



Chapter of the National Academy of Inventors

NAI-NJIT Chapter Workshop
Sustainable Societies: Global Healthcare
Innovations to Global Solutions

In Conjunction with
President's Forum
and
NJIT 2022 Research Institutes, Centers and Laboratory Showcase

February 21, 2022; 9.00 AM – 2.00 PM
Ballroom A/B and Gallery, Campus Center, NJIT

Abstract: As the world continues to evolve with increasing population and life expectancy along with urbanization and socio-economic inequalities, the global community is now facing a critical grand challenge of quality healthcare at affordable cost. According to the data published by World Health Organization (WHO), top global causes of death, in order of total number of lives lost but not including pandemic outbreaks, are associated with three broad topics: cardiovascular (ischemic heart disease, stroke), respiratory (chronic obstructive pulmonary disease, lower respiratory infections) and neonatal conditions.

Though the recent technological and pharmaceutical advances in healthcare have enabled tremendous improvements in diagnosis, treatment and therapeutic intervention of critical diseases, healthcare remains one of the most critical challenges in communicable and non-communicable diseases due to barriers to accessibility and continuously rising costs directly impacting the sustainability of the global society, specifically in under-resourced as well as elderly communities in both developing and developed countries.

The Point-of-Care (POC) technologies have a potential to provide global healthcare at affordable costs towards personalized, preventive and precision medicine. The potential benefits of POC technologies in providing sustainable healthcare solutions for managing communicable as well as non-communicable diseases globally are becoming increasingly evident. The POC innovations and technologies can provide essential tools in delivering effective healthcare in public health emergencies, disaster situations, and under-resourced environments.

The workshop will provide an open forum to discuss innovative global solutions to address the healthcare grand challenge through preventive, personalized and precision medicine exploring the

potential contributions of Point-of-Care technologies for communicable as well as non-communicable diseases. The workshop will feature keynote talks and panel discussions by leaders from all stakeholder groups representing academic, industry, healthcare, and regulatory sectors to discuss potential pathways and collaborative synergies towards sustainable societies with affordable quality healthcare.

Panel-1 will focus on challenges associated with global healthcare for public health emergencies such as COVID-19 pandemic as well as critical non-communicable diseases. Lessons learned from the recent NIH's successful RADx initiative in developing and accelerating the use of POC testing technologies for timely intervention and clinical management of COVID-19 pandemic will be discussed. The panel will also explore how challenges the US encounters managing patients across systems, spending limited resources effectively, and setting and meeting regulatory requirements become even more complex in global healthcare. Panel-2 will focus on technology innovation, translation, and scalability of innovative solutions to diverse environments and societies, each with unique care delivery models and opportunities. In addition, select research and development technologies in critical global healthcare applications will be explored.

Program Agenda

- 8.30 AM – 9.00 AM: Registration and Electronic PPT Poster Set-up
- 9.00 AM – 10.00 AM: NJIT Research Institutes, Centers and Laboratories Showcase: Electronic Poster Session-1
- 10.00 AM – 10.05 AM: Welcome Remarks:
Atam Dhawan, Senior Vice Provost for Research, NJIT
Joel Bloom, President, NJIT
Fadi Deek, Provost and Senior Executive Vice President, NJIT
- 10.05 AM – 10.10 AM: Program Agenda and Introduction to the Distinguished Speaker
Atam Dhawan, Senior Vice Provost for Research, NJIT
- 10.10 AM – 10.50 AM: Keynote Presentation: Opportunities in Engineering Medicine to Advance Global Healthcare
Distinguished Speaker: [Roderic Pettigrew, PhD, MD](#)
Chief Executive Officer of Engineering Health and Executive Dean Intercollegiate School of Engineering Medicine at Texas A&M University, Former Founding Director, National Institute of Biomedical Imaging and Bioengineering, National Institutes of Health (NIH)
- 10.50 AM – 11.30 AM: Distinguished Panel Discussion I: Sustainable Societies: Global Healthcare Challenges

Moderator:

[Arunan Skandarajah, PhD](#)

Presidential Innovation Fellow at FDA

Panelists:

[Steven Schachter, MD](#)

CAO, CIMIT

[Jo Carol Hiatt, MD, MBA, FACS](#)

Vice President, Health Economics and Patient Value
Medical Device Innovation Consortium

[Yukari C. Manabe, MD](#)

