rahman, Jilong Kuang and Alex Gao (Samsung Research America, USA)

Impedance Pneumography; Assessment of Dual-Frequency Calibration Approaches

Hewon Jung, Samer Mabrouk and Omer T Inan (Georgia Institute of Technology, USA)

Wireless respiration monitoring using a flexible sensor and bistable circuit

Zhipeng Li, Ze Xiong, Chenhui Li and John Ho (National University of Singapore, Singapore)

Towards Motion-Aware Passive Resting Respiratory Rate Monitoring Using Earbuds

Md Mahbubur Rahman (Samsung Research America, USA); Tousif Ahmed (Samsung Research America Inc., USA); Mohsin Y Ahmed (University of Virginia, USA); Ebrahim Nemati (Samsung Research America, USA); Minh Dinh and Nathan Folkman (Samsung Design and Innovation Center, USA); Md Mehedi Hasan, Jilong Kuang and Alex Gao (Samsung Research America, USA)

Piezoelectric-Based Respiratory Monitoring: Towards Self-Powered Implantables for the Airways

Luis J Lopez Ruiz (University of Virginia, USA); Vivian Lin (University of Pennsylvania, USA); Lucy Fitzgerald, Joe Zhu, Larry Borish and Daniel Quinn (University of Virginia, USA); John Lach (The George Washington University & University of Virginia, USA)

14:00-15:00

BSN Special Session: Body Sensor Networks in the era of pandemic

Session Chairs: Raffaele Gravina & Ivan Lee

A UWB Radar-based Approach of Detecting Vital Signals

Qimeng Li (University of Calabria, Italy); Jikui Liu (Shenzhen Institute of Advanced Technology, Chinese Academy Sciences, China); Raffaele Gravina (University of Calabria, Italy); Ye Li (Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China); Giancarlo Fortino (University of Calabria, Italy)

The Use of Thermal Imaging and Deep Learning for Pulmonary Diagnostics and Infection Detection

Suzie Byun (Massachusetts Institute of Technology, USA); Bernardo Garcia Bulle Bueno (MIT, USA); Yogesh Gupta (Gandhi Medical College, India); Nagesh Dhadge (Central Health Services, India); Shrikant Pawar (Chest Research Foundation, India); Rahul Kodgule (Chest Research Foundatiob, India); Richard Fletcher (MIT, USA)

Multi-band Implantable Microstrip Antenna on Large Ground Plane and TiO2 Substrate

Lida Kouhalvandi (Istanbul Technical University, Turkey); Ladislau Matekovits (Politecnico di Torino, Italy); Ildiko Peter (George Emil Palade University, Tarqu-Mures, Romania)

FaceMask: a Smart Personal Protective Equipment for Compliance Assessment of Best Practices to Control Pandemic

Raffaele Gravina (University of Calabria, Italy); Ruperto Alexander Lopez and Pablo F. Ordonez-Ordonez (Universidad Nacional de Loja, Ecuador)

CardioTEXTIL: Wearable for Monitoring and End-to-End Secure Distribution of ECGs

Georg Bramm (Fraunhofer AISEC, Germany); Matthias Hiller (Fraunhofer Institute for Applied and Integrated Security AISEC, Germany); Christian Hofmann (Fraunhofer-Institut für Integrierte Schaltungen, Germany); Stefan Hristozov (Fraunhofer Institute for Applied and Integrated Security AISEC, Germany); Maximilian Paul Oppelt (Fraunhofer Institute for Integrated Circuits IIS, Germany); Norman Pfeiffer (Fraunhofer Institute for Integrated Circuits IIS, Germany); Matthias Struck (Fraunhofer Institute for Integrated Circuits, Germany); Dominik Weber (Fraunhofer Institute for Integrated Circuits IIS, Germany)

15:00-15:05

Opening Welcome

15:05-15:35

Keynote Lecture

Session Chairs: Carmen Poon

Wearable "SUPER-MINDS" for the Precision Control of CVDs and COVIDs

Yuan-Ting Zhang, Hong Kong Center for Cerebro-cardiovascular Health Engineering (COCHE)

15:35-16:00

BHI-BSN Roadmap: The Celebration

16:00-16:25

Kevnote Lecture

Session Chairs: Georgia Tourassi

Simplifying interpretation and acquisition of ultrasound scans

Alison Noble, University of Oxford, UK

16:25-16:30

Break

16:30-17:30

Clinical/Translational panel

Session Chairs: Athanasios Tzioufas

Advances and Trends in use of Informatics in Clinical Practice

Maria Teresa Arredondo, Universidad Politécnica de Madrid, Spain; Doris Bamiou, University College of London, UK; Elazer R. Edelman, MIT, US; Norbert Graf, University of the Saarland, Germany; Peter Stone, Harvard Medical School, US

17:30-18:00

Featured Session

Session Chairs: Constantinos S. Pattichis

Pandemic Mitigation by Modeling and Informatics: Lesson Learned from COVID-19

George Panos, University of Cyprus & Nicosia General Hospital Internal Medicine Clinic, Cyprus; Joshua S Weitz, Georgia Institute of Technology, USA

18:00-18:05

Break

18:05-19:05

BHI Session: Al and Big Data Analytics (II)

Session Chairs: Amira Ashour & George Matsopoulos

High-Resolution MRI Brain Inpainting

Mohamed Almansour, Nagia M Ghanem and Soheir Ahmed Fouad Bassiouny (Faculty of Engineering, Alexandria University, Egypt)

HistoTransfer: Understanding Transfer Learning for Histopathology

Yash Sharma (University of Virginia & Gastroenterology Data Science Lab, USA); Lubaina Ehsan, Sana Syed and Donald Brown (University of Virginia, USA)

Automated Risk Assessment of COVID-19 Patients at Diagnosis Using Electronic Healthcare Records

Felipe O Giuste (Georgia Institute of Technology & Emory University School of Medicine, USA); Lawrence He, Monica Isgut and Wenqi Shi (Georgia Institute of Technology, USA); Blake Anderson (Emory University School of Medicine, USA); May Dongmei Wang (Georgia Institute of Technology and Emory University, USA)

Decentralized Knowledge Transfer on Edge Networks for Detecting Cancer in Images

Orpaz Goldstein (UCLA, USA); Mohammad Kachuee (University of California, Los Angeles, USA); Majid Sarrafzadeh (UCLA, USA)

Analysis Towards Classification of Infection and Ischaemia of Diabetic Foot Ulcers

Moi Hoon Yap and Bill Cassidy (Manchester Metropolitan University, United Kingdom (Great Britain)); Joseph Pappachan (Lancashire Teaching Hospitals, United Kingdom (Great Britain)); Claire O'Shea (Waikato District Health Board, New Zealand); David Gillespie and Neil D. Reeves (Manchester Metropolitan University, United Kingdom (Great Britain))

18:05-19:05

BHI Special Session: Opportunities for Machine Learning and Noninvasive Sensing to Impact Emergency Cardiovascular Care Session Chairs: Jin-Oh Hahn & Omer Inan

Preclinical Evaluation of Wearable Sensors and Machine Learning for Continuous Estimation of Hypovolemic Status

Jacob Kimball, Jonathan Zia and Sungtae An (Georgia Institute of Technology, USA); Christopher Rolfes (Translational Training and Testing Laboratories Inc. (T3 Labs), USA); Jin-Oh Hahn (University of Maryland, USA); Michael Sawka and Omer T Inan (Georgia Institute of Technology, USA)

Challenges of Atrial Fibrillation Detection Using Smartwatches

Ki Chon (University of Connecticut, USA)

Smarter, safer, faster: Emergency resuscitation through machine learning

Michael R Pinsky (University of Pittsburgh, USA)

Obtaining Robust Personalized and Generative Physiological Models through Collective Inference

Ali Tivay (University of Maryland, USA); George Kramer (University of Texas Medical Branch, USA); Jin-Oh Hahn (University of Maryland, USA)

Detection of Impending Hospitalizations via Non-contact Adherence-independent Sensing in the Home Bed

Kevin R King (UC San Diego & UCSD, USA)

Spatiotemporal regularization in effective reconstruction of epicardial potential

Yu Shu (Binghamton University, USA); Wei Dan (Shenzhen Technology University, China); Changqing Cheng (Binghamton University, USA)

Noninvasive Electrocardiographic Imaging (ECGI) of Cardiac Arrhythmias

Rudy Yoram (USA)

18:05-19:05

BSN Session: Machine Learning for the Analysis of Wearable Sensor Data

Session Chairs: Benny Lo & Rita Paradiso

Multi-Objective Optimisation for SSVEP Detection

Yue Zhang and Zhi-Qiang Zhang (University of Leeds, United Kingdom (Great Britain)); Shengquan Xie (University of Leeds, United Kingdom (Great Britain) & Binzhou Medical University, China)

Semi-Supervised Contrastive Learning for Generalizable Motor Imagery EEG Classification

Jinpei Han and Xiao Gu (Imperial College London, United Kingdom (Great Britain)); Benny Lo (Imperial College, United Kingdom (Great Britain))

Real-Time 3D Arm Motion Tracking Using the 6-axis IMU Sensor of a Smartwatch

Wenchuan Wei, Keiko Kurita, Jilong Kuang and Alex Gao (Samsung Research America, USA)

Deep Learning Model with Individualized Fine-tuning for Dynamic and Beat-to-Beat Blood Pressure Estimation

Jingyuan Hong and Jiasheng Gao (Shenzhen Technology University, China); Qing Liu (Xi'an Jiaotong-Liverpool University, China); Yuanting Zhang (City University of Hong Kong, China); Yali Zheng (Shenzhen Technology University, China)

Identifying causal relationships in time-series data from network of wearable sensors

DK Arvind (University of Edinburgh, United Kingdom (Great Britain))

Deep 3D Body Landmarks Estimation for Smart Garments Design

Annalisa Baronetto and Dominik Wassermann (Chair of Digital Health & Friedrich-Alexander University Erlangen-Nuremberg, Germany); Oliver Amft (Friedrich-Alexander Universität (FAU) Erlangen-Nürnberg, Germany)

18:05-19:05

BSN Special Session: Body Sensor Network for Tele-Health Monitoring and Coaching

Session Chair: Bobak Mortazavi

Investigating racial bias in machine learning models of mental health: Implications for equitable telebehavioral health

Theodora Chaspari, Venkata Dubagunta and Projna Paromita (Texas A&M University, USA); Sohyun Han and Yehsong Kim (University of Southern California, USA); Adela C. Timmons (Florida International University, USA); Gayla Margolin (University of Southern California, USA)

WildCam: A Privacy Conscious Wearable Eating Detection Camera People Will Actually Wear in the Wild

Nabil Alshurafa and Josiah Hester (Northwestern University, USA); Andrea Graham (Northwestern, USA); Bonnie Spring and Aggelos K Katsaggelos (Northwestern University, USA)

What Makes Home Telemonitoring Systems Work for Underserved Diabetes Patients in the Real World

Hye-Chung Kum (Population Informatics Lab, Texas A&M University & Center for Remote Health Technologies and Systems, Texas A&M University, USA)

Campus safety and the internet of wearable things: Assessing student safety conditions on campus while riding a smart scooter

Devansh Gupta (Case Western Reserve University, USA); Wenyao Xu (SUNY Buffalo & Wireless Health Institute, USA); Xiong Yu and Ming-Chun Huang (Case Western Reserve University, USA)

Multi-Task Active Learning Mobile Health

Asiful Arefeen and Hassan Ghasemzadeh (Washington State University, USA)

19:05-19:35

Poster Session # 2 Chair: Stacy Bamberg

Human Activity Recognition in a Distributed Machine Learning System

John Moran (University of Limerick, Ireland)

Continual Learning in Body Sensor Networks

Iman Mirzadeh and Hassan Ghasemzadeh (Washington State University, USA)

Stress Classification and Personalization: Getting the most out of the least

Ramesh Kumar Sah and Hassan Ghasemzadeh (Washington State University, USA)

Real-Time Hyperglycemia Prediction in Type 2 Diabetes for Various Pharmacotherapies

