IEEE EMBS GRAND CHALLENGES FORUM

COVID-19 Healthcare, Screening, Tracing, and Treatment

VIRTUAL • NOVEMBER 12-15, 2020

PROGRAM AT-A-GLANCE

THURSDAY, NOVEMBER 12, 2020

9:45 – 10:00 am ET

OPENING REMARKS

10:00 am – 1:30 pm ET

SYMPOSIUM #1 | Grand Challenges in COVID-19 Healthcare

Moderator / Metin Akay

- Biykem Bozkurt MD, PhD
- Kristl Vonck, MD, PhD
- John Torous, MD, MBI
- Lisa Cosimi, MD
- Michael J. Tuite, MD, FACR
- Jennifer Radin, PhD

FRIDAY, NOVEMBER 13, 2020

10:00 am – 1:30 pm ET

SYMPOSIUM #2 | Grand Challenges in COVID-19 Screening

Moderator / Colin Brenan

- Nancy Gagliano, MD, MBA
- David Walt, PhD
- Achillefs Kapanidis, PhD
- Ali Tinazli, PhD
- Andrea Zanchettin, PhD
- Eva van Rikxoort, PhD
- Jeffrey Kanne, MD
- Steven C. Schachter, MD

SATURDAY, NOVEMBER 14, 2020

10:00 am – 1:30 pm ET

SYMPOSIUM #3 | Grand Challenges in COVID-19 Tracing

Moderator / Paolo Bonato

- Ross Zafonte, DO
- Jeffrey S. Palmer, PhD
- Lauren Ancel Meyers, PhD
- Yuan-Ting Zhang, PhD
- Ramesh Raskar, PhD
- John Rodgers, PhD
- Brian Subirana, PhD
- Vasilis Marmarelis, PhD

SUNDAY, NOVEMBER 15, 2020

10:00 am – 1:30 pm ET

SYMPOSIUM #4 | Grand Challenges in COVID-19 Treatment

Moderator / Shankar Subramaniam

- Hanneke Schuitemaker, PhD
- Barney S. Graham, MD, PhD
- Maria Elena Bottazzi, PhD
- Bali Pulendran, PhD
- Liang Schweizer, PhD
- Neil King, PhD
- Beth Jaworski, PhD

1:30 pm ET

CLOSING REMARKS

ORGANIZING COMMITTEE CHAIRS

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.

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

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 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.

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).

SYMPOSIUM #1 SPEAKERS

Grand Challenges in COVID-19 Healthcare

Biykem Bozkurt MD, PhD is an advanced heart failure and cardiac transplantation, a specialist at Baylor College of Medicine (BCM), where she serves as the Associate Provost of Faculty Affairs and Senior Associate Dean of Faculty Development, Mary and Gordon Cain Chair in Cardiology, and Professor of Medicine; Vice-Chair of Department of Medicine and Medical Care Line Executive at the DeBakey VA Medical Center in Houston, TX.

Dr. Bozkurt is the Immediate Past President of the Heart Failure Society of America. With over 200 publications, she has been identified as one of Web of Science's World's Highly Cited Researchers (top 1% Web of Science) in 2019. She serves as a Senior Associate Editor for Circulation; a Heart Failure Section Editor for the Journal of American College of Cardiology, and Co-Chair of the 20201 AHA/ACC Heart Failure Guidelines Writing Committee. She has served as the Heart Failure Council Chair of the American College of Cardiology and immediate Past Chair of the ACC/AHA Task Force for Clinical Data Standards.

Throughout her career, Dr. Bozkurt has been recognized for excellence in clinical care, education, and leadership. She was the recipient of the National Veterans Affairs Secretary's Hands and Heart Award for Recognition of Highest Standards in Patient Care in 2003, American College of Cardiology Proctor Harvey MD Young Teacher Award in 2005, BCM Barbara and Corbin J. Robertson, Jr. Presidential Award for Excellence in Education in 2014, BCM Master Clinician Lifetime Award in 2014, American College of Cardiology Gifted Educator Award in 2016, BCM Ben and Margaret Love Foundation Bobby Alford Presidential Award for Academic Clinical Professionalism in 2019 and BCM Distinguished Faculty Alumni Award in 2020. Additionally, in 2018, she was selected among the top 100 Turks Leading Medicine, and the second-highest-ranking Turkish women scientist by *Turkish Time* Magazine.