Associate Director of Global Health Research and Innovation
Professor of Medicine, JHU

11.30 AM – 12.10 PM: Distinguished Panel Discussion II: Sustainable societies: Global Healthcare Innovations

Moderator:

[Reynold A. Panettieri, Jr., MD](#)

Vice Chancellor for Translational Medicine and Science
Director, Rutgers Institute for Translational Medicine and Science
Professor of Medicine, Robert Wood Johnson Medical School

Panelists:

[Caroline Mbindyo](#)

CEO, Amref Health Innovations

[Treena Arinzeh, PhD](#)

Distinguished Professor, NJIT

[George F. Heinrich, MD](#)

Vice Chair and CEO, Foundation Venture Capital Group, New Jersey
Health Foundation

12.10 PM – 12.30 PM: Concluding Remarks
Distinguished Speaker: [Amadou Sall, PhD](#)
CEO of the Institut Pasteur de Dakar in Senegal

12.30 PM – 1.00 PM: Lunch and Networking Session

1.00 PM – 2.00 PM: NJIT Research Institutes, Centers and Laboratories Showcase:
Electronic Poster Session-2

Biographical Sketches

Roderic Pettigrew, PhD, MD: Roderic I. Pettigrew, PhD, MD, serves as chief executive officer (CEO) of Engineering Health (EnHealth) and executive dean for Engineering Medicine (EnMed) at Texas A&M University, in partnership with Houston Methodist Hospital. Dr. Pettigrew also holds the endowed Robert A. Welch Chair in Medicine. 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 an MD and master's degree in engineering in four years.

An internationally recognized leader in biomedical imaging and bioengineering, Dr. Pettigrew served for 15 years as the founding 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 professor of radiology and medicine (cardiology) and Georgia Institute of Technology as professor of bioengineering. He is known for pioneering work in four-dimensional imaging of the cardiovascular system using magnetic resonance imaging (MRI).

Dr. Pettigrew has been elected to membership in the National Academy of Medicine, the National Academy of Engineering (NAE), the National Academy of Inventors, the American Academy of Arts and Sciences, and the National Academy of Sciences, India. His awards include gold medals from the Academy of Radiology Research and the Radiological Society of North America, the Arthur M. Bueche Award from the NAE and the Vannevar Bush Award from the National Science Board.

He is a graduate of Morehouse College as a Merrill Scholar (BS in physics), Massachusetts Institute of Technology (MIT) as a Whitaker HST fellow (PhD in radiation physics), the Leonard M. Miller School of Medicine at the University of Miami (MD), and completed residency training at UC-San Diego.

Atam P Dhawan, PhD: Atam Dhawan, PhD is Senior Vice Provost for Research, Executive Director of Undergraduate Research and Innovation (URI) and Distinguished Professor of Electrical & Computer Engineering at NJIT. He obtained his bachelor's and master's degrees from the Indian Institute of Technology, Roorkee, and Ph.D. from the University of Manitoba, all in Electrical Engineering. From 1985-2000, he held faculty positions in Electrical & Computer Engineering, and Radiology departments at University of Houston, University of Cincinnati, University of Texas, University of Texas Medical Center (Dallas). From 2000-2014, he served as the Chair of the Department of Electrical and Computer Engineering, and Associate and Interim Dean of Albert Dorman Honors College.

Dr. Dhawan is an elected Fellow of the National Academy of Inventors (NAI), Fellow of the Institute of Electrical and Electronics Engineering (IEEE), Fellow of the American Institute of Medical and Biological Engineering (AIMBE), and Fellow of the International Academy of Medical and Biological Engineering (IAMBE) for his contributions in medical imaging and image analysis, and healthcare innovations. He has published over 215 research papers and book chapters. He has also authored and co-authored several books in medical imaging, and image analysis.