Andrew N. Shahidelpour and Mudassir Rashid (Illinois Institute of Technology, USA); Mohammad Reza Askari (400 E. 33rd Street & Illinois Institute of Technology, USA); Xiaoyu Sun (Illinois Institute of Technology, USA); Cynthia Fritschi (University of Illinois at Chicago, USA); Ali Cinar (Illinois Institute of Technology, USA)

A Target-Specific Evidence Function for Indication Expansion Queries in the Open Targets Platform

Erin Teeple, Yi-Chien Chang and Deepak Rajpal (Sanofi, USA)

Outcomes-Driven Clinical Phenotyping in Cardiogenic Shock using a Mixture of Experts

Nathan C Hurley (Texas A&M University, USA); Alyssa Berkowitz (Yale University, USA); Frederick Masoudi (University of Colorado School of Medicine, USA); Joseph Ross and Nihar Desai (Yale University, USA); Nilay Shah (Mayo Clinic, USA); Sanket Dhruva (UCSF School of Medicine, USA); Bobak Jack Mortazavi (Texas A&M University & Center for Outcomes Research and Evaluation - Yale University, USA)

Sparse Gated Mixture-of-Experts to Separate and Interpret Patient Heterogeneity in EHR data

Zepeng Huo and Lida Zhang (Texas A&M University, USA); Rohan Khera (Yale University, USA); Shuai Huang (University of Washington, USA); Xiaoning Qian (Texas A&M University, USA); Zhangyang Wang (University of Texas at Austin, USA); Bobak Jack Mortazavi (Texas A&M University & Center for Outcomes Research and Evaluation - Yale University, USA)

DynEHR: Dynamic adaptation of models with data heterogeneity in electronic health records

Lida Zhang (Texas A&M University, USA); Xiaohan Chen and Tianlong Chen (The University of Texas at Austin, USA); Zhangyang Wang (University of Texas at Austin, USA); Bobak Jack Mortazavi (Texas A&M University & Center for Outcomes Research and Evaluation - Yale University, USA)

Discovering the Causal Structure of the Hamilton Rating Scale for Depression Using Causal Discovery

Lu Wang, Mark Chignell and Haoyan Jiang (University of Toronto, Canada); Sachinthya Lokuge, Geneva Mason, Kathryn Fotinos and Martin Katzman (S. T. A. R. T. Clinic, Canada)

Real-time Mortality Prediction Using MIMIC-IV ICU Data Via Boosted Nonparametric Hazards

Zhale Nowroozilarki, Arash Pakbin and James Royalty (Texas A&M University, USA); Donald Lee (Emory University, USA); Bobak Jack Mortazavi (Texas A&M University & Center for Outcomes Research and Evaluation - Yale University, USA)

Mask-Grasp R-CNN: Simultaneous Instance Segmentation and Robotic Grasp Detection

Mena S.A. Kamel and Michael D Naish (Western University, Canada)

Body Pose Analysis using CNN and Pressure Sensor Array Data

Aakash Bhatt, Svetlana N. Yanushkevich, Thomas Truong and Mohammed Almekhlafi (University of Calgary, Canada)

Multi-module Recurrent Convolutional Neural Network with Transformer Encoder for ECG Arrhythmia Classification

Minh Duc Le, Vidhiwar Rathour, Sang Q Truong and Quan Mai (University of Arkansas, USA); Patel Brijesh (West Virginia University, USA); Ngan Le (University of Arkansas, USA)

Evaluating the Effect of Longitudinal Dose and INR Data on Maintenance Warfarin Dose Predictions

Anish Karpurapu, Adam Krekorian, Ye Tian and Leslie Collins (Duke University, USA); Ravi Karra (Duke University Medical Center, USA); Aaron D Franklin and Boyla Mainsah (Duke University, USA)

Integrating microbiome and metabolome data for host disease prediction via deep learning neural networks

Tina Khajeh (University of Illinois At Chicago, USA); Derek Reiman (University of Illinois at Chicago, USA); Ryan Morley (University of Illinois At Chicago, USA); Yang Dai (University of Illinois at Chicago, USA)

Neural Topic Modeling to Understand Breast Cancer Peer-to-peer Online Information Seeking at Diagnosis

Xiao Luo and Sahil Kumar (IUPUI, USA); Natalie Lambert (Indiana University, USA)

Personalizing TTS Voices for Progressive Dysarthria

Yunxin Zhao, Minguang Song, Yanghao Yue and Mili Kuruvilla-Dugdale (University of Missouri, USA)

Learning from Heterogeneous Data via Contrastive Learning: An Application in Multi-Source COVID-19 Radiography

Wenqi Shi and Mitali Gupte (Georgia Institute of Technology, USA); May Dongmei Wang (Georgia Institute of Technology and Emory University, USA)

Simulating Study Design Choice Effects on Observed Performance of Predictive Patient Monitoring Alarm Algorithms

David O Nahmias (The MITRE Corporation, USA); Christopher G Scully (US Food and Drug Administration, USA)

Multimodal Breast Lesion Classification Using Cross-Attention Deep Networks

Hung Vo and Pengyu Yuan (University of Houston, USA); Tiancheng He (Houston Methodist Hospital, USA); Stephen Wong (Houston Methodist Cancer Center, USA); Hien Nguyen (University of Houston, USA)

Multi-Label Classification of ICD-10 Coding & Clinical Notes Using MIMIC & CodiEsp

Ivan Makohon and Yaohang Li (Old Dominion University, USA)

A Knowledge Network-Based Approach to Facilitate Annotation of Clinical Pathway Component Clusters

Minsu Kim (Oak Ridge National Laboratory, USA); S M Shamimul Hasan (Oak Ridge National Lab, USA); Byung-Hoon Park (Oak Ridge National Laboratory, USA); Makoto Jones, Merry Ward and Jonathan Nebeker (Veterans Administration, USA)

Identifying Features for COVID-19 Hospitalization Risk Prediction

José Joaquín Casado Garrido, Gabriel A Cruz and Zhiyi Dong (Georgia Institute of Technology, USA); Blake Anderson (Emory University School of Medicine, USA); May Dongmei Wang (Georgia Institute of Technology and Emory University, USA)

Replacing Histological Grade with Gene Expression Grade Index to Predict Breast Cancer Survival

John Anderson, Brady Bove Muñoz, Janani Guru and Nadia Hepburn (Georgia Institute of Technology, USA); May Dongmei Wang (Georgia Institute of Technology and Emory University, USA)

Cancer Clinical Decision Support Enabled by Processing of Histopathological Images

Peter F Lais, Carlos Sabater, Christine Saw and Ila Vienneau (Georgia Institute of Technology, USA); May Dongmei Wang (Georgia Institute of Technology and Emory University, USA)

What makes a person obese?: An individual-level analysis of obesity

Tahar Touati (San Francisco State University & Computer Science Dept, USA); Kazunori Okada and Hyo Jung Song (San Francisco State University, USA)

Accurate Predictive Modeling and Risk Factor Identification for COVID-19 through Machine Learning

Alice Feng (Harker School, USA)

Machine Learning Models for Seizure Detection Deployment Insight for e-health IoT platform

Gabriel Puerta (Univ Lyon, INSA Lyon, Inria, CITI,); Frederic Le Mouel and Oscar Carrillo (INRIA / INSA Lyon, France)

Seizure detection using human intracranial electrophysiology via information theoretic methods

Lisa Yamada, Tomiko Oskotsky and Paul Nuyujukian (Stanford University, USA)

Attention Based Joint Learning for Automatic Arrhythmia Diagnosis in Electrocardiogram

Yiyu Shi and Xinrong Hu (University of Notre Dame, USA); Long Wen, Jian Zhuang and Xiaowei Xu (Guangdong General Hospital, China)

An Optimal Control Approach for Automated Fluid Resuscitation

Jacob Grant and Hossein Mirinejad (Kent State University, USA)

Dynamic Networks of Physiologic Interactions of Brain Waves and Rhythms in Muscle Activation

Rossella Rizzo, Sergi Garcia Retortillo and Plamen Ivanov (Boston University, USA)

Improving Lexical Category Features for Depression Screening with Text Messages

Mahum Shah, Monica L. Tlachac, Benjamin Litterer, Saitheeraj Thatigotla, Nick Jurovich and Elke Rundensteiner (Worcester Polytechnic Institute, USA)

A Novel Method of Diagnosing Depression through the Use of the SpaceNet Classifier

Anker Zhao (Shady Side Academy, USA); Kevin Z. Qi (Boston College, USA); Daniel Che (Academy for Advanced Research and Development, USA); Justin Swaney (MIT, USA); Tingying Helen Zeng (Academy for Advanced Research and Development, USA)

Detecting Adversarial Attacks on Deep Learning Models for Oncological Images

Marina Z Joel (Yale School of Medicine, USA); Sanjay Aneja (Yale University, USA); Enoch Chang, Sachin Umrao and Rachel Choi (Yale School of Medicine, USA)

Thursday, July 29

12:30-13:00 Poster Session # 3 Chair: Paolo De Carvalho

Estimation of center of pressure in gait using magneto-inertial measurement units

Janez Podobnik and David Kraljić (University of Ljubljana, Slovenia); Matjaž Zadravec (University Rehabilitation Institute Republic of Slovenia, Slovenia); Marko Munih (University of Ljubljana, Slovenia)

Latency Aligning Task-related Component Analysis for Enhancing Performance of SSVEP-based BCIs

Jiayang Huang, Pengfei Yang and Bang Xiong (Xidian University, China); Zhi-Qiang Zhang (University of Leeds, United Kingdom (Great Britain))

Estimation Technique for Vertical Ground Reaction Force using Inertial Sensor during Nursing Activity

Kodai Kitagawa (Kyushu Institute of Technology, Japan); Takayuki Nagasaki (Tohoku Bunka Gakuen University, Japan); Sota Nakano (Kyushu University of Nursing and Social Welfare, Japan); Mitsumasa Hida (Osaka Kawasaki Rehabilitation University, Japan); Shogo Okamatsu (Kitakyushu Rehabilitation College, Japan); Chikamune Wada (Kyushu Institute of Technology, Japan)

Machine Learning implementation for an accelerometer-based wearable device for neonatal monitoring

Francesco Desimoni (Úniversity of Eastern Piedmont, UNIUPO, Italy); Massimo Canonico (Università del Piemonte Orientale, Italy); Matteo Ratti (University of Eastern Piedmont, UNIUPO, Italy); Luigi Portinale (Università del Piemonte Orientale, Italy); Massimiliano Panella (University of Eastern Piedmont, UNIUPO, Italy)

Predicting post COVID-19 rehabilitation duration with linear kernel SVR

Elisa Setti (Scuola Superiore Sant'Anna, Istituto di BioRobotica & IRCCS Fondazione Don Carlo Gnocchi, Italy); Silvia Campagnini (Scuola Superiore Sant'Anna, Istituto di BioRobotica, Italy); Chiara Fanciullacci, Chiara Arienti and Michele Patrini (IRCCS Fondazione Don Carlo Gnocchi, Italy); Andrea Mannini (Scuola Superiore Sant'Anna, Italy); Maria Chiara Carrozza (Scuola Superiore Sant'Anna, Istituto di BioRobotica & IRCCS Fondazione Don Carlo Gnocchi, Italy)

2D/3D registration with a statistical deformation model prior using deep learning

Jeroen Van Houtte (Imec-Vision Lab, University of Antwerp, Belgium); Xiaoru Gao (Institute of Medical Robotics, School of Biomedical Engineering, Shanghai Jiao Tong University, China); Jan Sijbers (Imec-Vision Lab, University of Antwerp, Belgium); Guoyan Zheng (Shanghai Jiao Tong University, China)

DeepASDM: a Deep Learning Framework for Affine and Deformable Image Registration Incorporating a Statistical Deformation Model

Xiaoru Gao (Institute of Medical Robotics, School of Biomedical Engineering, Shanghai Jiao Tong University, China); Jeroen Van Houtte (Imec-Vision Lab, University of Antwerp, Belgium); Zihao Chen and Guoyan Zheng (Shanghai Jiao Tong University, China)

A Deep Learning Architecture for Spatio-Temporal Feature Extraction and Alcoholism Detection

Neeraj Neeraj and Vatsal Singhal (Indian Institute of Technology Patna, India); Jimson Mathew (IIT Patna & Computer Science Dept, India)