Dr. Bozkurt actively participates in clinical and translational research; presents at national and international scientific sessions; teaches medical students, residents, fellows at the bedside and in the classroom setting; mentors trainees and faculty locally and nationally.

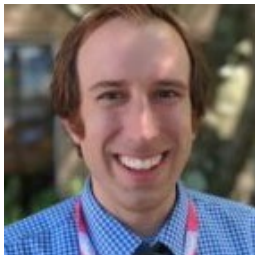
Kristl Vonck, MD, PhD is Head of the Department 'Head and Skin' at Ghent University in Belgium. She was trained at Guy's Hospital, London, UK; Yale University School of Medicine, New Haven, Connecticut, USA and the University of Stellenbosch, South Africa. She is a fellow of the EAN and a member of the EU Joint Task Force of the International League Against Epilepsy. She is a founding member of the international Neuromodulation Task Force for COVID-19.

Her research interests include epilepsy, neuromodulation, bioelectronic medicine, and neurophysiological home-monitoring of neurological disorders. In the translational research setting of the 4Brain Research team, her team investigates the mechanism of action, efficacy, and side effects of several neurostimulation modalities. Both in animals and patients, crucial questions are investigated for the application of neurostimulation as a valuable treatment option for neurological disorders: stimulation parameters, open and closed-loop neurostimulation applications, seizure detection and prediction algorithms, invasive versus non-invasive neurostimulation. Proof-of-concept and early innovative techniques for neurological monitoring@home are validated at the excellence Center for Neurofysiological Monitoring (CNM) of Ghent University Hospital before being investigated in a home environment.

Kristl Vonck has published widely in international peer-reviewed journals >150 papers), has authored seven book chapters, and has given 190 international presentations.

SYMPOSIUM #1 SPEAKERS CONTINUED

Grand Challenges in COVID-19 Healthcare



John Torous, MD MBI is director of the digital psychiatry division, in the Department of Psychiatry at Beth Israel Deaconess Medical Center, a Harvard Medical School-affiliated teaching hospital, where he also serves as a staff psychiatrist and assistant professor. He has a background in electrical engineering and computer sciences and received an undergraduate degree in the field from UC Berkeley before attending medical school at UC San Diego. He completed his psychiatry residency, fellowship in clinical informatics, and master's degree in biomedical informatics at Harvard. Dr. Torous is active in investigating the potential of mobile mental health technologies for psychiatry and has published over 200 peer-reviewed articles and 5 book chapters on the topic. He serves as editor-in-chief for an academic journal on technology and mental health, JMIR Mental Health, web editor for JAMA Psychiatry, and currently leads the American Psychiatric Association's workgroup on the evaluation of smartphone apps.

Lisa Cosimi, MD earned a B.A. in Economics from Cornell University in 1992 and M.D. from the Weill Cornell Medical College in 1996. She completed her residency in Internal Medicine and Primary Care at the Massachusetts General Hospital, and Infectious Disease training at the Mass General Brigham combined fellowship program, before joining the Brigham and Women's Hospital as faculty in Infectious Diseases. As a clinician she cares for immunocompromised patients with HIV, cancer, as well those who have undergone organ and stem cell transplantation. As a researcher, Dr. Cosimi has spent her career focused on improving health systems and quality of health care in resource-limited settings. From 2003-2007 she was based in Vietnam where she worked with the U.S. CDC Global AIDS Program (GAP) Vietnam to lead the development of their HIV clinical programs, treatment scale-up under the United States President's Emergency Plan for AIDS Relief (PEPFAR). During this time she became increasingly interested in the role that health system gaps play in the quality of care. Her group, The Partnership for Health Advancement in Vietnam (HAIVN), brings together faculty, residents and medical students throughout the Harvard Medical School community to partner with Vietnam's Ministry of Health, Medical Universities and hospitals to reform and modernize health care worker education, and improve quality of health care throughout the country.