He is a recipient of numerous awards including Martin Epstein Award (1984), NIH FIRST Award (1988), Sigma-Xi Young Investigator Award (1992), IEEE EMBS Early Career Achievement Award (1995), Doermann Distinguished Lecture Award (1999), EMBS Distinguished Lecturer award (2012-2013) and IEEE EMBS William J. Morlock Award in Excellence in Biomedical Technology (2021). He served as the Conference Chair of the IEEE 28th

International Conference of Engineering in Medicine and Biology Society (2006) and IEEE 42nd International Conference of Engineering in Medicine and Biology Society (2020). He has organized and chaired the IEEE-EMBS International Conferences on Point-of-Care Technologies and Healthcare Innovation in Bangalore, India (2013), and in Seattle (2014), co-chaired the NIH-IEEE Strategic Conference on Point-of-Care Technologies for Precision Medicine in Bethesda (2015), co-chaired IEEE-NIH Conference on Healthcare Innovation and Point-of-Care Technologies in Cancun (2016) and co-chaired 2017 IEEE-NIH Special Topics Conference on Healthcare Innovation and Point-of-Care Technologies in Bethesda. Dr. Dhawan served as the founding Editor-In-Chief of the IEEE Journal of Translational Engineering in Health and Medicine (2012-2018), and the founding chair of the IEEE EMBS technical committee on Translational Engineering and Healthcare Innovations (2014-2018). He also served as the Senior Editor of the IEEE Transactions on Biomedical Engineering, Editorial Board Member for International Journal of Pattern Recognition, and steering committee member for IEEE Transactions on Medical Imaging.

Since 1990, Dr. Dhawan has chaired numerous NIH special emphasis and review panels, and site visit teams for NIH BTRR program. From 2008-2011, He chaired the NIH Chartered Study Section on Biomedical Computing and Health Informatics. His research interests lie in medical imaging, medical image analysis, point-of-care technologies, pattern recognition and computer-aided-diagnosis.

Arunan Skandarajah, PhD: Arunan Skandarajah serves as a White House Presidential Innovation Fellow embedded within the US Food and Drug Administration. He supports the agency's digital transformation, developing programs and resources to use their unique data and modern analytics to protect the public health. He is an engineer, strategist, and global health practitioner who has spent his career developing software and hardware products, generating evidence that they can improve care, and advancing the healthcare ecosystem abroad.

Most recently at the Bill & Melinda Gates Foundation, Arunan developed and led programs to connect diagnostics to public health systems, manufacture COVID tests in new ways, and use inexpensive sensors to measure the risk of disease. As a Program Officer, he structured technology and scale-up strategies, managed cross-functional technical and business/legal teams to invest in innovators, and coordinated collaborations between leading tech and deployment partners. Previously, he served clients across the healthcare continuum from providers and insurers to diagnostics and therapeutics companies as a management consultant.

Arunan graduated from Vanderbilt University. He then completed a PhD in Bioengineering at UC Berkeley, where he developed microscopes that paired with mobile phones for diagnosing oral cancer and bloodborne parasites. Outside of work, he has coached small businesses and developed teacher resources for STEM education.

Steven Schachter, MD: Dr. Steven Schachter attended medical school at Case Western Reserve University in Cleveland, Ohio. He completed an internship in Chapel Hill, North Carolina, a neurological residency at the Harvard-Longwood Neurological Training Program, and an epilepsy fellowship at Beth Israel Hospital in Boston, Massachusetts. He is Chief Academic Officer and Program Leader of NeuroTechnology at the Consortia for Improving Medicine with Innovation and Technology (CIMIT). He is Chief, of the NIH/NIBIB Rapid Acceleration of Diagnostics program (RADx), and a Professor of Neurology at Harvard Medical School (HMS). Dr. Schachter is Past President of the American Epilepsy Society. He is also past chair of the Professional

Advisory Board of the Epilepsy Foundation and has served on their board. He has directed over 70 research projects involving antiepileptic therapies, and published over 200 articles and chapters. He compiled the 6-volume Brainstorms series, which has been distributed to over 150,000 patients and families worldwide in several languages, and edited or written 30 other books on epilepsy and behavioral neurology. Dr. Schachter is the founding editor and editor-in-chief of the medical journals *Epilepsy & Behavior* and *Epilepsy & Behavior Case Reports*.

Jo Carol Hiatt, MD: Jo Carol Hiatt, MD joined the Medical Device Innovation Consortium (MDIC) as Vice President, Health Economics and Patient Value (HEPV) in October 2020. Her portfolio currently includes two workstreams: Patient Perspective/Risk Tolerance Research (PPR) and Real-World Evidence (RWE). Areas of focus are close collaboration with CMS and FDA to support improved clarity around applications of RWE and PPR to inform decisions by health technology assessment organizations and payers. In June, 2021, Dr. Hiatt was elected Secretary and member of Board of Directors, Health Technology Assessment International.

