PROGRAM AT-A-GLANCE

WEDNESDAY, FEBRUARY 10, 2021

9:45 – 10:00 am EST
OPENING REMARKS

10:00 am – 2:00 pm EST
SYMPOSIUM #1 | Medical Imaging

Moderators | Andrew Laine & Amir Amini

- Roderic Pettigrew, Ph.D., M.D. | *"Integrating Engineering and Medicine to Address Big Challenges"*
- Michael I. Miller, Ph.D. | *"Brain Imaging and Mapping"*
- Cynthia Rudin, Ph.D. | *"Stop Explaining Black Box Machine Learning Models for High Stakes Decisions and Use Interpretable Models Instead"*
- Muyinatu Bell, Ph.D. | *"Ultrasound Image Formation in the Deep Learning Age"*
- Laura Waller, PhD. | *"End-to-end learning for computational microscopy"*
- Marco Lorenzi, Ph.D. | *"Biomedical Data Integration in Neurodegenerative Disorders: Towards In-silico Simulation of Intervention Trials"*
- Hayit Greenspan, Ph.D. | *"AI in Medical Imaging"*
- Eric A. Hoffman, Ph.D. | *"Structural and Functional Lung Phenotyping via Multi-spectral CT"*
- Kristy K Brock, Ph.D., DABR, FAAPM | *"Challenges and Opportunities in the Clinical Translation of AI for Image Guided Cancer Therapy"*

THURSDAY, FEBRUARY 11, 2021

10:00 am – 2:30 pm EST
SYMPOSIUM #2 | Precision Medicine

Moderators | Colin Brenan & Ali Tinazli

- Raimond L. Winslow Ph.D. | *"Predictive Analytics in Critical Care Medicine"*
- Craig Cummings, Ph.D. | *"Driving Personalized Oncology Through Advanced Analysis of Genomic, Cellular and Image-based Biomarker Data From Large Clinical Trial Cohorts"*
- Kamala K. Maddali, DVM, Ph.D. | *"Precision Medicine in Cancer: Technology Barriers and Breakthroughs to Better Serve Community Cancer Patients"*
- George Em Karniadakis, Ph.D. | *"Deep Transfer Learning and Data Augmentation Improve Glucose Levels Prediction in Type 2 Diabetes Patients"*
- Erin Shellman, Ph.D. | *"Data Science in Synthetic Biology"*
- Thomas Wilckens, M.D. | *"Precision Medicine – a Data Hungry Paradigm Shift"*
- Jadwiga Bienkowska, Ph.D. | *"Leverage Data Science and Unravel Molecular Mechanisms of Disease, Advance New Therapies and Deliver Precision Medicine to Patients"*
- Curtis C. Harris, Ph.D. | *"Precision Medicine of Lung Cancer"*
- Anita Rogacs, Ph.D. | *"Microfluidics, MEMS and Nanotechnology in Precision Medicine"*

PROGRAM AT-A-GLANCE

FRIDAY, FEBRUARY 12, 2021

10:00 am – 2:00 pm EST
SYMPOSIUM #3 | Digital Healthcare

Moderators | Paolo Bonato & Jeff Palmer

- Dina Demner Fushman, M.D., Ph.D. | *"Transforming Data into Information for Clinical Decision Support"*
- Derek O'keeffe, MD, Ph.D. | *"Digital Doctors: The Future of Medicine"*
- Deborah Estrin Ph.D. | *"From Patient Generated Data to Digital Biomarkers and Therapeutics"*
- Wendy Nilsen, Ph.D. | *"Challenges in Digital Healthcare: On the Cusp of Transformation"*
- Tom Quatieri, Ph.D. | *"Vocal Biomarkers of Neurological Conditions Based on Motor Timing and Coordination"*
- David Clifton, DPhil (Oxon) | *"Recent Advances for AI in Digital Health"*
- Bjoern Eskofier, Ph.D. | *"Germany's New Digital Healthcare Act – Paving the Way through the Valley of Innovation Death"*
- Julien Penders, M.Sc. | *"From Concept to Market: How Startups Help Putting Digital Health Innovations into People's Hands"*
- Lucila Ohno-Machado, M.D., MBA, Ph.D. | *"Data Science Challenges: Building AI Models while Protecting Privacy"*

SATURDAY, FEBRUARY 13, 2021

10:00 am – 2:00 pm EST
SYMPOSIUM #4 | Brain and Neural System

Moderators | Erika Ross & Metin Akay

- Emery N. Brown, MD, Ph.D. | *"Challenges in Data Science and Engineering in Brain and Neural Systems*
- Paul Sajda, Ph.D. | *"Machine Learning for Fusing Simultaneously Acquired EEG-fMRI"*
- Aldo Faisal, Ph.D. | *"Ethomics: Restoring, Augmenting and Understanding the Brain's Function through Behaviour"*
- Sridevi V. Sarma, Ph.D. | *"Localizing the Epileptogenic Zone in Epilepsy Patients from Resting State EEG"*
- Andreas Savas Tolias, Ph.D. | *"A Less Artificial Intelligence"*
- Gabriel A. Silva, Ph.D. | *"Machine Learning in Neuroscience: Graph Neural Network Based Discovery of Generalizable Models"*
- Maryam Shanechi, Ph.D. | *"Dynamical Modeling and Decoding of Multiscale Brain Networks and Application to Brain-machine Interfaces"*
- Theo Zanos | *"Using Data Science to Address Challenges in Bioelectronic Medicine"*
- Mengjia Xu, Ph.D. | *"A New Stochastic Graph Embedding Method for Alzheimer's Disease Early-stage Prediction and Intervention Evaluation"*

2:00 pm EST
CLOSING REMARKS

ORGANIZING COMMITTEE

Metin Akay, Chair
University of Houston

Metin Akay received his B.S. and M.S. in Electrical Engineering from the Bogazici University, Istanbul, Turkey in 1981 and 1984, respectively, and a Ph.D. degree from Rutgers University in 1990. He also received an honorary Ph.D. from the Aalborg University in 2010. He is currently the founding chair of the new Biomedical Engineering Department and the John S. Dunn professor of biomedical engineering at the University of Houston. He is currently the President-Elect of IEEE Engineering in Medicine and Biology Society.

He has played a key role in promoting biomedical education in the world by writing and editing several books, editing several special issues of prestigious journals, including the Proc of IEEE, and giving several keynotes and plenary talks at international conferences, symposiums, and workshops regarding emerging technologies in biomedical engineering. He is the founding editor-in-chief of the Biomedical Engineering Book Series published by the Wiley and IEEE Press and the Wiley Encyclopedia of Biomedical Engineering. He is also the editor of the Neural Engineering Handbook published by Wiley/IEEE Press and the first steering committee chair of the IEEE Trans on Computational Biology and Bioinformatics.

He established the IEEE EMBS Special Topic Conference on Neural Engineering. He is also the chair of the IEEE EMBS Neuroengineering Technical Committee. He was the program chair of the International IEEE EMBS 2001 and the co-chair of the International IEEE EMBS 2006 and the program co-chair of the International IEEE EMBS 2011 and the IEEE EMBS Point-of-Care Health Technologies (POCHT) 2013. He currently serves on the advisory board of several international journals including the IEEE T-BME, IEEE T-ITIB, Smart Engineering Systems, etc. and furthermore serves on several NIH and NSF review panels Dr. Akay is a recipient of the IEEE EMBS Early Career and Service awards as well an IEEE Third Millenium Medal and is a fellow of IEEE, the Institute of Physics (IOP), the American Institute of Medical Biological Engineering(AIMBE), and the American Association for the Advancement of Science (AAAS). His Neural Engineering and Informatics Lab is interested in developing a novel Brain Chip for precision medicine and an intelligent wearable system for monitoring and detecting coronary artery disease. In addition, his lab is currently investigating the effect of maternal alcohol and nicotine intake on the health risk in newborns.