Michael J. Tuite, MD, FACR is a Musculoskeletal Diagnostic and Interventional Radiologist with experience in image-guided percutaneous needle biopsy of bone and soft tissue lesions. My role in this project is to help review the PET- CT and other imaging studies of patients in the study, confirm lesions that can be safely biopsied that address the purpose of the study, and to perform the targeted image-guided bone biopsies and deliver the samples for histopathologic analysis.

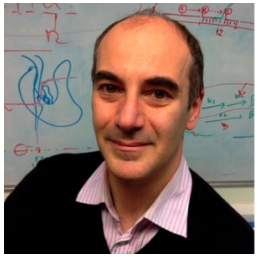
Jennifer Radin, PhD is an epidemiologist with the Digital Medicine Division at Scripps Research Translational Institute, where she conducts research to improve disease prediction and prevention by incorporating digital devices, sensors, and platforms. Dr. Radin published a pivotal study in Lancet Digital Health which used wearable data to improve real-time detection of flu-like illness at the state level: HERE. She is currently the PI on DETECT, an app-based research study that seeks to understand if data from wearable devices can provide early indications of viral infections, such as influenza and COVID-19. Before joining the Translational Institute, she worked with the Operational Infectious Disease Department at the Naval Health Research Center and the Influenza Division at the Centers for Disease Control and Prevention. Jennifer received her doctoral degree in Epidemiology from the University of California, San Diego, and San Diego State University. She also holds a Master of Public Health degree, specializing in Epidemiology of Microbial Diseases, from Yale University and a bachelor's degree in Biology from the College of William and Mary.

SYMPOSIUM #2 SPEAKERS

Grand Challenges in COVID-19 Screening

Nancy Gagliano, MD, MBA, a Harvard Medical School, and Northeastern D'amore Mckim graduate is an internist by training. She is currently leading the RADx Tech Large Scale Deployment Core to support NIH RADX: Rapid Acceleration of Diagnostics for COVID-19 testing nationally. Previously, she spent over 6 years at CVS Health as an SVP and CMO or MinuteClinic overseeing the quality of care, Point of Care Testing, and growth expansion for their 1000+ clinics seeing 6 million patients annually. She spent 21 years at Massachusetts General Hospital, as a Harvard faculty Primary Care Provider and ultimately the SVP of Practice Improvement. She has been a member of CIMIT and the POCTRN Executive Board.

David R. Walt, PhD is the Hansjörg Wyss Professor of Bioinspired Engineering at Harvard Medical School and Professor of Pathology at Harvard Medical School and Brigham and Women's Hospital, is a Core Faculty Member of the Wyss Institute at Harvard University, Associate Member at the Broad Institute, and is a Howard Hughes Medical Institute Professor. Dr. Walt is co-Director of the Mass General Brigham Center for COVID Innovation. Dr. Walt is the Scientific Founder of Illumina Inc., Quanterix Corp., and has co-founded several other life sciences startups including Ultivue, Inc., Arbor Biotechnologies, Sherlock Biosciences, and Vizgen, Inc. He has received numerous national and international awards and honors for his fundamental and applied for work in the field of optical microwell arrays and single molecules. He is a member of the National Academy of Engineering, the National Academy of Medicine, a Fellow of the American Academy of Arts and Sciences, a Fellow of the American Institute for Medical and Biological Engineering, a Fellow of the American Association for the Advancement of Science, a Fellow of the National Academy of Inventors, and is inducted in the US National Inventors Hall of Fame.



Achillefs Kapanidis, PhD, University of Oxford's Biological Physics research group, within Condensed Matter Physics, studies mechanisms and machines of gene expression using single-molecule biophysical methods and biochemistry.

What is your main area(s) of interest/expertise?
We study the biological machinery microbes (such as bacteria and viruses) use to copy and repair their genetic information. Our studies are mainly based on detecting single molecules of the machinery via powerful microscopes that we develop in house. We also use our understanding of the microbial machinery and our novel microscopes to develop ultra-sensitive tests of biomedical importance.

What are you working on right now?
During the University shutdown, we focused all of our experimental efforts to repurpose a rapid viral detection assay (initially developed for influenza) to achieve diagnostics of COVID-19 in minutes, much faster than currently possible; this project is running collaboratively with colleagues in the John Radcliffe Hospital.