Prior to MDIC, Dr. Hiatt was a physician with the Southern California Permanente Medical Group for many years. She led the Kaiser Permanente (KP) National Product Council for nearly 16 years, overseeing selection of equipment, devices, diagnostic tests, and products used to care for members across the entire program. She also chaired KP's internal technology assessment organization. In addition, Dr. Hiatt served two terms on the Medicare Evidence Development & Coverage Advisory Committee which conducts evidence reviews and public hearings for some Medicare National Coverage decisions. In 2013 she was designated an American College of Surgeons Health Policy Scholar.

Dr. Hiatt received her undergraduate degree from Stanford University and her medical degree from Duke University. She trained in general surgery at UCLA. In addition to her clinical degree, Dr. Hiatt received an MBA from UCLA's Anderson School of Management. She has presented frequently on technology assessment integration with value-based decision and implementation processes.

Yukari C. Manabe, MD: Dr. Manabe is currently the Associate Director of Global Health Research and Innovation within the Johns Hopkins Center for Global Health, Professor of Medicine, International Health, and Molecular Microbiology and Immunology, and a faculty member of both the Center for Tuberculosis Research and Center for Clinical Global Health Education. Dr. Manabe is the first Clinical Director of the [John G. Bartlett Speciality Practice](#), a state-of-the-art clinic at established at Johns Hopkins in May 2017 for patients with infectious diseases.

From 2007 until 2012, she was the Head of Research at the Infectious Diseases Institute (IDI) in Kampala, Uganda, where she built research infrastructure, improved research regulatory compliance, enlarged the pool of statistical expertise, began a translational research lab to build basic science research, and streamlined scientific research at the IDI which has led to increased academic productivity and formal recognition of the IDI as a Research Center of Excellence. She also consolidated and built the research capacity building programs which has trained numerous Ugandan masters and PhD students within country. Her own research is in diagnostic accuracy testing in HIV, TB, sexually transmitted infections, and acute febrile illness. She has also done research in health systems strengthening and implementation science particularly in the area of TB-HIV infection and opportunistic infections. Dr. Manabe is an author of more than 170 peer-reviewed publications.

Dr. Manabe obtained her undergraduate degree from Yale University and her MD from Columbia University College of Physicians and Surgeons. She joined the Johns Hopkins School of Medicine faculty in 1999 after completing her residency in internal medicine and fellowship in infectious diseases at Johns Hopkins Hospital.

Reynold A. Panettieri, Jr., MD: Dr. Reynold Panettieri serves as Director for the New Jersey Alliance for Clinical and Translational Science (NJ ACTS). He is Vice Chancellor for Translational Medicine and Science at Rutgers University, and the Director of the Institute for Translational Medicine and Science. This Institute fosters translational studies in health and disease, and integrates the expertise of the disciplines of epidemiology, pharmacology, cell biology, genetics, biochemistry, health economics and informatics across the Rutgers Biomedical and Health Sciences (RBHS) network. Previously, he was the Robert L. Mayock and David A. Cooper Professor of Medicine in the Pulmonary, Allergy and Critical Care Division of the Department of Medicine and served as Deputy Director of the Center of Excellence in Environmental Toxicology at the University of Pennsylvania Perelman School of Medicine where he remains Professor Emeritus. He developed expertise in human exposure to ozone, toxicants and particulate matter in the modulation of airway inflammation and hyperresponsiveness. Dr. Panettieri also focuses on proteomic and genomic studies to identify unique proteomic signatures in COPD and asthma. His translational science interests use state-of-the-art cellular and molecular techniques to characterize airway smooth muscle as an immunomodulatory cell, and in the study of cell signaling mechanisms inducing glucocorticoid insensitivity and excitation-contraction coupling. His fundamental studies also focus on translational targets for new therapeutics and bench-to-bedside testing of novel approaches in the treatment of severe asthma and COPD.