Shankar Subramaniam, Co-chair
University of California San Diego

Shankar Subramaniam is a Distinguished Professor of Bioengineering, Computer Science and Engineering, Cellular and Molecular Medicine, and Nanoengineering. He is currently the President of IEEE EMBS. He was the Chair of the Bioengineering Department at the University of California at San Diego (2008-13) leading the Department to be ranked first in NRC rankings.
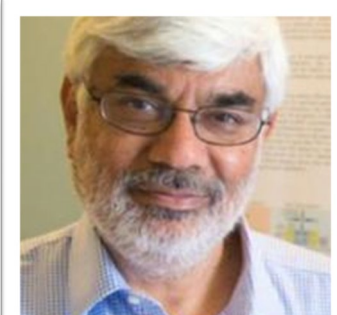
He holds the inaugural Joan and Irwin Jacobs Endowed Chair in Bioengineering and Systems Biology. He was the Founding Director of the Bioinformatics Graduate Program at the University of California at San Diego. He is a fellow of the American Institute for Medical and Biological Engineering (AIMBE), American Association for the Advancement of Science (AAAS), and International Federation of Medical and Biological Engineering (IFMBE). Subramaniam is a recipient of the Smithsonian Foundation and Association of Laboratory Automation Awards and his research spans systems biology and medicine. In 2002, he received the Genome Technology All-Star Award. In 2011, he was appointed as a Distinguished Scientist at the San Diego Supercomputer Center. In 2019 he was awarded the of IIT Kanpur Jubilee Year Distinguished Alumni Award. Subramaniam is a pioneer in Systems Biology research. He has published in leading journals such as Nature, Cell, Science family, and in 2008, he was awarded the Faculty Excellence in Research Award at UCSD. His work at the interface of engineering and medicine has impacted several research areas in biomedicine. He has served on several national research advisory councils including the National Institutes of Health.

PROGRAM COMMITTEE

Paul Sajda, Chair
Columbia University

Paul Sajda, Ph.D. is a Professor of Biomedical Engineering, Electrical Engineering and Radiology (Physics) at Columbia University. He is also a Member of Columbia's Data Science Institute and an Affiliate of the Zuckerman Institute of Mind, Brain and Behavior. He received a BS in electrical engineering from MIT in 1989 and an MSE and PhD in bioengineering from the University of Pennsylvania, in 1992 and 1994, respectively. Professor Sajda is interested in what happens in our brains when we make a rapid decision and, conversely, what processes and representations in our brains drive our underlying preferences and choices, particularly when we are under time pressure. His work in understanding the basic principles of rapid decision-making in the human brain relies on measuring human subject behavior simultaneously with cognitive and physiological state. Important in his approach is his use of machine learning and data analytics to fuse these measurements for predicting behavior and infer brain responses to stimuli. Professor Sajda applies the basic principles he uncovers to construct real-time brain-computer interfaces that are aimed at improving interactions between humans and machines. He is also applying his methodology to understand how deficits in rapid decision-making may underlie and be diagnostic of many types of psychiatric diseases and mental illnesses.

Professor Sajda is a co-founder of several neurotechnology companies and works closely with a range of scientists and engineers, including neuroscientists, psychologists, computer scientists, and clinicians. He is a fellow of the IEEE, AMBIE and AAAS and Chair of the IEEE Brain Initiative. He is also a recent recipient of the DoD's Vannevar Bush Faculty Fellowship (VBFF).

Jack Ming Po, Co-chair
Google

Ming Jack Po, MD, PhD, is a product manager at Google working in Healthcare. 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.

SYMPOSIUM #1 CHAIRS

Andrew Laine
Columbia University

Andrew F. Laine received his D.Sc. degree from Washington University (St. Louis) School of Engineering and Applied Science in Computer Science, in 1989 and BS degree from Cornell University (Ithaca, NY). He was a Professor in the Department of Computer and Information Sciences and Engineering at the University of Florida (Gainesville, FL) from 1990-1997. He joined Columbia University in 1997 and served as Vice Chair of the Department of Biomedical Engineering 2003 – 2011, and Chaired of the Department of Biomedical Engineering 2012 – 2017. He is currently the Percy K. and Vida L. W. Hudson Professor of Biomedical Engineering and Professor of Radiology (Physics).

Professor Laine served on the IEEE ISBI (International Symposium on Biomedical Imaging) steering committee, 2006-2009 and 2009 – 2012. He was the Program Chair for the IEEE EMBS (Engineering in Biology and Medicine Society) annual conference in 2006 held in New York City and served as Program Co-Chair for IEEE ISBI in 2008 (Paris, France). He served as Area Editor for IEEE Reviews in BME in Biomedical Imaging since 2007-2013. He was Program Chair for the EMBS annual conference for 2011 (Boston, MA). Professor Laine Chaired the Steering committee for IEEE ISBI, 2011-2013, and Chaired the Council of Societies for AIMBE (American Institute for Medical and Biological Engineers) in 2012-2013. Finally, he served as IEEE EMBS Vice President of Publications 2008 – 2012, and was the President of IEEE EMBS 2015 and 2016. He is currently past-chair of the IEEE EMBS Technical Committee on Biomedical Health Informatics. He is a Fellow of IEEE, AIMBE and IFMBE.

Amir Amini
University of Louisville

Amir A. Amini is Professor and Endowed Chair in Bioimaging at the University of Louisville. He received the BS degree in Electrical Engineering from the University of Massachusetts, Amherst, MA, with high honors when at 18 he was the youngest graduate of the University, and the Ph.D. from the University of Michigan, Ann Arbor in 1990. After postdoctoral work on biomedical imaging (1990-1992), he was at Yale as Assistant Professor (1992-1996). He then moved to Washington University in St. Louis where he was Assistant and then Associate Professor with tenure (1996-2006). He has been at University of Louisville since August 2006 as Professor and Endowed Chair where he directs the Medical Imaging Laboratory.

He is the recipient of the National Institutes of Health FIRST Award (1998) and University of Louisville Delphi Center for Teaching and Learning Faculty Favorite Award for his course on medical imaging (2013). He co-chaired the SPIE Medical Imaging Conference on Physiology, Function, and Structure from Medical Images (2003-2006), SPIE Medical Imaging Symposium in 2007, and IEEE International Symposium on Biomedical Imaging in 2018. He was a Distinguished Lecturer of the IEEE EMBS in 2013, has served since 2013 on the IEEE EMBS Technical Committee on Biomedical Imaging and Image Processing (BIIP), and the EMBS Administrative Committee (Ad Com) for the term 2016-2018. Dr. Amini has been on the editorial board of IEEE Trans. On Medical Imaging since 1999, Elsevier's journal of Computerized Medical Imaging and Graphics since 2012, IEEE Trans. on Biomedical Engineering since 2014, IEEE Journal of Biomedical Health Informatics (2016-2019), the IEEE Open Journal of Engineering in Medicine and Biology since 2019, and the IEEE Reviews in Biomedical Engineering since 2020. He has served on the scientific advisory board of IEEE Journal of Biomedical Health Informatics since 2020. He is the Vice President for Publications for IEEE EMBS for the term 2020-2021. He is a Fellow of the IEEE (2007), of the American Institute for Medical and Biological Engineering (2017), and of the International Society for Optics, Photonics, and Imaging (SPIE) (2019).

SYMPOSIUM #2 CHAIRS

Colin Brenan
1CellBio Inc.

Colin J.H. Brenan is a serial life science entrepreneur and senior executive with over 30 years of experience in scientific research, project management, product development, strategic marketing, and financing of early-stage life science companies. Dr. Brenan is currently a Founder/Chief Commercial Officer of antibody-drug developer HiFiBiO Ltd and Founder/CEO of the single-cell instrumentation company 1CellBio Inc.. Formerly he was Managing Director of the Monsanto-Atlas Seed Fund Alliance at Atlas Venture (Cambridge, USA) where he identified and invested in seed and early-stage life science companies. Prior to Atlas, Dr. Brenan was Director of Strategic Relationships for the Center for Integration of Medicine and Innovative Technology (Boston, MA).

Previous to joining CIMIT, Dr. Brenan was the Founder, Chief Technology Officer, and Senior Vice President, Business Development for BioTrove Inc. (Woburn, USA), a life science tools and consumables company spun-out from the Massachusetts Institute of Technology (MIT) and acquired by Life Technologies Inc. (LIFE:NASDAQ); and a Founder of Biocius Inc., a drug development instrument and service provider spun-out from BioTrove and acquired by Agilent Inc. (A:NYSE).