Why is Oxford a good place to work in this field of research?
At Oxford, we are blessed to be able to work with extremely talented, motivated, and innovative students and researchers, and to be surrounded by outstanding colleagues who can complement our work in areas of virology, microscopy, nucleic acid chemistry, and clinical diagnostics. The vibrant university spin-out scene also provides excellent access to new technology and provides avenues for commercialization of microscopy and biophysical applications.

SYMPOSIUM #2 SPEAKERS CONTINUED

Grand Challenges in COVID-19 Screening

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.

Andrea Zanchettin, PhD was born in Cremona (Italy) in 1983. He received his MSc in Computer Science Engineering and his PhD in Information Technology, both with honor, from Politecnico di Milano in 2008 and 2012, respectively. During Spring 2010, he spent a research stay at the Department of Automatic Control (Reglerteknik) at Lund University. From January 2012 until February 2014 he has been a temporary research assistant at the Dipartimento di Elettronica, Informazione e Bioingegneria (DEIB). From March 2014 until September 2019 he has been a fixed-term assistant professor at DEIB where he is now Associate Professor. His research interests are about mechatronic systems (robotics mainly) and automatic control. Andrea Zanchettin has been a member of the IEEE Robotics and Automation Society since 2009. Since 2017, he has been co-founder and co-chair of the IEEE RAS Technical Committee on Collaborative Automation for Flexible Manufacturing. Dr. Zanchettin is also chair of the Italian Chapter of the IEEE RAS (I-RAS). He is also co-founder and member of the Board of Directors of Smart Robots, a spin-off company of Politecnico di Milano.

Eva van Rikxoort, PhD is co-founder and managing director of Thirona, a company focusing on the development of automated medical image analysis. Eva holds a Ph.D. in medical image analysis from Utrecht University Medical Center in the Netherlands. After postdoctoral training at UCLA, she became an assistant professor at Radboud University Medical Center in the Netherlands. Eva founded Thirona to bridge the gap between academia and clinical use. Thirona focuses on thoracic and retinal diseases and most recently added CAD4COVID, software for the detection and quantification of COVID-19, to its portfolio of certified products.

Jeffrey P. Kanne, MD is a professor of Radiology, Chief of Thoracic Imaging, and Vice Chair of Quality. He specializes in thoracic radiology with special expertise in interstitial and diffuse lung diseases, lung infections, and high-resolution CT of the chest. Additionally, Dr. Kanne is a NIOSH-certified B-reader with expertise in occupational lung diseases. Other professional interests include postgraduate and continuing medical education, utilization management, low-dose CT techniques, and quality improvement in radiology.

Dr. Kanne has authored or coauthored over 100 articles in radiology in addition to multiple chapters and textbooks on thoracic imaging. He is a regular lecturer on topics in thoracic imaging at national and international conferences. Dr. Kanne is co-director of the ACR's High-Resolution CT of the Chest hands-on course and chairs postgraduate courses in thoracic imaging in conjunction with the American College of Chest Physicians and the American Thoracic Society.

Dr. Kanne was awarded the Melvin M. Figley Fellowship in Radiology Journalism in 2010. He serves as Deputy Editor of Journal of Thoracic Imaging and regularly reviews manuscripts for Radiology, AJR, Chest, European Radiology, and other scholarly journals.

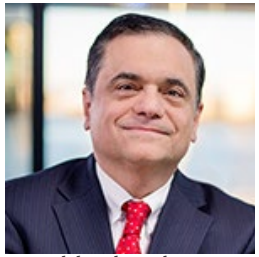
SYMPOSIUM #2 SPEAKERS CONTINUED

Grand Challenges in COVID-19 Screening

Steven C. Schachter, MD is Chief Academic Officer for the Consortia for Improving Medicine with Innovation & Technology (CIMIT) and a Professor of Neurology at Harvard Medical School. He is the Past President of the American Epilepsy Society and serves on the Epilepsy Foundation of America Board of Directors. He leads the NIH-funded initiative RADx Tech through the Point of Care Technologies Research Network. Dr. Schachter has published over 250 articles and chapters and edited or written 40 books. He is a member of the Administrative Committee of the IEEE Engineering in Medicine and Biology Society (EMBS), the Clinical Editor for Journal of Translational Engineering in Health and Medicine, and the founding editor and editor-in-chief of the medical journals Epilepsy & Behavior and Epilepsy & Behavior Case Reports.