Dr. Panettieri is the recipient of numerous honors and awards, including the Robert E. Cooke Memorial Lectureship at the American Academy of Allergy, Asthma and Immunology Annual Meeting, the Joseph R. Rodarte Award for Scientific Distinction and the Recognition Award for Scientific Accomplishments from the American Thoracic Society (ATS). He is also an active member of national professional and scientific societies including the American College of Chest Physicians and ATS; in 2013, he was elected Chair of the Respiratory Structure and Function Assembly of ATS. Dr. Panettieri served as chair of the NIH Lung Cellular, Molecular, and Immunobiology Study Section, is a member of the NIH Distinguished Editorial Panel, and is a member of the American Society for Clinical Investigation and Association of American Physicians. He is principal investigator on several NIH-sponsored grants and industry-sponsored clinical studies, is director of a program project grant examining novel approaches in modulating G protein-coupled receptor function, and is the Principal Investigator of the CTSA Hub entitled 'New Jersey Alliance for Clinical and Translational Science'. He is the author of over 475 peer-reviewed publications.

Dr. Panettieri manages the comprehensive clinical care of patients with asthma and is engaged in clinical investigations focused on the management of asthma and COPD.

Caroline Mbindyo: Caroline Mbindyo is an experienced leader in the fields of global health, innovation, technology, and international development. She has extensive experience in driving complex program deployments in multiple countries, initiating learning opportunities to better inform policy, testing technologies and innovations, and developing new business opportunities through public-private partnerships in emerging markets. She has over 20 years' experience running and growing entrepreneurial ventures in the nonprofit and commercial space, with a track

record of shifting opinions, and applying innovative approaches for profit, social impact, and sustainability. Caroline is a Board Member of White Ribbon Alliance Kenya Chapter and D-Tree International.

Treena Livingston Arinzeh, PhD: Dr. Treena Arinzeh is a Distinguished Professor of Biomedical Engineering at the New Jersey Institute of Technology (NJIT). Dr. Arinzeh received her B.S. from Rutgers University in Mechanical Engineering, her M.S.E. in Biomedical Engineering from Johns Hopkins University, and her Ph.D. in Bioengineering from the University of Pennsylvania. She worked for several years as a project manager at a stem cell technology company, Osiris Therapeutics, Inc. Dr. Arinzeh joined the faculty of NJIT as one of the founding faculty members of the department of Biomedical Engineering and served as interim chairperson and graduate director. Her most notable or cited work to date has been in the use of allogeneic mesenchymal stem cells (MSCs) with bioactive ceramics to induce bone formation in a large bone defect without the use of immunosuppressive therapy. This study demonstrated the potential use of allogeneic MSCs in long bone repair as an off-the-shelf therapy and served the basis for FDA approval to pursue clinical trials using allogeneic MSCs for various applications. Dr. Arinzeh has been recognized with numerous awards, including the National Science Foundation CAREER Award in 2003, Presidential Early Career Award for Scientists and Engineers (PECASE) in 2004, Outstanding Scientist Award from the NJ Association for Biomedical Research in 2004, People to Watch in 2005 in The Star Ledger and the Coulter Foundation Translational Award in 2010.

She was nominated by the Governor of Connecticut to the Connecticut Stem Cell Research Advisory Committee. She is a fellow of the National Academy of Inventors (NAE), American Institute for Medical and Biological Engineering (AIMBE) and the Biomedical Engineering Society (BMES). She recently served as the chairperson for the National Institutes of Health (NIH) Musculoskeletal Tissue Engineering (MTE) Study Section. She is currently a co-PI and the Director of Diversity of the NSF Science and Technology Center on Engineering Mechanobiology, which is a multi-institutional center with the University of Pennsylvania and Washington University in Saint Louis. She has also made a significant impact in the recruitment and mentoring of underrepresented minorities and women in biomedical engineering and other STEM fields.

George F. Heinrich, MD: Dr. George F. Heinrich is the vice chair and chief executive officer of Foundation Venture Capital Group, a position he also holds with New Jersey Health Foundation. Dr. Heinrich received his MD degree from New Jersey Medical School and served his residency in Internal Medicine at Martland Hospital in Newark. He has dedicated his career to the advancement of medical research and education and has served in a variety of capacities on many boards including those of hospitals, medical centers, nursing homes and charitable organizations within New Jersey and New York

Amadou A Sall, PhD: Dr Amadou A Sall is the CEO of Institut Pasteur de Dakar in Senegal and the chairman of the Global Outbreak Alert and Response Network and director of the WHO collaborating center for Arboviruses and viral hemorrhagic fever. Dr Sall is a virologist with a PhD in Public health. Dr Sall is an expert in epidemics response and control more specifically for arboviruses and viral hemorrhagic fevers (Ebola, Zika, Yellow fever ...).