Quantitative EEG Feature Selection by Majority Voting for Alcohol Use Disorder Detection

Ruchi Holker (Delhi Technological University, New Delhi India, India); Seba Susan (DTU, India)

Predicting hypertension onset using logistic regression models with labs and/or easily accessible variables: the role of blood pressure measurements

Chiara Roversi, Martina Vettoretti and Barbara Di Camillo (University of Padova, Italy); Andrea Facchinetti (Università degli Studi di Padova, Italy)

A Dynamic Bayesian Network model for simulating the progression to diabetes onset in the ageing population

Chiara Roversi, Erica Tavazzi, Martina Vettoretti and Barbara Di Camillo (University of Padova, Italy)

Personalised trainer recommendation based on physical activity and genetic profile

Edoardo Occhipinti, Khalid B Mirza and Christofer Toumazou (Imperial College London, United Kingdom (Great Britain))

Multimodal Segmentation of Medical Images with Heavily Missing Data

Muhammad Usman Akbar (Pattern Analysis and Computer Vision, Istituto Italiano di Tecnologia, Genova & University of Genova, Italy); Vittorio Murino (University of Verona, Italy); Diego Sona (Istituto Italiano Di Tecnologia & Fondazione Bruno Kessler, Italy)

An Unsupervised Learning Approach for Detecting Relapses from Spontaneous Speech in Patients with Psychosis

Christos Garoufis and Athanasia Zlatintsi (National Technical University of Athens, Greece); Panagiotis Filntisis (NTUA, Greece); Niki Efthymiou (National Technical University of Athens, Greece); Emmanouil Kalisperakis, Vasia Garyfalli, Thomas Karantinos, Leonidas Mantonakis and Nikolaos Smyrnis (Laboratory of Cognitive Neuroscience, UMHR, Greece); Petros Maragos (National Technical University of Athens, Greece)

Retrieving Chest X-rays for Differential Diagnosis: A Deep Metric Learning Approach

Ashery Mbilinyi and Heiko Schuldt (University of Basel, Switzerland)

Combining loss functions for deep learning bladder segmentation on dynamic MRI

Marc-Adrien Hostin (Aix Marseille Univ, Université de Toulon, CNRS, LIS Marseille, France); Augustin C. Ogier (Aix Marseille Univ, Université de Toulon, CNRS, LIS, France); Nicolas Pirro (AP-HM, France); Marc-Emmanuel Bellemare (Aix-Marseille Univ, Université de Toulon, CNRS, LIS, France)

Exploring Deep Learning Methods for Real-Time Surgical Instrument Segmentation in Laparoscopy

Debesh Jha (SimulaMet & UiT The Arctic University of Norway, Norway); Sharib Ali (University of Oxford, United Kingdom (Great Britain)); Nikhil Tomar (SimulaMet, Norway); Michael Alexander Riegler (Simula Research Laboratory, Norway); Dag Johansen and Håvard Johansen (UiT The Arctic University of Norway, Norway); Pål Halvorsen (Simula Research Laboratory & Department of Informatics, University of Oslo, Norway)

Dynamic patterns of change in mental health following breast cancer diagnosis: A trajectory-based unsupervised clustering approach

Eugenia Mylona (Unit of Medical Technology and Intelligent Information Systems, University of Ioannina & FORTH-IMBB, Greece); Konstadina Kourou (Institute of Molecular Biology and Biotechnology, FORTH-IMBB, Greece); Georgios C. Manikis (Foundation for Research and Technology, Greece); Evangelos Karademas (University of Crete, Greece); Panagiotis Simos (School of Medicine, University of Crete, Greece); Dimitris Fotiadis (Institute of Molecular Biology and Biotechnology, FORTH, Greece & University of Ioannina, Greece)

Machine Learning Approaches to Predict Parkinson's Disease using Speech Signals

Adedolapo Aishat Toye (Carnegie Mellon University Africa, Rwanda); Suryaprakash Kompalli (Carnegie Mellon University & INSOFE, India)

Predicting Drug Review Polarity Using Fuzzy and Latent Dirichlet Allocation (FLDA) Approach

Siyue Song (School of Computing and Engineering & University of Huddersfield, United Kingdom (Great Britain)); Tianhua Chen and Grigoris Antoniou (University of Huddersfield, United Kingdom (Great Britain))

DPCOVID: Privacy-Preserving Federated Covid-19 Detection

Trang Thi Ho (Research Center for Information Technology, Taiwan); Yennun Huang (Academia Sinica, Taiwan)

Coronary Artery Stenosis Prediction using Machine Learning Algorithms

Angela Koloi (University of Ioannina, Greece); Antonis Sakellarios (Institute of Molecular Biology and Biotechnology, FORTH, Greece); Vasileios C. Pezoulas and Costas Papaloukas (University of Ioannina, Greece); Marcus Kleber and Winfried März (Mannheim Medical Faculty, University of Heidelberg, Germany); Dimitris Fotiadis (Institute of Molecular Biology and Biotechnology, FORTH, Greece & University of Ioannina, Greece)

dx-time: An R package for Time Series Analysis in Healthcare

Yi-An Zhu (Chang Gung University, Taiwan); Yi-Ju Tseng (National Central University, Taiwan)

Estimating Contact Rates in Public Places and Mass Gatherings in Saudi Arabia using Deep Learning and Image Processing

Asma Mohammed Alghamdi and Suha Rushdi Bako (King Abdulaziz University, Saudi Arabia); Zahrah Ahmad Al Safwan (King Abdulaziz University & Saudi Arabia, Saudi Arabia); Sultanah M Alshammari (King Abdulaziz University, Saudi Arabia)

Aided Diagnosis Methods for Multi-Pathological Types of Pulmonary Nodules Based on 3D Multi-Resolution Attention CapsNet Yuqiang Gao and Enqing Dong (Shandong University, China)

Comparing the Predictive Power of Heart Failure Hospitalisation Risk Scores Across Different Care Settings

Alessandro Guazzo, Enrico Longato and Gian Paolo Fadini (University of Padova, Italy); Giovanni Sparacino (University of Padua, Italy); Alessandro Battaggia, Bruno Franco-Novelletto and Maurizio Cancian (SIMG-SVEMG, Italy); Massimo Fusello (SVEMG, Italy); Angelo Avogaro (Università degli Studi di Padova, Italy); Barbara Di Camillo (University of Padova, Italy)

Machine learning-based prediction of upper limb rehabilitation outcomes in multiple sclerosis: a preliminary analysis

Eva Josse (ETH Zurich, Switzerland); Ramona Sylvester and Roman Gonzenbach (Rehabilitation Center Valens, Switzerland); Olivier Lambercy (ETH Zurich, Switzerland); Christoph M. Kanzler (Singapore-ETH Centre & ETH Zurich, Singapore)

Activity Tracker Classification of Sleep Apnea

Brendan Lyden and Ruairi O'Reilly (Munster Technological University, Ireland)

A New Methodology to Perform Variable Ranking in Machine Learning Models with Correlated Features: In Silico Validation

Martina Vettoretti and Barbara Di Camillo (University of Padova, Italy)

Classifying herbal medicine origins by temporal and spectral data mining with electronic nose

Li Liu (Zhejiang University, China); Xianghao Zhan (Stanford University, China); Ziheng Duan, Rumeng Wu, Yi Wu, Xiaoqing Guan, Zhan Wang, You Wang and Guang Li (Zhejiang University, China)

Methods for Creating Reproducible Machine Learning Pipelines for Skin Lesion Classification

David Walshe and Ruairi O'Reilly (Munster Technological University, Ireland)

BHI Session: Biomedical Signal Processing and Disease Oriented Informatics

Session Chair: Zhiqiang Zhang

Computing Realistic Surrogate EEG for the Study of Functional Connectivity

Christian O'Reilly and Mayada Elsabbagh (McGill University, Canada)

A Diagnostic System for Intracranial Saccular and Fusiform Brain Aneurysm with Location Detection

Yousra Zafar (University of Engineering and Technology Taxila, Pakistan); Ali Javed (UET TAXILA, Pakistan); Khalid Mahmood Malik and Jeremy Santamaria (Oakland University, USA); Ghous Malik (Henry Ford Hospital, USA)

Spectral dynamics of muscle fiber activation in response to exercise and acute fatigue

Sergi Garcia Retortillo, Rossella Rizzo and Plamen Ivanov (Boston University, USA)

Transcutaneous Cervical Vagus Nerve Stimulation Lengthens Exhalation in the Context of Traumatic Stress

Asim H Gazi, Srirakshaa Sundararaj and Anna Harrison (Georgia Institute of Technology, USA); Nil Gurel (University of California, Los Angeles, USA); Matthew Wittbrodt (Northwestern University School of Medicine, USA); Amit J Shah and Viola Vaccarino (Rollins School of Public Health, USA); Douglas Bremner (Emory School of Medicine, USA); Omer T Inan (Georgia Institute of Technology, USA)

Gaze Behaviour During Reading as a Predictor of Mild Cognitive Impairment

Vida Groznik (University of Ljubljana & NEUS Diagnostics, doo, Slovenia); Martin Možina and Timotej Lazar (University of Ljubljana, Slovenia); Dejan Georgiev (University Medical Centre Ljubljana, Slovenia); Aleksander Sadikov (University of Ljubljana, Slovenia)

13:00-14:00

BHI Special Session: In silico clinical trials: Al and biomechanical modeling of heart disease

Session Chairs: Nenad Filipovic & Winston Wu

A machine learning risk stratification and disease progression modeling for hypertrophic cardiomyopathy

Tim Smole (University of Ljubljana, Slovenia); Bojan Žunkovič (University of Ljubljana, Faculty of Computer and Information Science, Slovenia); Matej Pičulin (University of Ljubljana, Slovenia); Enja Kokalj (University of Ljubljana, Faculty of Computer and Information Science, Slovenia); Marko Robnik-Šikonja and Matjaž Kukar (University of Ljubljana, Slovenia); Dimitris Fotiadis (Institute of Molecular Biology and Biotechnology, FORTH, Greece & University of Ioannina, Greece); Vasileios C. Pezoulas (University of Ioannina, Greece); Nikolaos Tachos (Unit of Medical Technology and Intelligent Information Systems, Greece); Fausto Barlocco and Francesco Mazzarotto (University of Florence, Italy); Dejana Popovic (University Clinical Center of Serbia, Serbia); Lars S Maier (University of Regensburg, Germany); Lazar Velicki (Faculty of Medicine, University of Novi Sad, Serbia); Iacopo Olivotto (University of Florence, Italy); Djordje G Jakovljevic (Faculty of Medical Sciences, Newcastle University, United Kingdom (Great Britain)); Nenad Filipovic (University of Kragujevac, Serbia); Zoran Bosnić (University of Ljubljana, Faculty of Computer and Information Science, Slovenia)

Design of the SILICOFCM Cloud Platform: integrating the effects of pharmacological vs lifestyle interventions on hypertrophic cardiomyopathy

Lazar Velicki (Faculty of Medicine, University of Novi Sad, Serbia); Nduka C Okwose (Newcastle University, United Kingdom (Great Britain)); Dejana Popovic (University Clinical Center of Serbia, Serbia); Andrej Preveden (Institute of Cardiovascular Diseases Vojvodina & University of Novi Sad, Faculty of Medicine, Serbia); Fausto Barlocco (University of Florence, Italy); Maria Tafelmeier (University Hospital Regensburg, United Kingdom (Great Britain)); Lars S Maier (University of Regensburg, Germany); Iacopo Olivotto (University of Florence, Italy); Arsen Ristic (University of Belgrade, United Kingdom (Great Britain)); Ouy MacGowan (Newcastle University, United Kingdom (Great Britain)); Nenad Filipovic (University of Kragujevac, Serbia); Djordje G Jakovljevic (Faculty of Medical Sciences, Newcastle University, United Kingdom (Great Britain))

Huxley Surrogate Model Based on Gated-Recurrent Units and Temporal Convolutional Networks

Bogdan Milicevic (University of Kragujevac & Bioengineering Research and Development Center BioIRC, Serbia); Milos Ivanovic and Boban Stojanovic (University of Kragujevac, Faculty of Science, Serbia); Nenad Filipovic (University of Kragujevac, Serbia)