SYMPOSIUM #3 SPEAKERS

Grand Challenges in COVID-19 Tracing



Ross D. Zafonte, DO is Earle P. and Ida S. Charlton Professor and Chairman of the Department of Physical Medicine and Rehabilitation (PM&R) at Harvard Medical School. He also serves as Chief of PM&R at Massachusetts General Hospital, Brigham and Women's Hospital, and is Senior Vice President Medical Affairs, Research, and Education at Spaulding Rehabilitation Network. Dr. Zafonte's textbook is considered one of the standards in the field of brain injury care. His work is presently funded by the NIH, DOD, and NIDRR, and he has been the director of several large clinical treatment trials. His work has focused on understanding phenotypes and recovery patterns after Brain Injury. Presently, he also serves as the principal investigator of the Football Players Health Study.

Lauren Ancel Meyers, PhD, is the Cooley Centennial Professor of Integrative Biology at the University of Texas at Austin where she was the founding chair of the Department of Statistics and Data Sciences and directs an NIH T32 training grant in Biomedical Big Data. She established the UT COVID-19 Modeling Consortium in March 2020, which has built multiple COVID-19 forecasting dashboards, published dozens of high impact reports and articles, and provided critical analyses for policymakers and public health authorities worldwide. For over 20 years, Dr. Meyers has pioneered the application of data-driven models and machine learning to uncover the drivers of epidemics and improve the detection, surveillance, forecasting and control of emerging viral threats, including COVID-19, pandemic influenza, Ebola, HIV, and Zika. She has built decision-support tools for the CDC, BARDA, DTRA, and multiple state and local agencies. Dr. Meyers consulted on the NASEM Guidance for K-12 Education on Responding to COVID-19 and serves on COVID-19 task forces for the city of Austin, University of Texas, and multiple K12 school districts. She is a member of the NIH Infectious Diseases, Reproductive Health, Asthma, and Pulmonary Conditions (IRAP) Study Section NIH study section and serves on the external advisory boards of Outbreak Science, the NIH Models of Infectious Disease Agents Study (MIDAS), James S. McDonnell Foundation Postdoctoral Program, and the Santa Fe Institute. She was named as one of the top 100 global innovators under age 35 by the MIT Technology Review in 2004 and received the Joseph Lieberman Award for Significant Contributions to Science in 2017.

Yuan-Ting Zhang, PhD is currently the Chair Professor of Biomedical Engineering at City University of Hong Kong and the Adjunct Chair Professor at Shandong University. He is a LRG member of Karolinska Institutet MWLC. He was the Sensing System Architect in Health Technology at Apple Inc., California, the USA in 2015, and the founding Director of the Key Lab for Health Informatics of the Chinese Academy of Sciences in 2007. 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.

Prof. Zhang serves as the Editor-in-Chief for IEEE Reviews in Biomedical Engineering, Chair of the Working Group for the development of IEEE 1708 Standard on Wearable Cuffless Blood Pressure Measuring Devices, Organizer of IEEE-MDBS series since 2002, Organizer of ISS-BHE series since 2007, and a member of IEEE Medal panel for Healthcare Technology Award since 2017. He was the Editor-in-Chief for IEEE Transactions on Information Technology in Biomedicine and the first Editor-in-Chief of the IEEE Journal of Biomedical and Health Informatics. He served as Vice Preside of IEEE EMBS, Technical Program Chair of EMBC'98 in Hong Kong, Conference Chair of EMBC'05 in Shanghai, International Committee Co-Chair of EMBC'07 in Lyon, Internationale Committee Chair of EMBC' 11 in Boston, Internationale Committee Chair of EMBC'13 in Osaka, Technical Program Co-Chair of EMBC'17 in Jeju Island, and International Committee Co-Chair of EMBC'2020 in Montreal. He was the Chair of the 2018 Gordon Research Conference on Advanced Health Informatics and Chair of the 2016-2018 IEEE Award Committee in Biomedical Engineering. Prof. Zhang's research interests include cardiovascular health engineering, unobtrusive sensing, and wearable devices, neural muscular modeling, and pHealth technologies.