Dr. Brenan is the inventor of 30 US patents, +60 patent applications, and published +50 peer-reviewed journal articles, book chapters, and reports in the fields of bio-microsystems, confocal microscopy, spectroscopic imaging, and microsurgical robotics. He has over a decade of experience in consulting for the US National Institutes of Health and is a reviewer for IEEE, IEE, and AIP journals. Dr. Brenan is a Senior Member of the IEEE-EMBS and former Editor-in-Chief of IEEE PULSE Magazine. He received his B.Sc. (Honors Physics), M. Eng. (Electrical), and Ph.D. (Biomedical Engineering) from McGill University (Montreal, Canada) and completed post-doctoral training at MIT (Cambridge, USA).

Ali Tinazli
Fluxergy

Prior to his role at Fluxergy as Chief Commercial Officer, Dr. Ali Tinazli has been leading the corporate-wide, global strategy for Healthcare and Life Sciences for Hewlett-Packard (HP Inc.) and built a new life sciences business at SONY in his earlier career. He also currently serves as Board Member and Angel Investor at various start-up companies ranging from cybersecurity and digital health to oncology. Dr. Ali Tinazli has a deep background in the science and business of biomedicine and healthcare.
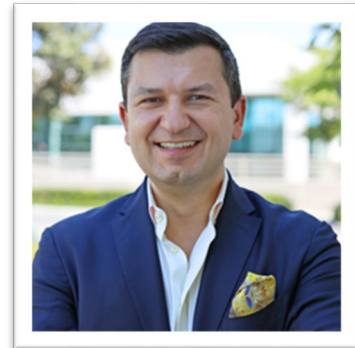
SYMPOSIUM #3 CHAIRS

Paolo Bonato
Harvard University

Paolo Bonato, Ph.D., is an Associate Professor in the Department of Physical Medicine and Rehabilitation at Harvard Medical School. He holds adjunct appointments at the MGH Institute of Health Professions, the Wyss Institute for Biologically Inspired Engineering, and Boston University College of Health & Rehabilitation Sciences.

He has held Adjunct Faculty positions at MIT, the University of Ireland Galway, and the University of Melbourne. His research work is focused on the development of rehabilitation technologies with special emphasis on wearable technology and robotics. Dr. Bonato currently serves as the Founding Editor-in-Chief of the IEEE Open Journal of Engineering in Medicine and Biology. He served as IEEE EMBS Vice President for Publications (2013-2016). He received an M.S. degree in electrical engineering from Politecnico di Torino, Turin, Italy in 1989 and a Ph.D. degree in biomedical engineering from Universita` di Roma "La Sapienza" in 1995.
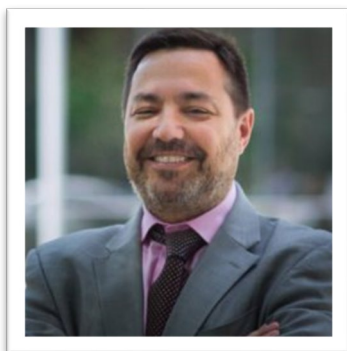
Jeff Palmer
Massachusetts Institute of Technology

Jeffrey S. Palmer is the Assistant Head of the Biotechnology and Human Systems Division at Lincoln Laboratory. In this role, he shares responsibility for research, development, evaluation, and technology transfer of advanced technologies and systems for chemical and biological defense, human health & performance, and global resilience to climate, conflict, and disaster threats. Prior to holding this position, he was the leader of the Human Health and Performance Systems Group, which focused on AI-enabled biomedical tools, human performance enhancement, objective neurocognitive analytics, and biosensing via a wearable, ingestible, and implantable devices. He has given presentations at international conferences and authored book chapters and technical articles on DNA biometrics and forensics, biomechanics, cell biology, materials science, soldier nanotechnology, biological-chemical defense, polymer science, high-energy lasers, microelectronics packaging, wearable biomedical sensing in extreme environments, and neurocognitive technologies. He has served on editorial boards for journals in biomechanics, molecular science, biomedical informatics, and biosensors. He has chaired technical conferences for the National Science Foundation, Department of Homeland Security, and the IEEE. Currently, he is the chairman of the IEEE Engineering in Medicine and Biology Society's Technical Committee on Wearable Biomedical Sensors and Systems and on the editorial board for the IEEE Open Journal of Engineering in Medicine and Biology. In addition, he has served as an advisor on U.S. and NATO military studies for enhancing health and performance and led a multi-agency U.S. government effort to develop automated rapid human DNA analysis capabilities for field biometrics and forensics applications. He currently serves on the faculty for the NIH RADx initiative, a standing committee for the National Academies of Science, Engineering, and Medicine, and as an mHealth study subcommittee co-lead for the Massachusetts General Brigham Center for COVID Innovation. Prior to working at Lincoln Laboratory, he worked at research laboratories at IBM and GE, and at the Physical Sciences Laboratory at New Mexico State University. He holds a bachelor's degree with a minor in mathematics from New Mexico State University, a master's degree from Rensselaer Polytechnic Institute, and a doctorate with a minor in bioengineering from MIT, all with majors in mechanical engineering.

SYMPOSIUM #4 CHAIRS

Erika Ross
Abbott Neuromodulation

Erika Ross, Ph.D. is the Director of Applied Research at Abbott Neuromodulation, leading applied research strategy, external partnerships, portfolio, and execution. Applied research includes computational modeling, pre-clinical, feasibility, and clinical safety trials that feed new products and indications. Prior to her role at Abbott, Erika was the Neuroscience Director at Cala Health, a Stanford Biodesign incubated start-up that has been developing a non-invasive, digitally enabled neuromodulation solution for Essential Tremor patients.

She has held roles of increasing leadership at Cala Health as the company completed development and prepared for commercialization and played a major role in developing their digital health architecture and team. Prior to Cala Health, Erika held the roles of Assistant Professor of Neurologic Surgery and Deputy Director of the Surgical Device Innovation Accelerator at the Mayo Clinic in Rochester, Minnesota where she developed invasive and non-invasive solutions to unmet needs in the neuromodulation and other surgical practice areas.
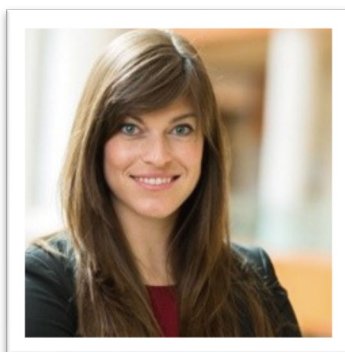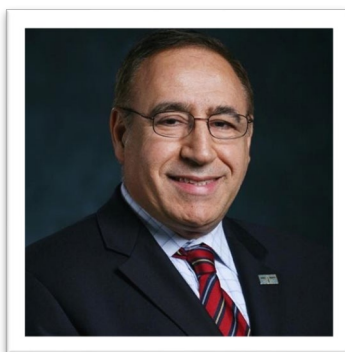
Metin Akay
University of Houston

Metin Akay received his B.S. and M.S. in Electrical Engineering from the Bogazici University, Istanbul, Turkey in 1981 and 1984, respectively, and a Ph.D. degree from Rutgers University in 1990. He also received an honorary Ph.D. from the Aalborg University in 2010. He is currently the founding chair of the new Biomedical Engineering Department and the John S. Dunn professor of biomedical engineering at the University of Houston. He is currently the President-Elect of IEEE Engineering in Medicine and Biology Society.

He has played a key role in promoting biomedical education in the world by writing and editing several books, editing several special issues of prestigious journals, including the Proc of IEEE, and giving several keynotes and plenary talks at international conferences, symposiums, and workshops regarding emerging technologies in biomedical engineering. He is the founding editor-in-chief of the Biomedical Engineering Book Series published by the Wiley and IEEE Press and the Wiley Encyclopedia of Biomedical Engineering. He is also the editor of the Neural Engineering Handbook published by Wiley/IEEE Press and the first steering committee chair of the IEEE Trans on Computational Biology and Bioinformatics.