Automatic segmentation and 3D reconstruction of plaque components in carotid artery from ultrasound images

Tijana Djukic (Institute for Information Technologies, University of Kragujevac, Serbia); Branko Arsic (Faculty of Science, University of Kragujevac, Serbia); Smiljana Djorovic (Faculty of Engineering, University of Kragujevac, Serbia); Branko Gakovic and Igor Koncar (Clinic for Vascular and Endovascular Surgery, Serbian Clinical Centre, Belgrade, Serbia); Nenad Filipovic (University of Kragujevac, Serbia)

Biomechanical modeling of the heart left ventricle

Miljan Milosevic (Bioengineering Research and Development Center BioIRC & Metropolitan University Belgrade, Serbia); Bogdan Milicevic (University of Kragujevac & Bioengineering Research and Development Center BioIRC, Serbia); Vladimir Simic and Vladimir Geroski (Bioengineering Research and Development Center BioIRC, Serbia); Nenad Filipovic (University of Kragujevac, Serbia); Milos Kojic (Bioengineering Research and Development Center BioIRC, Serbia)

Ultrasound image processing and 3D reconstruction of heart in patients with cardiomyopathy

Tijana Sustersic (Faculty of Engineering, University of Kragujevac & Bioengineering Research and Development Center (BioIRC), Serbia); Andjela Blagojevic (Faculty of Engineering, University of Kragujevac & Bioengineering Research and Development Center, Serbia); Bogdan Milicevic (University of Kragujevac & Bioengineering Research and Development Center BioIRC, Serbia); Miljan Milosevic (Bioengineering Research and Development Center BioIRC & Metropolitan University Belgrade, Serbia); Stefan Simovic (Faculty of Medical Sciences, University of Kragujevac & BioIRC, Serbia); Nenad Filipovic (University of Kragujevac, Serbia)

BSN Session: Medical and Wellness Applications Session Chairs: Christina Chase & Giancarlo Fortino

Wavelet-based analysis of gait for automated frailty assessment with a wrist-worn device

Domenico Minici (Dept. of Information Engineering, University of Pisa, Pisa, Italy); Guglielmo Cola (Institute of Informatics and Telematics, IIT-CNR, Pisa, Italy); Antonella Giordano and Silvana Antoci (Research Unit of Medicine of Aging, Dept. of Clinical and Experimental Medicine, University of Florence, Firenze, Italy); Elena Girardi (Unit of Geriatrics - Geriatrics Intensive Care Unit, Dept. of Medicine and Geriatrics, Careggi Hospital, Firenze, Italy); Mauro Di Bari (Research Unit of Medicine of Aging, Dept. of Clinical and Experimental Medicine, University of Florence, Firenze, Italy); Marco Avvenuti (Dept. of Information Engineering, University of Pisa, Pisa, Italy)

Adaptive Surface Electromyography Normalization for Long-Duration Recordings

Samantha Fox (University of Vermont, USA); Reed D Gurchiek (Stanford University, USA); Anna Teresa Ursiny (University of Vermont & M-Sense Research Group, USA); Brett M Meyer, Julianne M Boughton and Ryan S McGinnis (University of Vermont, USA)

Better Battery Life: Towards Energy-Efficient Smartwatch-Based Atrial Fibrillation Detection in Ambulatory Free-living Environment

Hanbin Zhang (University at Buffalo, SUNY, USA); Viswam Nathan, Li Zhu, Jilong Kuang, Jacob Kim and Alex Gao (Samsung Research America, USA)

An Artificial ear - A wearable device for the hearing impaired

Antonia Pavlidou (Imperial College London, United Kingdom (Great Britain)); Benny Lo (Imperial College, United Kingdom (Great Britain))

Reliable Real-Time Sensing of Respiration Rate Using Channel State Information Modeling in Wireless Body Area Networks Lawrence Lee, Ruslan Dautov and Gill R Tsouri (Rochester Institute of Technology, USA)

Real-Time ECG Interval Monitoring Using a Fully Disposable Wireless Patch Sensor

Gabriel Nallathambi (Vital Connect, Inc, USA); Paurakh L Rajbhandary (Vital Connect Inc., USA); Thang Tran and Olivier Colliou (Vital Connect, Inc, USA)

13:00-14:00

BSN Special Session: Advancements in Sensors, Algorithms and Clinical Trials for Non-invasive and Cuffless Blood Pressure Monitoring Session Chair: Yali Zheng

Estimation Fusion Improves Cuffless Blood Pressure Waveform Prediction

Cederick Landry, Sean Peterson and Arash Arami (University of Waterloo, Canada)

Evaluation of Cuff-Less Blood Pressure Measurement Devices: Challenges and Recommendations

Ramakrishna Mukkamala (University of Pittsburgh, USA)

Non-invasive and finger-worn system for capillary blood pressure measurement

Jing Liu (University of Souther California, USA)

Towards the longitudinal measurement of day and night blood pressure with the Aktiia optical device: improving the diagnosis and management of hypertension at scale

Josep Sola, Sibylle Fallet and David Perruchoud (Aktiia SA, Switzerland)

Wrist-worn Soft Sensor Array for Continuous, Cuffless Blood Pressure Monitoring

Sung-Min Park and Vega Pradana Rachim (POSTECH, Korea (South))

14:00-14:30 Keynote Lecture

Session Chairs: Daniela Giordano

Improving Consideration of Social and Cognitive Behaviors in Advancing Informatics Technologies for Health Care

Vimla L Patel, Center for Cognitive Studies in Medicine and Public Health at the New York Academy of Medicine, US

14:30-15:00 Keynote Lecture

Session Chairs: Omer Inan

Soft, Wearable Systems with Integrated Microfluidics and Biosensors for Remote Health Monitoring

Roozbeh Ghaffari, Northwestern University, US

15:00-15:05

Break

15:05-16:05 Regulatory panel

Session Chairs: Nenad Filipovic

Regulatory issues for medical devices panel

Kevin Fu, ÚS FDA Acting Director for Medical Device Cybersecurity; Andreas Melzer, University of Leipzig, Germany; Nick Petrick, OHT7: Office of In Vitro Diagnostics and Radiological Health; Yiannos Tolias, Legal Lead AI and AI liability in healthcare, European Commission, Belgium

16:05-16:10

Break

16:10-17:10

BHI Special Session: Personalized Dietary Informatics for Precision Nutrition

Session Chairs: Benny Lo & Edward Sazonov

An Overview of Synthetic Food Image Generation

Yue Han and Mridul Gupta (Purdue University, USA); Edward Delp (Purdue University & School of ECE, USA)

Detecting Granular Eating Behaviors in Lab and Free-Living Environments

Mark Mirtchouk and Samantha Kleinberg (Stevens Institute of Technology, USA)

Nudging for good: Real-time Al-driven diagnostics and behavior change to improve adolescents' diets and nutrition in urban Ghana and Viet Nam

Aulo Gelli (International Food Policy Research Institute (IFPRI), USA); Noora-Lisa Aberman (GAIN, USA); Alejandra Arrieta (University of Washington, USA); Boateng Bannerman (GIMPA, ACCRA GHANA, Ghana); Bianca Braga (Tufts University, USA); Gloria Folson (University of Ghana, Ghana); Rohit Gangupantulu (Penn State University, USA); Phuong Huynh (National Institute of Nutrition, Vietnam); Bastien Koch (International Food Policy Research Institute (IFPRI), USA); Lan Tran Mai (FHI International, Vietnam); Peter C McCloskey (Pennsylvania State University, USA); Hoang Nga (National Institute of Nutrition, Vietnam); Phuong Nguyen (International Food Policy Research Institute (IFPRI), Vietnam); David Hughes (Penn State University, USA)

Privacy Enhancing Framework to Advance Models of Behavior

Nabil Alshurafa (Northwestern University, USA)

Medipiatto: Promoting the Mediterranean Diet by using Meal Image Analysis and Artificial Intelligence

Stavroula Mougiakakou (University of Bern, Switzerland)

Estimating Food Volume in a Bowl Based on Geometric Image Features

Boyang Li and Wenyan Jia (University of Pittsburgh, USA); Zhi-Hong Mao (University of Pittsburg, USA); Thomas Baranowski (Baylor College of Medicine, USA); Lora Burke (University of Pittsburgh, Schools of Nursing, Public Health, and CTSI, USA); Mingui Sun (University of Pittsburgh, USA)

16:10-17:10

BHI Special Session: Sensor-based behavioral informatics in support of Health Management and Care

Session Chairs: Nikolaos Tachos & Manolis Tsiknakis

Ageing@Work: Health Behavior Tracking Through a Mobile-Based Multimodal Framework

Andreas Triantafyllidis (Information Technologies Institute, Centre for Research and Technology Hellas, Greece); Dimitrios Giakoumis (CERTH-ITI, Greece); Konstantinos Votis (Information Technologies Institute, Centre For Research and Technology Hellas, Greece); Dimitrios Tzovaras (Centre for Research and Technology Hellas, Greece)

Behaviour profiling for adaptive personalized interactions of an AR smart glasses solution in the working environment

Evanthia E Tripoliti (University of Ioannina & Unit of Medical Technology and Intelligent Information Systems, Greece); Dimitris Fotiadis (Institute of Molecular Biology and Biotechnology, FORTH, Greece & University of Ioannina, Greece)

Estimation of Frustration Levels with Dynamic Bayesian Networks

Eleni Georga (University of Ioannina, Greece); Dimitrios Kikidis, Athanasios Bibas and Christos Nikitas (National Kapodistrian University of Athens, Greece); Isabelle Daniela Walz (Faculty of Medicine, University of Freiburg, Germany); Christoph Maurer (Neurologische Universitätsklinik, Germany); Dimitris Fotiadis (Institute of Molecular Biology and Biotechnology, FORTH, Greece & University of Ioannina, Greece)

Fostering Palliative Care through Behavioral Informatics

Lefteris Koumakis (Computational Biomedicine Laboratory, FORTH-ICS, Greece); Fatima Schera (Fraunhofer Institute for Biomedical Engineering IBMT, St Ingbert, Germany); Stefan Hoffmann (Promotion Software, Germany); Heather Parker (Atlantis Healthcare, United Kingdom (Great Britain)); Maria E Chatzimina (Foundation for Research and Technology - Hellas (FORTH), Greece); Panos Bonotis (Centre for Research and Technology - Hellas, Greece & University of Western Macedonia, Greece); Panagiotis Argyropaidas and Giorgos Zacharioudakis (Foundation for Research and Technology - Hellas (FORTH), Greece); Pantelis Natsiavas (Centre for Research and Technology-Hellas (CERTH), Greece)

Resilience Indices for Breast Cancer Management

Haridimos Kondylakis (Computational Biomedicine Laboratory, FORTH-ICS, Greece); Panagiotis Simos (School of Medicine, University of Crete, Greece); Evangelos Karademas (University of Crete, Greece); Kostas Marias (FORTH, Greece); Paula Poikonen-Saksela (Helsinki University Hospital, Finland)

Automated Segmentation of a Timed Up and Go Test Using an Instrumented Cane

Ameya Sharad Valsangkar (University of New Brunswick & Institute of Biomedical Engieering, Canada); Pradeep Kumar and Erik Scheme (University of New Brunswick, Canada)

16:10-17:10

BSN Special Session: Digital Biomarkers for Monitoring and Predicting Upper Limb Recovery After Stroke

Session Chair: Christoph Kanzler

Upper limb activity performance after stroke, as measured by wearable sensors

Catherine E Lang (Washington University School of Medicine, USA)

Towards Estimating Upper-Limb Impairment in Stroke Survivors using a Single Wrist-Worn Sensor

Sunghoon Ivan Lee (University of Massachusetts, USA)

Digital Biomarkers for Maximizing the Benefits of Upper Extremity Movement Training after Stroke: Sensation, Synergy, Success

Reinkensmeyer David (UC Irvine, USA)

16:10-17:10

BSN Special Session: Non-Contact Technologies for Pervasive Healthcare

Session Chair:

Non-Invasive Photoplethysmography for Multi Physiological Parameter Monitoring

Ye Sun (Michigan Technological University, USA)

Heart Rate Detection using a Contactless Bed Sensor: A Comparative Study of Wavelet Methods

Ibrahim Sadek (University of Sherbrooke & Helwan University, Canada); Bessam Abdulrazak (Université de Sherbrooke, Canada); Terry Heng and Edwin Seet (Khoo Teck Puat Hospital, Singapore)

Capacitive Measurement of Bioelectrical Signal and its Application for Healthcare IoT

Hyun Jae Baek (Soonchunhyang University, Korea (South))

17:10-18:10

BHI Session: Bioinformatics
Session Chair: Barbara Di Camillo

Pneumothorax Segmentation In Chest X-Rays Using UNet++ And EfficientNet

Khai-My Vong (University of Science, Ho Chi Minh city, Vietnam); Tien Dinh (University of Science, Vietnam)

In Vitro Validation of a Novel Image-Based Inverse Method for Mechanical Characterization of Vessels

Bharath Narayanan (École Polytechnique Fédérale de Lausanne, Switzerland); Max L Olender (Massachusetts Institute of Technology, USA); Farhad Nezami (Brigham and Women's Hospital, USA); Elazer Edelman and David Marlevi (Massachusetts Institute of Technology, USA)

Computational insights on the molecular mechanisms across breast cancer progression combining gene differential expression and coexpression

Emmanouil Ikonomakis (University of Patras, Greece); Marilena Bourdakou and George Kolios (Democritus University of Thrace, Greece); Michael N. Vrahatis (University of Patras, Greece); George Spyrou (The Cyprus Institute of Neurology and Genetics, Cyprus)

Statistical Dependence between Neuronal Spike Train Pairs: Quantification based on Empirical Mutual Information Rate

Sathish Ande and Srinivas Avasarala (IIT Hyderabad, India); Ajith Karunarathne (The University of Toledo, USA); Lopamudra Giri and Soumya Jana (Indian Institute of Technology, Hyderabad, India)

KARGA: Multi-platform Toolkit for k-mer-based Antibiotic Resistance Gene Analysis of High-throughput Sequencing Data Mattia Prosperi and Simone Marini (University of Florida, USA)

17:10-18:10

BHI Special Session: Al-driven Informatics and Technologies for Cardiovascular Care using multi-modal data from EMRs and/or Wearables Session Chair: Bobak Mortazavi; Wenyao Xu

ECGDualNet: A Dual-Purpose Pipeline Incorporating Signal and Image Processing for Automated Electrocardiogram Diagnosis Veer Sangha and Rohan Khera (Yale University, USA)

Predicting Risk of Death 1-year after Hospital Discharge Using a Single Discharge Note among Patients with Acute Heart Failure Ben Rosand, Dragomir Radev, Harlan Krumholz and Rohan Khera (Yale University, USA)

Personalized Digital Health Information to Substantiate Human-Delivered Exercise Support for Adults with Type 1 Diabetes Garrett Ash (Yale University, USA)

Predicting Generalization of Deep Learning Models on Medical Images Using Margin Signature

Victor Lee (Yale School of Medicine, USA); Sanjay Aneja (Yale University, USA)

On the development of an in-silico cloud computing platform for virtual patients in hypertrophic cardiomyopathy

Grigoris Grigoriadis, Vasileios C. Pezoulas, Maria Roumpi and George Gkois (University of Ioannina, Greece); Nikolaos Tachos (Unit of Medical Technology and Intelligent Information Systems, Greece); Momcilo Prodanovic (University of Kragujevac, Faculty of Engineering & Bioengineering Research and Development Center (BioIRC), Serbia); Danica Prodanović (University of Kragujevac, Faculty of Science & Bioengineering Research and Development Center (BioIRC), Serbia); Boban Stojanovic (University of Kragujevac, Faculty of Science, Serbia); Srboljub M. Mijailovich (Illinois Institute of Technology, USA); Nenad Filipovic (University of Kragujevac, Serbia); Dimitris Fotiadis (Institute of Molecular Biology and Biotechnology, FORTH, Greece & University of Ioannina, Greece)

Continuous Atrial Fibrillation Detection with a Smartwatch

Li Zhu, Viswam Nathan, Jilong Kuang and Jacob Kim (Samsung Research America, USA); Robert Avram and Jeffrey Olgin (University of California San Francisco, USA); Alex Gao (Samsung Research America, USA)

17:10-18:10

BSN Special Session: New Technologies for the Future of Prenatal Health

Session Chairs: Julien Penders

Heart rate variability code: does it exist and can we hack it?

Martin Gerbert Frasch (Heart Rate AI, USA)

Towards Noninvasive Accurate Detection of Intrapartum Fetal Hypoxic Distress

Begum Kasap (University of California Davis, USA); Kourosh Vali and Weitai Qian (University of California, Davis, USA); Herman L. Hedriana, Aijun Wang and Diana L. Farmer (University of California Davis Health, USA); Soheil Ghiasi (University of California, Davis, USA)

Detection of preventable fetal distress during labor from scanned cardiotocogram tracings using deep learning

Martin Gerbert Frasch and Shadrian Strong (Heart Rate AI, USA); David Nilosek (Heart Rate AI, Inc, USA); Barry S. Schifrin (Heart Rate AI, USA)

17:10-18:10

BSN Special Session: Wearable solutions for continuous, efficient and accurate lung monitoring for innovative diagnostics in lung related chronic diseases

Session Chairs: Rita Paradiso

18:10-18:40

Poster Session # 4

Chair: Ivan lee

A Pilot Study using Covert Visuospatial Attention as an EEG-based Brain Computer Interface to Enhance AR Interaction Nataliya Kosmyna (MIT Media Lab, USA)

Oil Membrane Protected Sensor - A Key Breakthrough for Continuous Sweat Biosensing

Yuchan Yuan, Madeline DeBrosse and Jason Heikenfeld (University of Cincinnati, USA)

Mobile Depression Screening with Time Series of Text Logs and Call Logs

Monica L. Tlachac, Veronica Melican, Miranda Reisch and Elke Rundensteiner (Worcester Polytechnic Institute, USA)

Event-Triggered Decision Support and Automatic Control Systems for Type 1 Diabetes

Xiaoyu Sun and Mudassir Rashid (Illinois Institute of Technology, USA); Mohammad Reza Askari (400 E. 33rd Street & Illinois Institute of Technology, USA); Nicole Hobbs, Rachel Brandt and Ali Cinar (Illinois Institute of Technology, USA)

Estimating the Quality of Reaching Movements in Stroke Survivors

Juhyeon Lee and Hee-Tae Jung (University of Massachusetts Amherst, USA); Sunghoon Ivan Lee (University of Massachusetts, USA)

A Metric Learning Approach for Personalized Meal Macronutrient Estimation from Postprandial Glucose Response Signals

Michael Yang, Projna Paromita, Theodora Chaspari, Anurag Das and Seyedhooman Sajjadi (Texas A&M University, USA); Bobak Jack Mortazavi (Texas A&M University & Center for Outcomes Research and Evaluation - Yale University, USA); Ricardo Gutierrez-Osuna (Texas A&M University, USA)

Analysis of Regions of Interest and Distractor Regions in Breast Biopsy Images

Ximing Lu (University of Washington, USA); Sachin Mehta (Apple Inc., USA); Tad Brunyé (Tufts University, Medford, MA, United States, USA); Donald Weaver (University of Vermont, Burlington, VT, USA); Joann Elmore (University of California, Los Angeles, USA); Linda Shapiro (University of Washington, USA)

Screening for Suicidal Ideation with Text Messages

Monica L. Tlachac (Worcester Polytechnic Institute, USA); Katherine Dixon-Gordon (University of Massachusetts Amherst, USA); Elke Rundensteiner (Worcester Polytechnic Institute, USA)

A Pilot Study on Video-based Eye Movement Assessment of the NeuroEye Examination

Mohamed A Hassan (Electrical and Computer Engineering, USA); Xuwang Yin, Yan Zhuang, Chad M Aldridge, Timothy McMurry, Andrew Southerland and Gustavo Rohde (University of Virginia, USA)

Localization of Ocular Vessels with Context Sensitive Semantic Segmentation

Muhammad Zubair Khan (University of Missouri-Kansas City, USA)

Infusing Culture in Compartmental Epidemic Models

Eunice Santos (University of Illinois at Urbana-Champaign, USA); John Korah (California State Polytechnic University Pomona, USA); Suresh Subramanian and Vairavan Murugappan (University of Illinois at Urbana-Champaign, USA); Eugene Santos, Jr. (Dartmouth College, USA)

Behavioral Analysis of Airway Deformation during Drug Induced Sleep Endoscopy

Shane M Transue, Kevin R Macfarlane and Min-Hyung Choi (University of Colorado Denver, USA)

Screening Fundus Images to Extract Multiple Ocular Features: A Unified Modeling Approach

Muhammad Zubair Khan (University of Missouri-Kansas City, USA)

Improving Heart Transplant Rejection Classification Training using Progressive Generative Adversarial Networks

Ali Mirzazadeh, Arshawn Mohseni and Sahar Ibrahim (Georgia Institute of Technology, USA); Felipe O Giuste (Georgia Institute of Technology & Emory University School of Medicine, USA); Yuanda Zhu (Georgia Institute of Technology, USA); Bahig Shehata (Wayne State University School of Medicine, USA); Shriprasad Deshpande (Children's National Health System, USA); May Dongmei Wang (Georgia Institute of Technology and Emory University, USA)

Theory-Guided Randomized Neural Networks for Decoding Medication-Taking Behavior

Navreet Kaur (University of Virginia, USA); Manuel Gonzales IV (SDSU/UC San Diego Joint Doctoral Program in Clinical Psychology, USA); Cristian Garcia Alcaraz (SDSU/UCSD Joint Doctoral Program in Clinical Psychology, USA); Laura E Barnes (University of Virginia, USA); Kristen Wells (San Diego State University & SDSU/UC San Diego Joint Doctoral Program in Clinical Psychology, USA); Jiaqi Gong (University of Alabama, USA)

An Expansion for Automated Cardiac Anomaly Detection Frameworks with Multimodal Missing Data Imputation

Can Usanmaz, Matthew E White and Marcus Valancius (Georgia Institute of Technology, USA); May Dongmei Wang (Georgia Tech and Emory Univ, USA)

Ambulation Assessment Using Depth Cameras

Zihang You, Alec Steele and Mehrdad Nourani (University of Texas at Dallas, USA); Melinda Bopp and Dennis Sullivan (Central Arkansas Veterans Healthcare System, USA)

Effect of exposure time in adaptive processing of Laser Speckle Contrast Imaging

E. Morales-Vargas (INAOE, Mexico); Hayde Peregrina-Barreto (Instituto Nacional de Astrofísica, Óptica y Electrónica, Mexico); Julio Cesar Ramirez-San-Juan (INAOE, Mexico)

Central Blood Pressure Estimation via Partially Individualized Multi-Channel Transfer Function

Zahra Ghasemi (Abbott Laboratories, USA); Jin-Oh Hahn (University of Maryland, USA); Hm Cheng (National Yang Ming Chiao Tung University, Taiwan); Shih-Hsien Sung (National Yang-Ming University, Taiwan); Ramakrishna Mukkamala (University of Pittsburgh, USA)

skin lesion segmentation and classification using Mask RCNN and Transfer Learning

Lin Li and Wonseok Seo (Seattle University, USA)

Leveraging Integrated Patient Information Using an Instrumented Wheelchair

Daniela America da Silva (Instituto Tecnológico de Aeronáutica, Brazil); Gildarcio Sousa Goncalves, Victor Pugliese and Julhio Navas (Brazilian Aeronautics Institute of Technology, Brazil); Johnny Marques (Aeronautics Institute of Technology, Brazil); Luis Alberto Vieira Dias (ITA, Brazil); Adilson da Cunha and Paulo Tasinaffo (Brazilian Aeronautics Institute of Technology, Brazil); Jose Augusto Lopes, Eduardo Yamanaka, Denise Tsukimoto and Linamara Battistella (University of Sao Paulo, Brazil)