He was selected in 2014, 2015, 2016, 2017, 2018, and 2019 lists of China's Most Cited Researchers by Elsevier. He won a number of international awards including IEEE-EMBS best journal paper awards, IEEE- EMBS Outstanding Service Award, IEEE-SA 2014 Emerging Technology Award. Prof. Zhang is elected to be an IAMBE Fellow, IEEE Fellow, and AIMBE Fellow for his contributions to the development of wearable and m-Health technologies.

SYMPOSIUM #3 SPEAKERS CONTINUED

Grand Challenges in COVID-19 Tracing

Ramesh Raskar, PhD is an Associate Professor at MIT Media Lab and directs the Camera Culture, research group. His focus is on AI and Imaging for health and sustainability. These interfaces span research in physical (e.g., sensors, health-tech) digital (e.g., automating machine learning), and global (e.g., geomaps, autonomous mobility) domains. He received the Lemelson Award (2016), ACM SIGGRAPH Achievement Award (2017), DARPA Young Faculty Award (2009), Alfred P. Sloan Research Fellowship (2009), TR100 Award from MIT Technology Review (2004), and Global Indus Technovator Award (2003). He has worked on special research projects at Google [X], Apple and Facebook and co-founded/advised several companies.

Professor John A. Rogers obtained BA and BS degrees in chemistry and in physics from the University of Texas, Austin, in 1989. From MIT, he received SM degrees in physics and in chemistry in 1992 and a Ph.D. degree in physical chemistry in to 1997, Rogers was a Junior Fellow in the Harvard University Society of Fellows. He joined Bell Laboratories as a Member of Technical Staff in the Condensed Matter Physics Research Department in 1997 and served as Director of this department from the end of 2000 to 2002. He then spent thirteen years on the faculty at the University of Illinois, most recently as the Swanlund Chair Professor and Director of the Seitz Materials Research Laboratory. In the Fall of 2016, he joined Northwestern University as the Louis Simpson and Kimberly Querrey Professor of Materials Science and Engineering, Biomedical Engineering and Medicine, with affiliate appointments in Mechanical Engineering, Electrical, and Computer Engineering and Chemistry, where he is also Director of the recently endowed Institute for Bioelectronics. He is a member of the National Academy of Engineering, the National Academy of Sciences, the National Academy of Medicine, the National Academy of Inventors, and the American Academy of Arts and Sciences.

Jeffrey S. Palmer, PhD 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 #3 SPEAKERS CONTINUED

Grand Challenges in COVID-19 Tracing

Brian Subirana, PhD is Director of the MIT Auto-ID Lab, Director of the MIT and Accenture Convergence Initiative for Industry and Technology, Research Scientist at MIT, and also teaches at Harvard University. His Harvard class on Artificial Intelligence is the first MIT-run non-residential online class ever to offer academic credit. His MIT Sloan class was the first course ever to offer a recorded lecture on MIT Open Courseware. Before becoming an academic, he worked at The Boston Consulting Group. Prof. Subirana obtained his Ph.D. in Computer Science at the MIT Artificial Intelligence Laboratory (now CSAIL), his MBA at MIT Sloan, has founded three start-ups, and has been affiliated with MIT for over 20 years in various capacities including Visiting Professor at the MIT Sloan School of Management.

His research centers on the Internet of Things (IoT) and Artificial Intelligence, focusing on manufacturing, e-learning, the creative industries, and digital health. He is developing a Voice Name System that can help humans talk with any object in an IoT environment. During the COVID-19 pandemic, he is researching standardized multi-modal biomarkers that can help smart speakers pre-screen for positive and negative cases of various conditions including COVID, dementia, and Alzheimer's.