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SYMPOSIUM #1 SPEAKERS

Grand Challenges in Data Science and Engineering in Healthcare: Medical Imaging

Roderic I. Pettigrew, PhD, MD, serves as Chief Executive Officer (CEO) of Engineering Health (EnHealth) and executive dean for the Engineering Medicine (EnMed) program at Texas A&M University, in partnership with Houston Methodist Hospital. Dr. Pettigrew also holds the endowed Robert A. Welch Chair in Chemistry. EnHealth is the nation's first comprehensive educational program to fully integrate engineering into all health-related disciplines. EnMed is the nation's first four-year, fully-integrated engineering and medical education curriculum leading to both a MD and master's degree in engineering.

An internationally recognized leader in biomedical imaging and bioengineering, Dr. Pettigrew served as the first director for the National Institute of Biomedical Imaging and Bioengineering (NIBIB) at National Institutes of Health (NIH). Prior to his appointment at the NIH, he joined Emory University School of Medicine as a professor of radiology and Georgia Institute of Technology as a professor of bioengineering. Dr. Pettigrew is well-known for pioneering four-dimensional imaging of the cardiovascular system using magnetic resonance imaging (MRI). In addition to his numerous achievements, he is an elected member to both the National Academy of Medicine and the National Academy of Engineering.

After receiving his Bachelor of Science degree in physics from Morehouse College as a Merrill Scholar, Dr. Pettigrew attended Rensselaer Polytechnic Institute, where he earned his Master of Science degree in nuclear science and engineering. Dr. Pettigrew received his PhD in radiation physics at Massachusetts Institute of Technology (MIT) and attained his medical doctorate from Leonard M. Miller School of Medicine at the University of Miami.

Michael I. Miller, PhD is the Bessie Darling Massey Professor and Director of the Johns Hopkins Department of Biomedical Engineering. He is the co-director of the Kavli Neuroscience Discovery Institute.
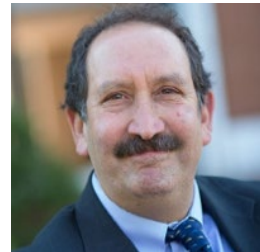
An internationally recognized leader in medical imaging and brain mapping, Miller pioneered the field of computational anatomy. His research focuses on the functional and structural characteristics of the human brain in health and disease, including Huntington's disease, Alzheimer's disease, dementia, bipolar disorder, schizophrenia, and epilepsy. His lab is currently devising cloud-based methods to build and share libraries of brain images—and the algorithms used to understand them—associated with neuropsychiatric illness.

Miller was appointed as one of 17 inaugural University Gilman Scholars in 2011. He has received numerous other honors, including the Herschel Ruth Seder Professorship and the National Science Foundation Presidential Young Investigator Award. He has co-authored more than 200 peer-reviewed publications, as well as two highly cited textbooks on random point processes and computational anatomy. Miller's research is highly translational, and he has co-founded four start-up companies in the past decade.

Cynthia Rudin, PhD is a professor of computer science, electrical and computer engineering, and statistical science at Duke University, and directs the Prediction Analysis Lab, whose main focus is interpretable machine learning. She is also an associate director of the Statistical and Applied Mathematical Sciences Institute (SAMSI). Previously, Prof. Rudin held positions at MIT, Columbia, and NYU. She holds an undergraduate degree from the University at Buffalo, and a PhD from Princeton University. She is a three-time winner of the INFORMS Innovative Applications in Analytics Award and a fellow of the American Statistical Association and the Institute of Mathematical Statistics.
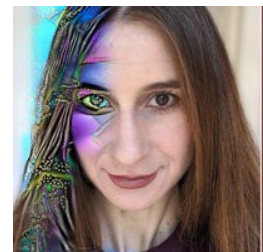
SYMPOSIUM #1 SPEAKERS CONTINUED

Grand Challenges in Data Science and Engineering in Healthcare: Medical Imaging

Muyinatu Bell, PhD is an Assistant Professor of Electrical and Computer Engineering, Biomedical Engineering, and Computer Science at Johns Hopkins University, where she founded and directs the Photoacoustic and Ultrasonic Systems Engineering (PULSE) Lab. Dr. Bell earned a B.S. degree in Mechanical Engineering (biomedical engineering minor) from Massachusetts Institute of Technology (2006), received a Ph.D. degree in Biomedical Engineering from Duke University (2012), conducted research abroad as a Whitaker International Fellow at the Institute of Cancer Research and Royal Marsden Hospital in the United Kingdom (2009-2010), and completed a postdoctoral fellowship with the Engineering Research Center for Computer-Integrated Surgical Systems and Technology at Johns Hopkins University (2016). Dr. Bell is Associate Editor-in-Chief of IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control (T-UFFC) and holds patents for short-lag spatial coherence beamforming and photoacoustic-guided surgery. Dr. Bell's a multiple awards and honors include MIT Technology Review's Innovator Under 35 Award (2016), the NSF CAREER Award (2018), the NIH Trailblazer Award (2018), the Alfred P. Sloan Research Fellowship (2019), the ORAU Ralph E. Powe Jr. Faculty Enhancement Award (2019), and Maryland's Outstanding Young Engineer Award (2019). She most recently received the inaugural IEEE UFFC Star Ambassador Lectureship Award (2020) and the SPIE Early Career Achievement Award (2021).

Laura Waller, PhD is the Ted Van Duzer Associate Professor of Electrical Engineering and Computer Sciences (EECS) at UC Berkeley, a Senior Fellow at the Berkeley Institute of Data Science, and affiliated with the UCB/UCSF Bioengineering Graduate Group. She received B.S., M.Eng. and Ph.D. degrees from the Massachusetts Institute of Technology (MIT) in 2004, 2005 and 2010, and was a Postdoctoral Researcher and Lecturer of Physics at Princeton University from 2010-2012. She is a Packard Fellow for Science & Engineering, Moore Foundation Data-driven Investigator, Bakar Fellow, OSA Fellow and Chan-Zuckerberg Biohub Investigator. She has received the Carol D. Soc Distinguished Graduate Mentoring Award, Agilent Early Career Professor Award (Finalist), NSF CAREER Award and the SPIE Early Career Achievement Award.

Marco Lorenzi, PhD is a tenured research scientist (CR) at Université Côte d'Azur, Inria Sophia Antipolis. His research interest is in the development of statistical and machine learning methods for the analysis of large-scale and heterogeneous biomedical data. Current research topics include Bayesian modeling and uncertainty quantification, time-series analysis, latent variable models, and federated learning.
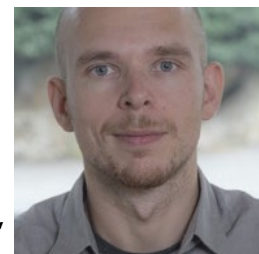
Hayit Greenspan, PhD is a Full Professor of Biomedical Engineering in the Faculty of Engineering, Tel-Aviv University. Dr. Greenspan received the B.S. and M.S. degrees in Electrical Engineering (EE) from the Technion, and the Ph.D. degree in EE from CALTECH – California Institute of Technology. She was a Postdoc with the CS Division at U.C. Berkeley following which she joined Tel-Aviv University. From 2008 until 2011, she was a visiting Professor at Stanford University, Department of Radiology, Faculty of Medicine. She was also a visiting researcher at IBM Research in the Multi-modal Mining for Healthcare group, in Almaden CA.
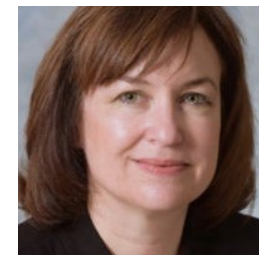
Dr. Greenspan has over 150 publications in leading international journals and conferences and has received several awards and patents. She is member of several journal and conference program committees, including SPIE medical imaging, IEEE_ISBI and MICCAI. She served as an Associate Editor for the IEEE Trans on Medical Imaging (TMI) journal. In 2016 she was the Lead Co-editor for a Special issue on Deep Learning in Medical Imaging in IEEE TMI. In 2017 she Co-edited an Elsevier Academic Press book on Deep learning for Medical Image Analysis. Recently she was titled as one of the Top-30 Women AI leaders in Drug Discovery and Advanced Healthcare, by Deep Knowledge Analytics.