Prioritization of Multi-level Risk Factors in Depression Ratings after Treatment Using Multi-Task Learning

Lu Wang and Mark Chignell (University of Toronto, Canada); Martin Katzman, Sachinthya Lokuge, Geneva Mason and Kathryn Fotinos (S. T. A. R. T. Clinic, Canada); Haoyan Jiang (University of Toronto, Canada)

Hierarchical Clusters of Symptoms in Multi-Study Depression Data

Lu Wang, Mark Chignell and Haoyan Jiang (University of Toronto, Canada); Sachinthya Lokuge, Geneva Mason, Kathryn Fotinos and Martin Katzman (S. T. A. R. T. Clinic, Canada)

COVID-19 Prevalence Estimation Using Multiple Linear Models

Rachel E Epperson (Georgia Institute of Technology, USA); Felipe O Giuste (Georgia Institute of Technology & Emory University School of Medicine, USA); May Dongmei Wang (Georgia Institute of Technology and Emory University, USA)

Covidentify: Using Commercial Wearable Devices and Smartphones to Detect and Monitor COVID-19

Md Mobashir Hasan Shandhi, Peter J Cho, Ke Wang, Karnika Singh, Geoffrey S Ginsburg, Ryan J Shaw and Jessilyn Dunn (Duke University, USA)

A Mobile Application for Real-time Accelerometry and Electromyography Analysis in Rehabilitation with Cross-Axial Sensor Fusion Support Alexandros Mathioudakis, Jeren J Koh and Krystyna Gielo-Perczak (University of Connecticut, USA)

Evaluating the Impact of Holidays on COVID-19 Dynamics in the USA Using a SIRD Model

Sofiya Vyshnya, Soumil Nariani, Mikaila Dowd and Cauviya Selva (The Georgia Institute of Technology, USA); Felipe O Giuste (Georgia Institute of Technology & Emory University School of Medicine, USA); Wenqi Shi (Georgia Institute of Technology, USA); May Dongmei Wang (Georgia Institute of Technology and Emory University, USA)

Use of speech features to track the progression of dysarthria and identify early onset in people with Huntington's disease

Hung P Nguyen (BioSensics, USA); Meghan Pawlik (University of Rochester Medical Cneter, USA); Ray Dorsey, Madeleine Coffey, Christopher Tarolli and Ruth Schneider (University of Rochester Medical Center, USA); Bijan Najafi (Baylor College of Medicine, USA); He Zhou and Hamid Ebrahimi (BioSensics, USA); Ashkan Vaziri (BioSensics); Jamie Adams (University of Rochester Medical Center, USA)

Detecting Adverse Drug Events via Protein Sequence-Structure Similarity Networks

Saminur Islam (West Virginia University, USA); Ahmed Abassi (University of Notre Dame, USA); Nitin Agarwal (University of Arkansas at Little Rock, USA); Wanhong Zheng, Gianfranco Doretto and Donald Adjeroh (West Virginia University, USA)

A Mobile Device Application of Deep Learning for Onset Stroke Detection

Aaron C Lee (630 San Marino Ave & Flintridge Preparatory School, USA); Daniel Che (Academy for Advanced Research and Development, USA); Kevin Z. Qi (Boston College, USA); Evan Patton (Massachusetts Institute of Technology, USA); Tingying Helen Zeng (Academy for Advanced Research and Development, USA)

Data-Driven Inference of Clinical Pathway Components for Identifying Basic Treatment Patterns from Electronic Health Records

Minsu Kim, Byung-Hoon Park, Ozgur Ozmen, Everett Rush and Junghoon Chae (Oak Ridge National Laboratory, USA); Makoto Jones, Randall Rupper, Jeffrey Humpherys, Merry Ward and Jonathan Nebeker (Veterans Administration, USA)

Quantifying the Effect of Body and Arm Posture on the Wrist Ballistocardiogram-Photoplethysmogram Pulse Transit Time

Azin Mousavi and Jin-Oh Hahn (University of Maryland, USA); Ramakrishna Mukkamala (University of Pittsburgh, USA); Sungtae Shin (University of Mayland, USA); Sophia Lyle and Elisabeth Jang (University of Maryland, USA); Peyman Yousefian (University of Mayland, USA); Dae-Geun Jang (Device Research Center, Samsung Advanced Institute of Technology, USA); Uikun Kwon (Samsung Electronics, Korea (South)); Youn Ho Kim (SAIT, Korea (South))

Classification of Blood Volume State via Wearable Physiological Sensing and Machine Learning

Yekanth Ram Chalumuri (University of Maryland, USA); Jacob Kimball (Georgia Institute of Technology, USA); Azin Mousavi (University of Maryland, USA); Jonathan Zia (Georgia Institute of Technology, USA); Christopher Rolfes (Translational Training and Testing Laboratories Inc. (T3 Labs), USA); Jesse Parreira (University of Maryland, USA); Omer T Inan (Georgia Institute of Technology, USA); Jin-Oh Hahn (University of Maryland, USA)

Friday, July 30

12:30-13:00 Poster Session # 5 Chair: Shyamal Patel

Self-directed assessment of standing balance and falls risk using a smartphone

Barry R. Greene (Kinesis Health Technologies, Ireland); Killian McManus (University College Dublin & Kinesis Health Technologies, Ireland); Lilian Genaro Motti Ader (University of Limerick, Ireland); Brian Caulfield (University College Dublin, USA)

Evaluation of Wearable Flex Sensor for Spine Angle Measurement during Picking-up Motion

Tatsuya Onishi, Ibai Gorordo Fernandez and Kodai Kitagawa (Kyushu Institute of Technology, Japan); Yuji Katae (Katae Orthopaedic and Rheumatology Clinic, Japan); Naoki Chijiwa, Aki Kuwazono and Hisashi Arizono (Arizono Orthopedic Supplies Co., Ltd., Japan); Chikamune Wada (Kyushu Institute of Technology, Japan)

Single IMU assessment of postural sway and falls risk in older adults

Killian McManus (University College Dublin & Kinesis Health Technologies, Ireland); Barry R. Greene (Kinesis Health Technologies, Ireland); Lilian Genaro Motti Ader (University of Limerick, Ireland); Brian Caulfield (University College Dublin, USA)

A Hybrid Factor Graph Model for Biomedical Activity Detection

Mareike Stender (German Research Center for Artificial Intelligence, Germany); Jan Graßhoff (Institute for Electrical Engineering in Medicine & Universität zu Lübeck, Germany); Tanya Braun (University of Luebeck, Germany); Ralf Möller (Universität zu Lübeck, Germany); Philipp Rostalski (Universität zu Lübeck & Institute for Electrical Engineering in Medicine, Germany)

Single-channel EEG-based subject identification using visual stimuli

Stamos Katsigiannis (Durham University, United Kingdom (Great Britain)); Pablo Arnau Gonzalez (University West Of Scotland, United Kingdom (Great Britain)); Miguel Arevalillo-Herráez (Universitat de Valencia, Spain); Naeem Ramzan (University of West of Scotland, United Kingdom (Great Britain))

EMoCy: Towards Physiological Signals-Based Stress Detection

Armando Bellante (Politecnico di Milano & Alta Scuola Politecnica, Italy); Letizia Bergamasco (Politecnico di Torino & Alta Scuola Politecnica, Italy); Ana Bogdanovic (Politecnico di Milano, Serbia); Noemi Gozzi and Anisia Lauditi (Politecnico di Milano & Alta Scuola Politecnica, Italy); Lorenzo Gecchelin, Moaad Khamlich and Eleonora D'Arnese (Politecnico di Milano, Italy); Marco D Santambrogio (Politecnico di Milano & MIT, Italy)

Efficient Screening of Diseased Eyes based on Fundus Autofluorescence Images using Support Vector Machine

Shanmukh Reddy Manne (Indian Institute of Technology Hyderabad, India); Kiran Kumar Vupparaboina (University of Pittsburgh, USA); Gowtham Chowdary Gudapati and Ram Anudeep Peddoju (Indian Institute of Technology Hyderabad, India); Konkimalla Chandra Prakash (IIT Hyderabad, India); Abhilash Goud and Sarforaz Bin Bashar (L V Prasad Eye Institute Hyderabad, India); Soumya Jana (Indian Institute of Technology, Hyderabad, India)

A Comparison of Explanations given by Explainable Artificial Intelligence Methods on Analysing Electronic Health Records

Jamie Andrew Duell (Swansea University & UKRI Centre for Doctoral Training in Artificial Intelligence, Machine Learning & Advanced Computing, United Kingdom (Great Britain)); Xiuyi Fan, Bruce Burnett and Gert Aarts (Swansea University, United Kingdom (Great Britain)); Shangming Zhou (University of Plymouth, United Kingdom (Great Britain))

A Multilayer Perceptron-based Carotid-to-Femoral Pulse Wave Velocity Estimation using PPG Signal

Mohamed A. Bahloul (King Abdullah University of Science and Technology, Thuwal, Saudi Arabia); Abderrazak Chahid and Taous-Meriem Laleg-Kirati (King Abdullah University of Sciences and Engineering (KAUST), Saudi Arabia)

Deployment of Physiologic-Heart Rate Indices in Mental Healthcare

Omid Jamalipournokandeh (Niigata University, Japan); Yana Kazuo (Hosei University, Japan); Junichi Hori (Niigata University, Japan)

Recurrence Quantification Analysis of Gait Rhythm in Patients Affected by Parkinson's Disease

Alessandro Mengarelli, Andrea Tigrini and Sandro Fioretti (Università Politecnica delle Marche, Italy); Federica Verdini (Universita' Politecnica delle Marche, Italy)

Automatic Storytelling from Wearable Sensor Data for Health and Wellness Applications

Ky Trung Nguyen (VTT Technical Research Centre of Finland Ltd., Finland); Jani Mantyjärvi (VTT, Finland); Tran Thi Ngoc Nguyen (Ho Chi Minh City University of Food Industry, Vietnam)

Heart Rate Variability Extraction using Commodity Wi-Fi Devices via Time Domain Signal Processing

Itsuki Shirakami and Takashi Sato (Kyoto University, Japan)

Disentangling the association between genetics and functional connectivity in Mild Cognitive Impairment

Heba Elshatoury (University of Tartu, Estonia); Federica Cruciani, Francesco Zumerle and Silvia Francesca Storti (University of Verona, Italy); André Altmann (University College London, United Kingdom (Great Britain)); Marco Lorenzi (Inria Sophia Antipolis, France); Gholamreza Anbarjafari (University of Tartu, Estonia); Gloria Menegaz and Ilaria Boscolo Galazzo (University of Verona, Italy)

Phonography-based Measurement of Fetal Heart Rate and Fetal Breathing Movements

Bálint Áron Üveges (Pázmány Péter Catholic University, Hungary); Ferenc Kovacs (Pazmany Peter Catholic University, Hungary)

Real-time implementation of EEG inverse problem solution through parallelization

Nikos Terzopoulos, Alkinoos Athanasiou, Konstantinos Mitsopoulos, Niki Pandria, Panagiotis Antoniou, Apostolos Praftsiotis and Athanasios Arvanitidis (Aristotle University of Thessaloniki, Greece); Alexander Astaras (American College of Thessaloniki, Greece); Ioannis Magras (Aristotle University of Thessaloniki, Greece); Panagiotis Bamidis (Medical School of the Aristotle University of Thessaloniki, Greece)

Wearable sensor network monitoring muscle activation and kinematics for use in serious gaming rehabilitation

Konstantinos Mitsopoulos, Panagiotis Antoniou, Apostolos Praftsiotis, Nikos Terzopoulos, Niki Pandria, Athanasios Arvanitidis and Alkinoos Athanasiou (Aristotle University of Thessaloniki, Greece); Alexander Astaras (American College of Thessaloniki, Greece); Ioannis Magras (Aristotle University of Thessaloniki, Greece); Panagiotis Bamidis (Medical School of the Aristotle University of Thessaloniki, Greece)

Proposal and Validation of an Oral Cavity-Friendly Predictive Clinical Electrical Thermometer

Yuji Mizuno (Osaka Electro-Communication University & Faculty of Medical Science and Health-Promotion, Japan)

Exploring a disease network using random walks with bibliometric assessment to reveal potential disease-related pathways