Vasilis Marmarelis, PhD in Engineering Science, Caltech (1976), Professor of Biomedical Engineering at USC and co-director of the Biomedical Modeling & Simulations Resource, a research center dedicated to Modeling of Biomedical Systems. He served as Department Chairman from 1990 to 1996 and on the IEEE-BME Editorial Board for many years. His key research interests are (1) dynamic nonlinear modeling of biomedical systems; (2) modeling of physiological autoregulation; (3) neural information processing; (4) multimodal ultrasound tomography for diagnostic imaging; (5) model-based diagnostic physio-markers. The key application domains of interest are cerebral flow regulation, dynamics of cortical tissue oxygenation, modeling of chemoreflex/baroreflex dynamics, diagnosis and treatment of neurodegenerative and cerebrovascular disease, neuronal encoding in cognitive systems, neuro-stimulation to treat brain disorders, endocrine-metabolic regulation and diabetes, dynamic modeling of infectious diseases and onco-genesis, and non-invasive lesion differentiation via MUST diagnostic imaging (invented in 2000). Author of the 2004 monograph: "Nonlinear Dynamic Modeling of Physiological Systems" and co-author of the seminal book: "Analysis of Physiological System: The White Noise Approach"(1978; Russian translation, 1981; Chinese translation, 1990). He has published more than 200 journal papers and book chapters and has edited four research volumes on the Modeling of Physiological Systems. In 2018, he received a large grant from NIH to evaluate clinically the model-based physio-markers for the diagnosis of early Alzheimer's Disease that his lab has pioneered. He is a Fellow of the IEEE and the AIMBE.

SYMPOSIUM #4 SPEAKERS

Grand Challenges in COVID-19 Treatment

Hanneke Schuitemaker, PhD, is the Head of Viral Vaccine Discovery and Translational Medicine and Disease Area Stronghold Leader for Viral Vaccines at Janssen Vaccines & Prevention B.V. In this role, she oversees Janssen's viral vaccine programs including investigational vaccine candidates for HIV, respiratory syncytial virus (RSV), Ebola, Zika, COVID-19 and HPV. She has been in this role since 2010. In addition, she is a Professor of Virology at the Amsterdam University Medical Center.

Barney S. Graham, MD, PhD is Deputy Director and Chief of the Viral Pathogenesis Laboratory at the NIAID Vaccine Research Center. He has a BA from Rice University, an MD from the University of Kansas School of Medicine, and a Ph.D. in Microbiology & Immunology from Vanderbilt University School of Medicine where he also completed an Internal Medicine residency, chief residencies, and a fellowship in Infectious Diseases. His primary interests are vaccine development for viral diseases, viral pathogenesis, and mechanisms of immunity and pandemic preparedness. He currently directs basic laboratory research, contributes to the pipeline of new VRC vaccines, and provides oversight of candidate VRC vaccines and antibodies in advanced development including those for HIV, Ebola, and Chikungunya. His laboratory explores the structural basis for antibody-mediated viral neutralization, investigates basic mechanisms by which T cells affect viral clearance and immunopathology, and has developed novel vaccines for RSV, influenza, Zika, and coronaviruses including the first COVID-19 vaccine and monoclonal antibody products to enter clinical testing.

Maria Elena Bottazzi, PhD is Associate Dean of the National School of Tropical Medicine, Professor of Pediatrics, and Co-director of Texas Children's Center for Vaccine Development at Baylor College of Medicine in Houston, Texas. She is an internationally recognized vaccinologist with more than two decades of experience advancing product development partnerships. She has built sustainable biotechnology capacity building alliances and successfully transitioned several neglected tropical diseases (NTDs) and emerging disease vaccines from bench to clinical trials.

As a global thought-leader, she has received national and international highly regarded awards, has more than 150 scientific papers, and participated in more than 250 conferences worldwide. She is a Member of the National Academy of Science of Honduras and an Emerging Leader in Health and Medicine Scholar of the National Academy of Medicine in the US. Dr. Bottazzi currently serves as Co-chair of the New Vaccines and Therapeutics Taskforce of the Lancet Commission on COVID-19. She is also a Fellow of the American Society of Tropical Medicine and Hygiene (ASTMH), the Executive Leadership in Academic Medicine (ELAM), the Leshner Leadership Institute Public Engagement and Sr. Fellow of the American Leadership Forum (ALF). In August 2020, Forbes LATAM selected Dr. Bottazzi as one of the 100 Most Powerful Women in Central America.