SYMPOSIUM #1 SPEAKERS CONTINUED

Grand Challenges in Data Science and Engineering in Healthcare: Medical Imaging

Eric A. Hoffman, PhD is a professor of radiology, medicine and biomedical engineering at the University of Iowa. He is the director of the Advanced Pulmonary Physiomic Imaging Laboratory (APPIL) in the Department of Radiology and the director of the Iowa Comprehensive Lung Imaging Center (I-Clic) at the University of Iowa. He received his Ph.D. in Physiology from the University of Minnesota / Mayo Graduate School of Medicine in 1981 and remained on staff at the Mayo Clinic where he was a member of the team which Developed the Dynamic Spatial Reconstructor (DSR), a one-of-a-kind CT scanner which was able to gather up to 240 contiguous CT sections of the body every 1/60 second. Throughout his career he has used advanced imaging methodologies to study basic respiratory physiology centered largely on mechanisms of ventilation and perfusion heterogeneity and regional lung mechanics. Dr. Hoffman moved from the Mayo Clinic in 1987 to head the Cardiothoracic Imaging Research Center in the Department of Radiology at the University of Pennsylvania and then moved in 1992 to his current position at the University of Iowa. Most recently, in addition to continuing basic physiologic research of the lung, he has established a combination of single and multi-spectral multidetector row spiral CT imaging (Siemens SOMATOM Force) methodology to objectively follow human lung pathology and pathophysiology with a particular emphasis on inflammatory lung diseases. Dr. Hoffman is the author of more than 570 journal articles and 20 book chapters in the field of dynamic volumetric imaging of the lung and heart and served for 5 years as the founding chair of the Physiology and Function from Multidimensional Imaging sessions of the SPIE Medical Imaging conference. Dr. Hoffman was inducted into the college of fellows of the American Institute for Medical and Biological Engineering in March of 2000 and was elected into the FleischnerSociety in May 2005. He received the 2013 John West award for Outstanding Contributions to the Field of Functional Pulmonary Imaging from the IWPFI, the 2014 Joseph R Rodarte Award for Scientific Distinction from the Respiratory Structure and Function Assembly of the American Thoracic Society and the 2018 Alton Ochsner Award "relating smoking and disease." He is a fellow of the European Respiratory Society and the American Thoracic Society. Dr. Hoffman's laboratory is dedicated to the use of advanced imaging methodologies for the exploration of normal and pathologic physiology of the lung and serves as the Radiology Center for numerous large multi-center studies utilizing imaging to phenotype the lung as a component of the study (including SPIROMICS, MESA Lung, SARP, PreCISE, British Lung Foundation Early COPD).

Kristy K Brock, PhD, DABR, FAAPM received her PhD in Nuclear Engineering and Radiological Sciences from the University of Michigan in 2003. After receiving her PhD, she joined the faculty at the University of Toronto (Radiation Medicine Program, Princess Margaret Hospital) and subsequently the faculty at the University of Michigan (Department of Radiation Oncology). She is currently a professor with tenure in the Department of Imaging Physics at the University of Texas MD Anderson Cancer Center, where she is the Director for the Image-Guided Cancer Therapy Research Program. Her research has focused on image guided therapy, where she has developed a biomechanical model-based deformable image registration algorithm to integrate imaging into treatment planning, delivery, and response assessment as well as to understand and validate imaging signals through correlative pathology. Her algorithm was licensed by RaySearch Laboratories and was incorporated into their commercially available radiation therapy treatment planning system.
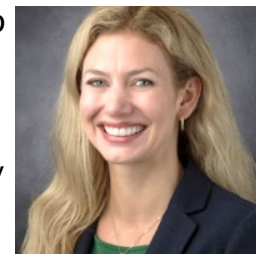
She is board certified by the American Board of Radiology in Therapeutic Medical Physics and holds a joint appointment with the Department of Radiation Physics at MD Anderson. Dr. Brock has published over 100 papers in peer-reviewed journals, is the Editor of the book 'Image Processing in Radiation Therapy' and has been the PI/co-PI on 21 peer-reviewed, industry, and institutional grants. She currently serves as the Vice Chair of Science Council for the American Association of Physicists in Medicine as well as Vice Chair of the Big Data Subcommittee. In addition, she is the Chair of the Promoting Science through Research and Training Committee of the American Society of Radiation Oncology and serves on the Program Committee for the SPIE Medical Imaging – Image-guided Procedures, Robotic Interventions and Modeling Conference Program.

SYMPOSIUM #2 SPEAKERS

Grand Challenges in Data Science and Engineering in Healthcare: Precision Medicine

Raimond L. Winslow, PhD is the Raj and Neera Singh Professor of Biomedical Engineering, and Founding Director of the Institute for Computational Medicine at Johns Hopkins University. His research is focused on two areas. The first is use of computational modeling to understand the molecular mechanisms of cardiac arrhythmias and sudden death. The second is use of statistical and dynamical systems modeling methods to predict the temporal evolution of patient clinical state. He holds joints appointments in the departments of Electrical and Computer Engineering, Computer Science, and the Division of Health Care Information Sciences at Johns Hopkins University.

Craig Cummings, PhD is the Senior Director and Head of Data Science within Oncology Biomarker Development (OBD) at Genentech. His group is responsible for development and execution of global data analytic strategies in OBD–including bioinformatics, real-world clinico-genomics, liquid biopsies, and digital pathology– to accelerate translational research and drive early and late stage oncology development pipelines.

Prior to joining Genentech, Craig worked at Sequenta where he developed tools for NGS-based minimum residual disease detection in lymphoid cancers and T cell repertoire analysis, and at Applied Biosystems/Life Technologies where he was responsible for pathogen detection assay design and NGS-based microbial genomics applications. As a post-doctoral fellow and research associate in the Stanford University Department of Microbiology and Immunology, Craig investigated Bordetella population genetics and gene expression using microarray-based approaches. He holds a Ph.D. in Genetics from the Stanford University School of Medicine, where he was a HHMI predoctoral fellow, and a B.A. in Biology from the University of Virginia.

Kamala K Maddali DVM, PhD is a pharma, diagnostics, and life sciences executive and board advisor with over 20 years of deep expertise in Precision Medicine implementing strategic initiatives across many Fortune 500 companies, most notably Merck and Co., Quintiles, and Quest Diagnostics. She holds a Ph.D. in Pharmacology from the University of Missouri-Columbia and a doctorate in Veterinary Medicine from Tirupati, India. She is a pioneer in the space and a patient advocate, on a mission to help patients with powerful tools from science and innovation for improving global community health. She currently is the Global Vice president for Deep lens inc, an Artificial Intelligence company focused on Precision Medicine, and also serves as an advisory board member for cancer patient advocacies and digital health companies. Her gracious battle as a rare disease patient with MS and Parkinson's like signs makes her one of the most innovative/empathetic patient and healthcare champions in the precision medicine world.

SYMPOSIUM #2 SPEAKERS CONTINUED

Grand Challenges in Data Science and Engineering in Healthcare: Precision Medicine

George Em Karniadakis, PhD is the Charles Pitts Robinson and John Palmer Barstow Professor of Applied Mathematics and Engineering at Brown University. He received his S.M. and Ph.D. from Massachusetts Institute of Technology (1984/87). He is an AAAS Fellow (2018-), Fellow of the Society for Industrial and Applied Mathematics (SIAM, 2010-), Fellow of the American Physical Society (APS, 2004-), Fellow of the American Society of Mechanical Engineers (ASME, 2003-) and Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA, 2006-). He received the SIAM/ACM prize in CSE in 2021, Alexander von Humboldt award in 2017, the Ralf E Kleinman award from SIAM (2015), the J. Tinsley Oden Medal (2013), and the CFD award (2007) by the US Association in Computational Mechanics. His h-index is 106 and he has been cited about 54,000 times.
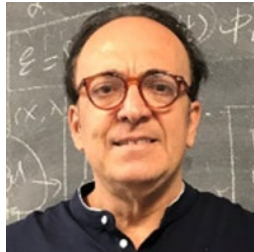
Erin Shellman, PhD is a technical leader and data scientist with a track record of building high-output, delivery-focused teams. She brings technical depth to all of her work, whether that's informing company strategy, product development, or building & maturing analytical teams and organizations. She's passionate about leading product-oriented teams that sustain rapid, incremental deliveries. Effective communication is a core value of all her teams, and they continuously improve their data storytelling through presentations, technical writing, and peer editing. A common thread throughout her career is a focus on teaching and continuous improvement– she loves data science because it demands constant learning and evolution.
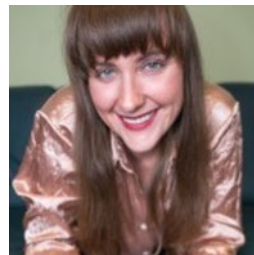
Thomas Wilckens, MD is a medical doctor and a serial entrepreneur. He serves as the CEO of InnVentis Ltd. (Israel), with a focus on the convergence of multi-omics technologies with real-world clinical data and machine learning to enable Precision Medicine. Thomas has app. 29K+ followers @LinkedIn being a recognized thought leader regarding emerging trends, technologies and the convergence of technologies and business models that drive the disruption of healthcare and related industries. Recently Thomas invested in MyBioma, an AI & microbiome Dx & Research company.