Rafaella Solomou (University of Cyprus, Cyprus); Giannis Savva (KIOS CoE & University of Cyprus, Cyprus); Michalis Mavrovouniotis and Georgios Ellinas (University of Cyprus, Cyprus); Maria K Michael (University of Cyprus & KIOS Center of Excellence, Cyprus); George Spyrou (The Cyprus Institute of Neurology and Genetics, Cyprus); Costas Pitris (University of Cyprus, Cyprus)

An Integrated System for Online Pharmacy Drug Product Matching

Chenxi Dong (China); Qingpeng Zhang (City University of Hong Kong, China); Bin Hu (111, Inc., China); Dalue Lin and Junchang Zhang (China); Kang Cao, Yuechun Yu and Zhichao Yan (111, Inc., China)

Gradient Boosting Algorithms to Classify fNIRS Signals

Dalchand Ahirwar (Indian Institute of Technology Mandi, India); Shweta Na (Indian Institute of Information Technology Allahabad, India); Kshitij Shakya (Indian Institute of Technology, Mandi, India); Shubhajit Roy Chowdhury (School of Computing and Electrical Engineering, IIT Mandi, India)

A Study on Potential Frequency Domain Indicators for STEMI Diagnosis Using Ultra-Short-Term ECG Signals

Ting Xiang and Nan Ji (City University of Hong Kong, Hong Kong); Yuanting Zhang (Hong Kong Centre for Cerebro-Cardiovascular Health Engineering (COCHE), Hong Kong)

Multi-platform Conversational System for Patients Information Collecting in Dermatological Scenarios

Surya Roca (University of Zaragoza, Spain); Yolanda Gilaberte (Miguel Servet University Hospital, IIS Aragón, Spain); José García and Alvaro Alesanco (University of Zaragoza, Spain)

Understanding the Significance of Marker-less Human Pose Estimation Systems for Clinical Biomechanics Analysis

Kai Armstrong (University of Lincoln, United Kingdom (Great Britain))

A Natural Language Processing-based Microservice System for Healthcare Scenarios

Surya Roca (University of Zaragoza, Spain); Sophie Rosset (Université Paris-Saclay, CNRS, LIMSI, France); José García and Alvaro Alesanco (University of Zaragoza, Spain)

Validation of mobile device recording for estimating acoustic voice features

Vitória S Fahed (University College Dublin & Insight Centre for Data Analytics, Ireland); Emer Doheny and Madeleine Lowery (University College Dublin, Ireland)

Bibliometric Analysis of Blockchain Research in Health- Year 2020 as Catalyst for Development

Matthew Pears and Stathis Konstantinidis (University of Nottingham, United Kingdom (Great Britain))

Preserving Privacy in Human-Motion Affect Recognition Abstract

Matthew K Malek-Podjaski and Fani Deligianni (University of Glasgow, United Kingdom (Great Britain))

Investigating common molecular signatures and network motifs for a group of neurodegenerative diseases

Erasmia Papaemmanouil (Aristotle University of Thessaloniki, Greece); Marilena Bourdakou (Democritus University of Thrace, Greece); Stefanos Sgardelis and Ioannis Antoniou (Aristotle University of Thessaloniki, Greece); George Spyrou (The Cyprus Institute of Neurology and Genetics, Cyprus)

Impact of pain on physiological signals in home cancer patients: a cosinor analysis

Serena Moscato and Pierpaolo Palumbo (University of Bologna, Italy); Vittoria Sichi, Andrea Giannelli, Rita Ostan and Silvia Varani (ANT Foundation, Italy); Lorenzo Chiari (University of Bologna, Italy)

A New Mathematical Model of Tonoarteriographic (TAG) Signal with Standard Aspects of its Wearable Measuring Devices

Nan Ji and Ting Xiang (City University of Hong Kong, Hong Kong); Yuanting Zhang (Hong Kong Centre for Cerebro-Cardiovascular Health Engineering (COCHE), Hong Kong)

A Lagrange Polynomial and Hilbert-Huang Transform-based Technology for Heart Rate Estimation with Photoplethymography

Yuan-Fu Cheng, Lih-Jen Kau, Chung-Ping Chen and Yen-Hsing Lin (National Taipei University of Technology, Taiwan)

Bluetooth-based Wireless Electromagnetic Tracking and Navigation System

Charu Pande (Tyndall National Institute & University College Cork, Ireland); Herman Alexander Jaeger and Kilian O'Donoghue (Tyndall National Institute, Ireland); Padraig J Cantillon-Murphy (Tyndall National Institute & Quadrant Scientific, Ireland)

SmartWatch for Real-Time Monitoring and Display of Glucose and Lactate Levels Utilising Microneedle Array Patch

Christina Abraham (Imperial College London, United Kingdom (Great Britain)); Salzitsa Anastasova (Imperial College, London, United Kingdom (Great Britain))

BHI Session: Sensor Informatics and Machine Learning Session Chairs: Themis Exarchos & Fahmi Khalifa

Classification of Cognitive Frailty in Elderly People from Blood Samples using Machine Learning

Shahidan Idris and Nasreen Badruddin (Universiti Teknologi PETRONAS, Malaysia)

Combining Multiple Annotations to Count Cells in 3D Cardiovascular Immunofluorescent Images

William Adorno, Laura Shankman and Donald Brown (University of Virginia, USA)

Respiratory Markers Significantly Enhance Anxiety Detection Using Multimodal Physiological Sensing

Asim H Gazi, Patrick Lis, Arshawn Mohseni and Christopher Ompi (Georgia Institute of Technology, USA); Felipe O Giuste (Georgia Institute of Technology & Emory University School of Medicine, USA); Wenqi Shi and Omer T Inan (Georgia Institute of Technology, USA); May Dongmei Wang (Georgia Institute of Technology and Emory University, USA)

Instrumented shoulder functional assessment using inertial measurement units for frozen shoulder

Ting-Yang Lu (National Yang Ming Chiao Tung University, Taiwan); Kai-Chun Liu (Research Center for Information Technology Innovation, Academia Sinica, Taiwan); Chia-Yeh Hsieh (National Yang Ming Chiao Tung University, Taiwan); Chih-Ya Chang (Tri-Service General Hospital, Taiwan); Yu Tsao (Research Center for Information Technology Innovation, Academia Sinica, Taiwan); Chia-Tai Chan (National Yang Ming Chiao Tung University, Taiwan)

Assessing the Influence of the Inner Clock on the Cortisol Awakening Response and Pre-Awakening Movement

Robert Richer (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany); Arne Küderle, Jana Dörr and Nicolas Rohleder (Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany); Bjoern M Eskofier (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany)

13:00-14:00

BHI Special Session: Real World Data analytics supporting High Value Care

Session Chairs: Fernando Seoane & Vicente Traver

Trusted Analysis Framework Requirements in Clinical Settings

María Dolón, Ivan Pau, María Luisa Martín and Ana Marta Gabaldón (Universidad Politécnica de Madrid, Spain)

Interactive Process Mining-based analysis for the pain management in Emergency Departments

Gema Ibanez-Sanchez (Universitat Politècnica de València, Spain); Angeles Celda (Hospital General Universitari de València, Spain); Carlos Fernandez-Llatas (Universitat Politècnica de València & TSB-ITACA, Spain); Vicente Traver (ITACA-TSB - Universidad Politecnica de València, Spain)

LifeChamps: A Collective Intelligent Platform To Support Cancer Champions

Zoe Valero (Polytechnic University of Valencia, Spain); Carlos Fernandez-Llatas (Universitat Politècnica de València & TSB-ITACA, Spain); Pedro Louro (Capgemini Engineering, Portugal)

Pathways in the emergency department for elderly frail patients, a descriptive study leveraging process mining

Gustav Malmer (Karolinska Institutet, Sweden); Carlos Fernandez-Llatas (Universitat Politècnica de València & TSB-ITACA, Spain); Fernando Seoane (Karolinska Institutet & Karolinska University Hospital, Sweden); Eli Westerlund (Danderyds Hospital, Sweden); Björn af Ugglas (Karolinska University Hospital, Sweden)

Hollistic Hospital framework to Implement Interactive Process Mining within the Quadruple Aim Paradigm

Fernando Seoane (Karolinska Institutet & Karolinska University Hospital, Šweden); Carlos Fernandez-Llatas (Ūniversitat Politècnica de València & TSB-ITACA, Spain); Ivan Pau (Universidad Politécnica de Madrid, Spain); Gema Ibañez (ITACA - Universitat Politecnica Valencia, Spain); Vicente Traver (ITACA-TSB - Universidad Politecnica de Valencia, Spain)

Transforming healthcare with big data analytics and artificial intelligence

Bernardo Valdivieso Martinez, Eva Salvo Marcos, Alberto Soto Martinez, Cesar Cano Cerviño and Javier Medina Alvarez (The University and Polytechnic La Fe Hospital of Valencia, Spain); Maria Eugenia Gas Lopez (The Medical Research Institute of Hospital La Fe, Spain)

BSN Session: Novel Sensing Solutions for Long-Term Monitoring

Session Chair: Valeria De Luca

A Soft Inflatable Elbow-Assistive Robot for Children with Cerebral Palsy

Yulin Wang (Imperial College London, United Kingdom (Great Britain)); Benny Lo (Imperial College, United Kingdom (Great Britain))

Assessing Internal and External Attention in AR using Brain Computer Interfaces: A Pilot Study

Nataliya Kosmyna (MIT Media Lab, USA)

Noninvasive Continuous Blood Pressure Measurement with Wearable Millimeter Wave Device

Catherine Liao, Oliver Shay, Elizabeth Gomes and Nikhil Bikhchandani (Blumio, Inc., USA)

Measurement of CO2 retention and breath frequency in Subea EasyBreath snorkeling masks converted into improvised COVID19 protection measures for medical services

Juliusz M. M. Stefański (AGH University of Science and Technology & ABB, Poland); Olaf Tomaszewski, Marek Iwaniec and Jacek Wesół (AGH University of Science and Technology, Poland)

Design and Evaluation of a Wrist Wearable Joint Acoustic Emission Monitoring System

Daniel Hochman and Goktug Cihan Ozmen (Georgia Institute of Technology, USA); Lori Ponder and Sampath Prahalad (Emory University School of Medicine, USA); Inan Omer (Georgia Institute of Technology, USA)

Small-form wearable device for long-term monitoring of cardiac sounds on the body surface

Bruno Miguel Gil Rosa (Hamlyn Centre & Imperial College London, United Kingdom (Great Britain)); Salzitsa Anastasova (Imperial College, London, United Kingdom (Great Britain)); Benny Lo (Imperial College, United Kingdom (Great Britain))

13:00-14:00

BSN Special Session: Wearable Sensing for Detecting and Monitoring Shock

Session Chair: Brian Telfer

Wearable photoplethysmography considerations for measuring compensatory reserve

Brian Telfer (MIT Lincoln Laboratory, USA)

Wearable Technologies for Pre-Hospital Trauma Care

Inan Omer and Jacob Kimball (Georgia Institute of Technology, USA); David Lin (Georgia Tech, USA); Jonathan Zia (Georgia Institute of Technology, USA)

Second Generation Compensatory Reserve Metric Algorithm using Deep Convolutional Networks

Robert W Techentin (Mayo Clinic, USA); David Holmes III (Mayo Clinic College of Medicine, USA); Christopher Felton (Mayo Clinic, USA); Leena Pramanik (Mayo Clinic Graduate School, USA); Barry K Gilbert (Mayo Clinic, USA); Timothy Curry and Michael Joyner (Mayo Clinic College of Medicine, USA); Victor Convertino (US Army Institute of Surgical Research, USA); Clifton Haider (Mayo Clinic, USA)

Accurate Decision Support for Patients Suffering with Hemorrhage: It's not about Monitoring - It's about Physiology!