Dr. Bottazzi obtained her bachelor's degree in Microbiology and Clinical Chemistry from the National Autonomous University of Honduras and a doctorate in Molecular Immunology and Experimental Pathology from the University of Florida. Her post-doctoral training in Cellular Biology was completed at the University of Miami and Pennsylvania.

SYMPOSIUM #4 SPEAKERS CONTINUED

Grand Challenges in COVID-19 Treatment

Bali Pulendran, PhD is the Violetta L. Horton Professor at the Stanford University School of Medicine, and a member of the Institute for Immunology, Transplantation, and Infection, and the Departments of Pathology and Microbiology & Immunology at Stanford University. He is also an adjunct professor at Emory University and the Yerkes National Primate Center, and director of the NIH Center for Systems Vaccinology, at Emory University in Atlanta. He received his undergraduate degree in the Natural Sciences Tripos from Queens' College, Cambridge University, and his Ph.D., from the Walter & Eliza Hall Institute in Melbourne, Australia, under the supervision of Sir Gustav Nossal. He then did his post-doctoral work at Immunex Corporation in Seattle. Dr. Pulendran's research is focused on understanding the mechanisms by which the innate immune system regulates adaptive immunity and harnessing such mechanisms in the design of novel vaccines.

More recently, his laboratory pioneered the use of systems biology approaches to predicting the efficacy of vaccines and deciphering new molecular correlates of protection against infectious diseases. Dr. Pulendran's research is published in front line journals such as Nature, Science, Cell, Nature Medicine, and Nature Immunology. Furthermore, Dr. Pulendran is the recipient of numerous grants from the National Institutes of Health, and from The Bill and Melinda Gates Foundation, serves on many editorial boards, and is the recipient of two concurrent MERIT awards from the National Institutes of Health.

Dr. Pulendran serves on many advisory boards including that of Keystone Symposia and on the External Immunology Network of GSK. He is listed on Thomson Reuter's list of Highly Cited Researchers, which recognizes the world's most influential researchers of the past decade, demonstrated by the production of multiple highly-cited papers that rank in the top 1% by citations.

Liang Schweizer, PhD is the co-founder, President, and CEO of HiFiBiO Therapeutics, an emerging multinational biotherapeutics company. Previously, she was a co-founder and CSO for Harbour Biomed. Before launching her entrepreneurial career, Liang served as Head of Asian Cancer Research at Sanofi and Director of Leads Evaluation at Bristol-Myers Squibb Company. Under her leadership, her various teams made significant contributions to 4 marketed drugs and impacted over 20 clinical candidates. She is also a co-inventor of multiple immunomodulation drug candidates.

Liang Schweizer graduated from the University of Science and Technology of China (USTC) majoring in Biology. She received her Master's degree in Microbial Engineering at the University of Minnesota with a minor in Chemical Engineering. Liang earned her Ph.D. in Molecular Biology from the University in Zurich, Switzerland. Her postdoctoral training was with Dr. Harold Varmus, a Nobel Laureate, at Memorial Sloan Kettering Cancer Center (MSKCC), New York.

Beth Jaworski, PhD, is a health science specialist and mobile UX research lead at the VA's National Center for PTSD-Dissemination and Training Division. She is involved in the creation, dissemination, and research of the mobile mental health apps created by the team. Previously, she was a research scientist at the California Department of Public Health. Dr. Jaworski's research focuses on how mobile mental health apps can be designed to promote engagement, increase mental health literacy, and help address mental health disparities. She received her master's and doctorate degrees in social psychology from the University of California at Santa Cruz. Dr. Jaworski currently serves on the American Psychological Association's Committee on Socioeconomic Status

SYMPOSIUM #4 SPEAKERS CONTINUED

Grand Challenges in COVID-19 Treatment

Neil King, PhD is an assistant professor of Biochemistry at the University of Washington's Institute for Protein Design. Dr. King pioneered the development of general computational methods for designing novel self-assembling proteins with atomic-level accuracy. His group is extending these methods to design functional protein nanomaterials for applications in targeted drug delivery and the design of next-generation vaccines. The King group works with collaborators around the world to optimize the performance of the designed materials.