Thomas also serves as an advisor to several Diagnostics, Biotech and Pharma companies. In such role he participates in internal workshops, Q&A or strategy meetings at board/SVP level.

Thomas is also the founder of the LinkedIn group Precision Medicine & Digital Health.

Prior to InnVentis, he was an associate at deep innovation GmbH, a boutique consultancy and spin-off of Vodafone Group R&D Germany serving governments and global player regarding digitization in healthcare and biomedical R&D.

In 1998 he founded a drug discovery company in Munich as CEO/CSO with a focus on inflammatory and metabolic diseases after winning a startup competition.

SYMPOSIUM #2 SPEAKERS CONTINUED

Grand Challenges in Data Science and Engineering in Healthcare: Precision Medicine

Jadwiga Bienkowska, PhD is Sr. Director and Head of Computational Biology at Pfizer, Oncology Research and Development. ORD mission is development of breakthrough therapies for unmet needs of Cancer patients. Mission of the Computational Biology is to decode complex molecular data into data driven decisions to accelerate drug development from new targets discovery and MOA studies, translation of pre-clinical observation to patient selection and progression of new therapies through Phase I trials, and bedside to bench translation of insights from Phase III -IV trials clinical and biomarker data. Dr. Bienkowska has over 20 years of experience in Pharma and Biotech assuming roles of increasing responsibilities and leadership to leverage Data Science and unravel molecular mechanisms of disease, advance new therapies and deliver Precision Medicine to patients. Prior to joining Pfizer Dr. Bienkowska lead a computational biology research groups at BiogenIdec and EMD Serono focused on uncovering molecular drivers and new therapies for Immune and Neurological diseases and Cancer. Dr. Bienkowska holds PhD from the University of Chicago and completed postdoctoral training at Harvard Medical School.

Curtis C. Harris, MD received his M.D. from Kansas University School of Medicine. He completed his clinical training at the University of California-Los Angeles, and at the NCI. He has held positions of increasing responsibility at the NCI and is also an Adjunct Professor of Oncology at Georgetown University School of Medicine. Harris has received numerous honors throughout his distinguished career including the Alton Ochsner Award relating Smoking and Health (American College of Physicians), Deichmann Award (International Union of Toxicology), Charles Heidelberger Award (International Society of Gastroenterological Carcinogenesis), the Distinguished Service Medal (the highest honor of the U.S. Public Health Service), NCI Outstanding Mentor Award in 2007 and 2013, Ph.D. (Honorary) Nippon University School of Medicine in 2013.

In 2009 he was awarded the AACR-Princess Takamatsu Award, and in 2014 he was awarded the ILCA Nelson Fausto Award, and AACR-American Cancer Society Award for Research Excellence in Cancer Epidemiology and Prevention. In 2016 he was awarded the Distinguished Medical Alumnus Award from Kansas University School of Medicine and in 2020, was awarded the Environmental Mutagenesis and Genome Society Annual Award. He also serves as an honorary member for the Japanese Cancer Association and Fellow at the American Society of Clinical Investigation and AAAS. Harris has published more than 500 journal articles, 100 book chapters, and edited 10 books, and holds more than 30 patents owned by the U.S. Government. He also serves as Editor-in-Chief for the journal, Carcinogenesis, and has held or currently holds elected offices in scholarly societies and non-profit foundations including the American Association of Cancer Research, the International Society of Differentiation, the Keystone Symposia on Molecular and Cellular Biology and the Aspen Cancer Conference. Harris has a wide range of scientific interests and accomplishments spanning molecular genetics and epigenetics of human cancer to molecular epidemiology of human cancer risk and mechanistic biomarkers of cancer diagnosis, prognosis and therapeutic outcome. Harris has a long productive history of investigating the mutation and function of p53. Current investigations include the p53 isoforms involvement in cellular reprogramming and senescence.

Anita Rogacs, PhD has done extensive work in the field of microfluidics, analytical chemistry, molecular biology, nanotechnology, plasmonics, and Raman spectroscopy, authoring over 30 publications. Anita received her M.S. and Ph.D in Mechanical Engineering from Stanford University, and has studied business at the Stanford Graduate School of Business. She is a National Science Foundation (NSF) and Sandia National Laboratories Fellow. After receiving her Ph.D., she joined HP's CTO office and Labs, where she led strategy and the technology development of a broad array of Life Sciences platforms. Today, she is the Scientific Director of New Business Strategy and Incubation, focusing on bringing HP healthcare solutions to the market.

SYMPOSIUM #3 SPEAKERS

Grand Challenges in Data Science and Engineering in Healthcare: Digital Healthcare

Dina Demner Fushman, MD, PhD is an Investigator at the National Library of Medicine, NIH. Her research objective is to develop artificial intelligence approaches that enable easy access to reliable health-related information. To that end, she leads research in the areas of natural language processing, data mining and multimodal information processing. Her research focuses on information extraction and textual data analysis, Electronic Health Record (EHR) data analysis, and image and text retrieval for clinical decision support and education. Her group has developed approaches to prediction of the course of disease, extraction of key information from text, document summarization, question answering and multi-modal information retrieval and question answering.

Derek O'Keeffe, MD, PhD holds dual first class honours degrees in Engineering (Gold Letter) and Medicine (Gold Medal). In addition he holds a Medical Doctorate and a Masters & PhD in Biomedical Engineering from the University of Limerick and National University of Ireland Galway. He was a Fulbright Scholar at Harvard, a Green Templeton Scholar at Oxford and is a graduate of the Endocrinology Clinical Fellowship at the Mayo Clinic, USA. As well as multiple academic publications, he holds biomedical patents and several international research prizes. He has done volunteer work in Ireland, USA, Ghana & Papua New Guinea. He has travelled in over 100 countries & was awarded The Outstanding Young Person of the World by Junior Chamber International. He is a Black Belt Taekwondo Instructor, Qualified Pilot, Advanced Scuba Diver & Triathlete.

He has previously worked with NASA placing a sleep experiment onboard the International Space Station. In addition he has acted as Flight Surgeon for a NASA Extreme Environment Mission Operation (NEEMO) where they used digital health data to monitor crew health and make mission decisions. He recently completed the world's first bi-directional care of a patient living in a remote community with drone technology. He currently works as a Consultant Physician (Endocrinologist) at University Hospital Galway (UHG) and is the Professor of Medical Device Technology at the National University of Ireland Galway.

Deborah Estrin, PhD is a Professor of Computer Science at Cornell Tech where she holds The Robert V. Tishman Founder's Chair, serves as the Associate Dean for Impact, and is an Affiliate Faculty at Weill Cornell Medicine. Estrin's research activities include technologies for caregiving, immersive health, small data, participatory sensing, and Public Interest Technology.
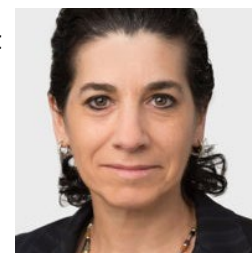
Before joining Cornell University Estrin was the Founding Director of the NSF Center for Embedded Networked Sensing (CENS) at UCLA; pioneering the development of mobile and wireless systems to collect and analyze real-time data about the physical world. Estrin co-founded the non-profit startup, Open mHealth, and has served on several scientific advisory boards for early-stage mobile health startups. She is currently an Amazon Scholar (2019-present).