Victor Convertino (US Army Institute of Surgical Research, USA)

14:00-14:30

Keynote Lecture

Session Chairs: Paolo Bonato

Digital Health Technology - leveraging real-world insights in mobility

Lynn Rochester, Newcastle University, UK

14:30-15:00

Keynote Lecture

Session Chairs: Benny Lo

Leveraging Electronic Health Records for Precision Health

Marylyn D. Ritchie, University of Pennsylvania School of Medicine, US US

15:00-15:05

Break

15:05-16:05

Industry panel

Session Chairs: Julien Penders

The Evolution of Al products/services in medical informatics

Ilkka Korhonen, CTO at Firstbeat Technologies, Tampere Area, Finland; Christine Miyachi, IEEE Future Directions Committee Chair and Nuance Communications, USA; Andreas Persidis, Biovista, Greece; Ming Jack Po, Ansible Health, USA; Hosain Rahman, Jawbone Health, USA

16:05-16:10

Break

16:10-17:10

BHI Session: Imaging Informatics Session Chairs: Ehsan Adeli & Huazhu Fu

A Machine Learning Approach to Predict Acute Ischemic Stroke Thrombectomy Reperfusion using Discriminative MR Image Features
Haoyue Zhang and Jennifer Polson (University of California, Los Angeles, USA); Kambiz Nael, Noriko Salamon and Bryan Yoo (University of California,
Los Angeles - David Geffen School of Medicine, USA); William Speier and Corey Arnold (University of California, Los Angeles, USA)

Cardiac Image Dynamic Visualization and Enhancement for Palpitation Collaborative Diagnosis Using Internet Synchronization Qi Zhang (Illinois State University, USA); Terry Peters (Western University, Canada)

A Preliminary Assessment of the Impact of Scan Length on ICA Dimensionality & Network Features Behnaz Jarrahi (Stanford, USA)

Utility of High-Throughput Imaging Mass Cytometry for Cancer Research: A feasibility study

Sindhura Thirumal, Amoon Jamzad, Tiziana Cotechini, Charles T. Hindmarch, Céline Hardy, Nathalia Kim, Amber Simpson, Charles H. Graham, David M. Berman, Robert Siemens and Parvin Mousavi (Queen's University, Canada)

Interpreting Deep Learning based Cerebral Palsy Prediction with Channel Attention

Manli Zhu (Northumbria University, United Kingdom (Great Britain)); Qianhui Men (City University of Hong Kong, Hong Kong); Edmond S. L. Ho (Northumbria University, United Kingdom (Great Britain)); Howard Wing Ho Leung (City University of Hong Kong, Hong Kong); Hubert P. H. Shum (Durham University, United Kingdom (Great Britain))

16:10-17:10

BHI Special Session: Mobile Digital Solutions in Patient Care

Session Chairs: Galina Ivanova & Georgios Raptis

Toward an efficient mobile system for stroke case managers: requirements

Jean-Baptiste Tylcz (Leipzig University & ICCAS, Germany); Alexander Prost, Daniela Geisler, Daniela Urban and Max Schreiber (University of Leipzig, Germany); Till Handel (Interdisciplinary Competence Center Biomedical Data Science & Institute for Applied Informatics, Germany); Dominik Michalski (University of Leipzig, Germany); Galina Ivanova (University of Leipzig & Innovation Center Computer Assisted Surgery (ICCAS), Germany)

A Mobile Application for Documentation and Guiding of Stroke Patients - The LotsenApp

Christian Lüpkes and Timo Wolters (OFFIS - Institute for Information Technology, Germany); Andreas Hein (Universität Oldenburg, Germany)

Conceptual Design and Analysis of a Mobile Digital Identity for eHealth Applications

Dominik Spychalski (Fraunhofer Institute for Secure Information Technology SIT, Germany); Olaf Rode (Fraunhofer FOKUS, Germany); Markus Ritthaler (OTH Regensburg, University of Applied Sciences, Germany); Georgios Raptis (OTH Regensburg, Germany)

Mobile Sensors and Multi-Modal Integration in Health and Medical Applications

Max Schreiber (University of Leipzig, Germany); Till Handel (Humboldt-Universität zu Berlin, Germany); Jean-Baptiste Tylcz (Leipzig University & ICCAS, Germany); Galina Ivanova (ICCAS, Germany)

Requirements for Apps Providing Teleconsultation Services Between Nursing Homes, Home-Based Nursing Care, and Doctors

Jennifer Wolter (OTH Regensburg, University of Applied Sciences, Germany); Georgios Raptis and Luise Middel (OTH Regensburg, Germany); Markus Ritthaler (OTH Regensburg, University of Applied Sciences, Germany); Julika Loss (Robert Koch Institute, Germany); Bernd Ludwig (University of Regensburg, Germany)

Intersectoral Digital Patient Care - Challenges and Opportunities

Galina Ivanova (University of Leipzig & Innovation Center Computer Assisted Surgery (ICCAS), Germany); Max Schreiber (University of Leipzig, Germany); Till Handel (ICCAS, Universität Leipzig, Germany); Jean-Baptiste Tylcz (Leipzig University & ICCAS, Germany)

16:10-17:10

BSN Special Session: Recent Advances in Wearable and Implantable Electronics and Circuits

Session Chair: Wen Li

Skin-Interfaced Wearable Sweat Biosensors

Wei Gao (California Institute of Technology, USA)

CMOS Neural Probes for Large Scale Electrophysiology

Carolina Mora Lopez (IMEC, Belgium)

Soft Rubbery Bioelectronics

Cunjiang Yu (University of Houston, USA)

Multimaterial Fibers for Wearable and Implantable Applications

Xiaoting Jia (Virginia Tech, USA)

16:10-17:10

BSN Special Session: Toward Artificial General Intelligence for Wearable Systems

Session Chair: Hassan Ghasemzadeh

Wearable-based Classification of Running Styles with Deep Learning

Setareh Rahimi Taghanaki, Michael Rainbow and Ali Etemad (Queen's University, Canada)

Enhancing Human Activity Recognition by Opportunistically Selecting IoT Sensors

Zhale Nowroozilarki and Nathan C Hurley (Texas A&M University, USA); Bobak Jack Mortazavi (Texas A&M University & Center for Outcomes Research and Evaluation - Yale University, USA)

Context-aware Few-shot Learning of Human Activities of Daily living

Ali Akbari and Roozbeh Jafari (Texas A&M University, USA)

Addressing Unreliability of Wearable Photoplethysmogram Signals in Machine Learning

Vignesh Ravichandran and Dhaval Solanki (University of Rhode Island, USA); Shehjar Sadhu (University Of Rhode Island, USA); Kunal Mankodiya (University of Rhode Island, USA)

17:10-18:10

BHI Special Session: Challenges and opportunities in assessing biomarkers of mental states during cognitive demanding tasks

Session Chairs: Ricardo Couceiro & Marco Simoes

Biofeedback augmented software engineering: a new paradigm to improve software quality

Henrique Madeira (University of Coimbra, Portugal)

Intelligent Content Comprehension Assessment in Software Engineering

Haytham Hiajzi, Portugal (University of Coimbra, CISUC, Portugal)

The role of the insula in cognitive demanding tasks

Joao Castelhano (University of Coimbra & CIBIT/ICNAS, Portugal)

Monitoring brain activations during programming tasks by Time Domain fNIRS and Electroencephalography

Caterina Amendola (Politecnico di Milano, Italy)

Establishing EEG as ground truth for the assessment of cognitive state in software development activities

Júlio Cordeiro Medeiros (University of Coimbra, Portugal)

A Non-intrusive Experimental Paradigm for Studying Cognitive Errors of Software Developers

Fugun Huang (Institute of Interdisciplinary Scientists, USA)

17:10-18:10

BHI Special Session: Computational Approaches in Neural Engineering

Session Chair: James Weiland

Real-time optimization of retinal ganglion cell spatial response to epiretinal stimulation

Dorsa Haji Ghaffari (University of Michigan, USA); Akwasi Akwaboah (Johns Hopkins University, USA); Ehsan Mirzakhalili and James Weiland (University of Michigan, USA)

How morphological features influence thresholds to artificial stimulation in RGCs

Paul Werginz (Vienna University of Technology, Austria); Vineeth Raghuram and Shelley Fried (Massachusetts General Hospital, Harvard Medical School, USA)

Model-based Analysis and Optimization of Neural Recruitment During Spinal Cord Stimulation for Pain

Evan R Rogers, Hans J Zander, Ehsan Mirzakhalili and Scott Lempka (University of Michigan, USA)

Computational modeling of microelectrode recordings from an A-delta neuron in a dorsal root ganglion

Lauren R Madden, Robert Graham, Scott Lempka and Tim M. Bruns (University of Michigan, USA)

Developing predictive models for optimizing subject-specific deep brain stimulation for treating parkinsonian gait

Mojgan Goftari and Matthew Johnson (University of Minnesota, USA)

17:10-18:10

BHI Special Session: Healthcare Analytics. Improving Healthcare outcomes using Multimedia Big Data Analytics

Session Chair: Imran Razzak; Guandong Xu

DeepCIS: An end-to-end Pipeline for Cell-type aware Instance Segmentation in Microscopic Images

Nabeel Khalid and Mohsin Munir (German Research Center for Artificial Intelligence, Germany); Christoffer Edlund (Sartorius Corporate Research, Sweden); Timothy Jackson (Sartorius, BioAnalytics, United Kingdom (Great Britain)); Johan Trygg and Rickard Sjögren (Sartorius Corporate Research, Sweden); Andreas Dengel (Deutsche Forschungszentrum für Künstliche Intelligenz GmbH, Germany); Sheraz Ahmed (German Research Center for Artificial Intelligence, Germany)

Pinball Twin Bounded Support Vector Clustering

M. Tanveer, M. Tabish and Jatin Jangir (Indian Institute of Technology Indore, India)

ChrSLoc-Net: Machine Learning-Based Prediction of Channelrhodopsins Proteins within Plasma Membrane

Muhammad Nabeel Asim and Muhammad Ibrahim (German Research Center for Artificial Intelligence, Germany); Muhammad Imran MAlik (National University of Sciences and Technology, Pakistan, Germany); Andreas Dengel (Deutsche Forschungszentrum für Künstliche Intelligenz GmbH, Germany); Sheraz Ahmed (German Research Center for Artificial Intelligence, Germany)

Generative Adversarial Network with Local Discriminator for Synthesizing Breast Contrast-Enhanced MRI

Eunjin Kim (Sungkyunkwan University & MIPL, Korea (South)); Hwan-ho Cho, Eunsook Ko and Hyunjin Park (Sungkyunkwan University, Korea (South))

Uncertainty-based Self-training for Biomedical Keyphrase Extraction

Zelalem H Gero (Emory University, USA)

The Effects of Drugs and Sarcomeric Protein Mutations on Cardiac Muscle Function Estimated by Integrative Modeling Approach

Momcilo Prodanovic (University of Kragujevac, Faculty of Engineering & Bioengineering Research and Development Center (BioIRC), Serbia); Boban Stojanovic (University of Kragujevac, Faculty of Science, Serbia); Danica Prodanović (University of Kragujevac, Faculty of Science & Bioengineering Research and Development Center (BioIRC), Serbia); Nenad Filipovic (University of Kragujevac, Serbia); Srboljub M. Mijailovich (Illinois Institute of Technology, USA)

17:10-18:10

BSN Special Session: Open-source algorithms and tools for accelerating adoption of wearable technology in clinical research Session Chair: Rvan McGinnis

Facilitating Translational Research and Evidence-Based Practice through Open-Source Algorithms

Cristine Agresta (University of Washington, USA)

Freezing of gait in a clinic using wearable sensors

Vrutangkumar V Shah (Balance Disorders Lab, OHSU, USA)

RemoteBMX: An open-source software platform for multimodal free-living gait analysis with wearable sensors

Reed D Gurchiek (Stanford University, USA); Brett M Meyer, Samantha Fox and Ryan S McGinnis (University of Vermont, USA)

R package GGIR: A tool to process and analyse multi-day wearable accelerometer data

Vincent T van Hees (Accelting, The Netherlands)

18:10-18:40

Keynote Lecture

Session Chairs: Maria Fernanda Cabrera, Spain

Large networks of disease-disease interactions at the medical and molecular level

Alfonso Valencia, ICREA Research Professor and Director of the Life Sciences Department, Barcelona Supercomputing Centre, Spain

18:40-19:00

Closing Ceremony/Best Paper, Best Poster Awards

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