Estrin is an elected member of the National Academy of Engineering, National Academy of Medicine, and was chosen as a 2018 fellow of the MacArthur Foundation.

SYMPOSIUM #3 SPEAKERS CONTINUED

Grand Challenges in Data Science and Engineering in Healthcare: Digital Healthcare

Wendy J. Nilsen, PhD is the Acting Deputy Division Director in the Information and Intelligent Systems Division of the Computer and Information Science and Engineering Directorate at NSF. She is also the lead Program Director in the Smart Health program. Her work has focused on the intersection of computing and human functioning. Her interests span the areas of sensing, analytics, cyber-physical systems, information systems, machine learning, artificial intelligence and robotics. She also serves as cochair of the Health Information Technology Research and Development working group of the Networking and Information Technology Research and Development Program and, serving on numerous federal technology initiatives. Prior to joining NSF, Wendy was at the National Institutes of Health.
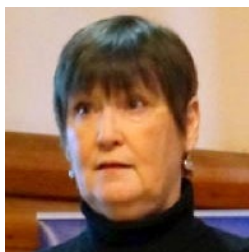
Thomas F. Quatieri, ScD received the B.S. degree (summa cum laude) from Tufts University in Medford, MA, and the S.M., E.E., and Sc.D. degrees from the Massachusetts Institute of Technology (MIT) in Cambridge, MA. He is a Senior Member of the Technical Staff with MIT Lincoln Laboratory, Lexington, focused on speech and auditory signal processing and neuro-biophysical modeling with application to detection and monitoring of neurological, neurotraumatic, and stress conditions. He holds a faculty appointment in the Harvard-MIT Speech and Hearing Bioscience and Technology Program. Dr. Quatieri is an author on more than 200 publications, holds 12 patents, and authored the textbook Discrete-Time Speech Signal Processing: Principles and Practice. He is a recipient of four IEEE Transactions Best Paper Awards and the 2010 MIT Lincoln Laboratory Best Paper Award. He led the Lincoln Laboratory team that won the 2013 and 2014 AVEC Depression Challenges and the 2015 MIT Lincoln Laboratory Team Award for their work on vocal and facial biomarkers.

He served on many IEEE technical committees and the IEEE James L. Flanagan Speech and Audio Awards Committee. He has also served on the editorial board of the IEEE Transactions on Signal Processing, and is currently an associate editor of Computer, Speech, and Language. He co-led the mHealth group on Monitoring COVID Patients and Clinical Personnel under the Mass General Brigham Center for COVID Innovation. He is a Fellow of the IEEE and a member of Tau Beta Pi, Eta Kappa Nu, Sigma Xi, ICSA, ARO, and ASA.

David Clifton, DPhil (Oxon) is Professor of Clinical Machine Learning in the Department of Engineering Science of the University of Oxford, and Official Fellow in AI & Machine Learning at Reuben College, Oxford. He is a Research Fellow of the Royal Academy of Engineering, and a Fellow of Fudan University, China.

He studied Information Engineering at Oxford's Department of Engineering Science, supervised by Prof. Lionel Tarassenko CBE, Chair of Electrical Engineering, previous Head of the Department of Engineering Science. His research focuses on the development of machine learning for tracking the health of complex systems. His previous research resulted in patented systems for jet-engine health monitoring, used with the engines of the Airbus A380, the Boeing 787 "Dreamliner", and the Eurofighter Typhoon. Since 2008, he has focused mostly on the development of AI-based methods for healthcare. Patents arising from this collaborative research have been commercialized via university spin-out companies OBS Medical, Oxehealth, and Sensyne Health, in addition to collaboration with multinational industrial bodies.

Prof. Clifton holds a Grand Challenge award from the UK Engineering and Physical Sciences Research Council, which is an EPSRC Fellowship that provides long-term strategic support for "future leaders in healthcare". His research has been awarded over 30 academic prizes; in 2018, he was joint winner of the inaugural "Vice-Chancellor's Innovation Prize", which identifies the best interdisciplinary research across the entirety of the University of Oxford.

SYMPOSIUM #3 SPEAKERS CONTINUED

Grand Challenges in Data Science and Engineering in Healthcare: Digital Healthcare

Bjoern Eskofier, PhD studied Electrical Engineering at the Friedrich-Alexander University (FAU) Erlangen-Nuernberg (Germany). He did his PhD in Biomechanics in 2010 at the University of Calgary ("Application of Pattern Recognition Methods in Biomechanics"). In 2011, he became assistant professor for Computer Science in Sports (an endowed professorship of the adidas AG). In 2017, he became full professor for 'Digital Support Systems in Sports and Health' within the Heisenberg-program of the German Research Foundation (DFG).
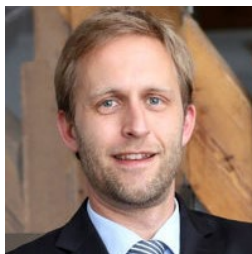
He authored more than 200 peer-reviewed articles, submitted 5 patent applications, and started three spinoff startup companies. Him and his team also won several medical-technical research awards.

In 2016, he was a visiting professor in Dr. Paolo Bonato's Motion Analysis Lab at Harvard Medical School. In 2018, he was a visiting professor in Sandy Pentland's Human Dynamic Lab at MIT.

He is the representative of the FAU's Central Institute for Medical Engineering, and closely connected to their Medical Valley and European Institute of Innovation & Technology for Health activities.

His current research interests are applied machine learning, data science, signal processing, simulation, human-computer-interaction, and sensor integration methods for wearable computing systems in human-centered studies with a focus on wellness, sports, and health care.

The purpose and motivation of his research is generating a positive impact on human wellbeing, be it through increasing performance, maintaining health, reducing injuries, improving rehabilitation, or monitoring disease.

Julien Penders, MSc is co-founder and COO at Bloomlife, where he's building the future of prenatal health using wearable technologies and predictive analytics. Julien is a passionate entrepreneur with 15-year experience in R&D and product development for the medical device and digital health industry. He led international teams through the development of wearable and digital health products covering hardware, software, analytics and clinical validation. He has (co-) authored over 60 papers and 14 patents. He has been a keynote or invited speakers at multiple events including TEDx and the Creativity World Forum. He serves on the IEEE Technical Committee on Biomedical Health Informatics and sits on the Program Committees for several international conferences. Julien was a 2004/2005 fellow of the Belgian American Educational Foundation. He holds a M.Sc. degree in Systems Engineering from University of Liege, Belgium (2004), and a M.Sc. degree in Biomedical Engineering from Boston University, MA (2006).

Lucila Ohno-Machado, M.D., MBA, Ph.D. received her medical degree from the University of São Paulo and her doctoral degree in medical information sciences and computer science from Stanford. She is Associate Dean for Informatics and Technology, and the founding chair of the Health System Department of Biomedical Informatics at UCSD, where she leads a group of faculty with diverse backgrounds in medicine, nursing, informatics, and computer science. Prior to her current position, she was faculty at Brigham and Women's Hospital, Harvard Medical School and at the MIT Division of Health Sciences and Technology. Dr. Ohno-Machado is an elected fellow of the American College of Medical Informatics, the American Institute for Medical and Biological Engineering, and the American Society for Clinical Investigation. She was one of the founders of UC-Research eXchange, a clinical data research network that connected the data warehouses of the five University of California medical centers. She was the director of the NIH-funded National Center for Biomedical Computing iDASH (integrating Data for Analysis, 'anonymization,' and Sharing) based at UCSD with collaborators in multiple institutions. iDASH funded collaborations involving study of consent for data and biospecimen sharing in underserved and under-represented populations.

SYMPOSIUM #4 SPEAKERS

Grand Challenges in Data Science and Engineering in Healthcare: Brain and Neural System

Emery N Brown, MD, PhD is the Edward Hood Professor of Medical Engineering and Computational Neuroscience at Massachusetts Institute of Technology; the Warren M. Zapol Professor of Anaesthesia at Harvard Medical School; and a practicing anesthesiologist at Massachusetts General Hospital. Dr. Brown received his B.A. (magna cum laude) in Applied Mathematics from Harvard College, his M.A. and his Ph.D. in statistics from Harvard University and his M.D. (magna cum laude) from Harvard Medical School.

Dr. Brown is an anesthesiologist-statistician whose experimental research has made important contributions towards understanding the neuroscience of how anesthetics act in the brain to create the states of general anesthesia. In his statistics research he has developed signal processing algorithms to solve important data analysis challenges in neuroscience. His research has been featured on National Public Radio, in Scientific American, Technology Review, the New York Times and in TEDMED 2014.

Aldo Faisal, PhD (@FaisalLab) is Professor of Artificial Intelligence & Neuroscience at the Dept. of Bioengineering and the Dept. of Computing at Imperial College London, where he leads the Brain & Behaviour Lab [www.faisallab.org] and is the holder of a UKRI Turing AI Fellowship. He is the Director of the £20Mio UKRI Centre for Doctoral Training in AI for Healthcare since 2019 and the Behaviour Analytics Lab at the Data Science Institute (London) since 2017. Aldo works at the interface of Machine Learning, Neuroscience and translational Biomedical engineering to help people in diseases and health. Core to his research discovery and technology innovation work is the idea that both artificial and human intelligence have common roots in the understanding, learning and generation of behaviour.
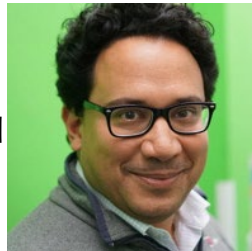
He currently is one of the few engineers world-wide that lead their own clinical trials to validate their technology, His work received a number of prizes and awards, including the $50,000 Research Discovery Prize by the Toyota Foundation.

Sridevi V. Sarma, PhD received a B.S. in Electrical Engineering from Cornell University in 1994; and an M.S. and Ph.D. in Electrical Engineering and Computer Science from Massachusetts Institute of Technology (MIT) in 1997 and 2006. From 2000-2003 she took a leave to start a data analytics company. From 2006-2009, she was a Postdoctoral Fellow in the Brain and Cognitive Sciences Department at the MIT. She is now an Associate Professor in the Institute for Computational Medicine, Department of Biomedical Engineering, at Johns Hopkins University. Her research includes modeling, estimation and control of neural systems using electrical stimulation. She is cofounder of Neurologic Solutions, Inc. that develops EEG analytics tools for brain disorders. She is a recipient of the the Burroughs Wellcome Fund Careers at the Scientific Interface Award, the Krishna Kumar New Investigator Award from the North American Neuromodulation Society, and a recipient of the Presidential Early Career Award for Scientists and Engineers and the Whiting School of Engineering Robert B. Pond Excellence in Teaching Award.

SYMPOSIUM #4 SPEAKERS CONTINUED

Grand Challenges in Data Science and Engineering in Healthcare: Brain and Neural System

Dr. Andreas Savas Tolias' research is focused on understanding how brains give rise to intelligence. His lab combines imaging, electrophysiological, molecular and behavioral methods with machine learning approaches to decipher the neocortical circuit principles of perceptual inference. He obtained his Ph.D. from the Massachusetts Institute of Technology in Systems and Computational Neuroscience and postdoctoral training at the Max-Planck Institute for Biological Cybernetics. He has received numerous awards including the NIH Director's Pioneer Award, the Beckman Foundation Young Investigator Award, the McNight Foundation Scholar Award and the Michael E. DeBakey Excellence in Research Award. Dr. Tolias is also a co-founder of the Neuroscience-Inspired Networks for Artificial Intelligence organization (ninai.org) and is leading an international team of scientists and engineers working on the interface between brain research and machine intelligence with the goal of engineering less artificial and more intelligent algorithms.

Gabriel A. Silva, MSc, PhD is a Professor in the Department of Bioengineering and the Department of Neurosciences at the University of California, San Diego. He holds a Jacobs Family Scholar in Engineering Endowed Chair, is the Founding Director of the Center for Engineered Natural Intelligence, and Associate Director of the Kavli Institute for Brain and Mind. He is an affiliated faculty member in the Department of NanoEngineering, and a faculty member in the BioCircuits Institute, Neurosciences Graduate Program, Computational Neurobiology Program, and Institute for Neural Computation. Previously, he served as Vice Chair of the Department of Bioengineering and Co-Director of the Retinal Engineering Center in the Institute of Engineering in Medicine.
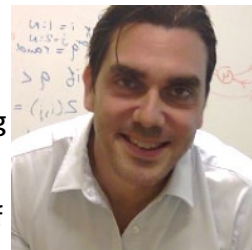
Prof. Silva received an Hon.B.Sc. in human physiology and a B.Sc. in biophysics from the University of Toronto, Canada in 1996, followed by an M.Sc. in neuroscience in 1997. He then did his Ph.D. in bioengineering and neurophysiology at the University of Illinois at Chicago, graduating in 2001, followed by a postdoctoral fellowship in the Institute for BioNanotechnology and Medicine (IBNAM) and the Department of Neurology at Northwestern University in Chicago in 2001. He joined the faculty at the University of California, San Diego in 2003.

Maryam M. Shanechi, PhD is Assistant Professor and Viterbi Early Career Chair in Electrical and Computer Engineering and a member of the Neuroscience Graduate Program and Department of Biomedical Engineering at the University of Southern California. She received her B.A.Sc. degree in Engineering Science from the University of Toronto, her S.M. and Ph.D. degrees in Electrical Engineering and Computer Science from MIT, and her postdoctoral training in Neural Engineering at Harvard Medical School and UC Berkeley. Her research focuses on developing closed-loop neurotechnology and studying the brain through decoding and control of brain network dynamics. Her lab has developed brain-machine interfaces for restoring lost emotional function in mental disorders and lost motor function in neurological injuries and diseases. She is the recipient of several awards including the NIH Director's New Innovator Award, NSF CAREER Award, ONR Young Investigator Award, MIT Technology Review's top 35 Innovators Under 35, Popular Science Brilliant 10, Science News 10 Scientists to Watch, and an ARO Multidisciplinary University Research Initiative (MURI) Award.

SYMPOSIUM #4 SPEAKERS CONTINUED

Grand Challenges in Data Science and Engineering in Healthcare: Brain and Neural System

Theo Zanos is the head of the Neural and Data Science Lab and an Assistant Professor at the Institute of Bioelectronic Medicine, Feinstein Institutes for Medical Research and the Zucker School of Medicine, Hofstra Northwell. He received his Engineering diploma in Electrical and Computer Engineering from the Aristotle University of Thessaloniki in Greece, his MSc and PhD in Biomedical Engineering from the University of Southern California and postdoctoral training at the Montreal Neurological Institute at McGill. His current research focuses on developing and applying data science and machine learning methods on neural and biological data to enable early diagnosis, disease severity assessment, and personalization and adaptability of therapies. To that end, his lab focuses on understanding how the nervous system senses the state and affects the function of the immune, metabolic and cardiopulmonary systems, as well as combine machine learning methods with multiple healthcare data modalities (Electronic Health Records, continuous vitals, imaging, unstructured notes) to develop and deploy clinical predictive and diagnostic models. His research has been featured in PBS, Scientific American, CNET and other media outlets and he has been awarded the Northwell Excellence in Research Award, the Jean Timmins Award and the Center of Excellence in Commercialization and Research Award.

Mengjia Xu, PhD is currently a postdoctoral associate at McGovern Institute for Brain Research at MIT. Before joining MIT in June 2019, she worked at Massachusetts General Hospital, Harvard Medical School (2018.12 – 2019.6) and Peking University (2017.12-2018.11). She received her PhD degree in *Computer Science* from Northeastern University of China in December 2017. During her PhD, she worked at Brown University for two years as a visiting PhD student in the Division of Applied Mathematics. Previously, she worked as a full-time research intern at Neusoft Research Institute for two years. Her main research focus is to develop data-driven machine learning methods for multimodality neuroimaging data analysis.