The National Academies of SCIENCES ENGINEERING MEDICINE

Forum on NEUROSCIENCE and NERVOUS SYSTEM DISORDERS

Neuroscience Training: Developing a Nimble and Versatile Workforce—A Virtual Workshop Series

Topic #5: Evolving the Culture of Science and Training in Neuroscience to Meet a Changing World

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Panelist Biographical Sketches

Amy Bernard, Ph.D., has provided operational and strategic leadership at the Allen Institute in Seattle, Washington. Dr. Bernard led research teams at the Allen Institute for Brain Science from 2009-2016, overseeing the generation of petabytes of data for large-scale open science initiatives such as the Allen Connectivity Atlas, Allen Developing Brain Atlas, and Allen Human Brain Atlas. She then served as Product Architect and led the technology product program to deliver open data and tools to the research community through the brain-map.org web portal, until 2019. Currently she leads Science & Technology Strategy for the Allen Institute. She has authored over 50 publications, in technology standards, developmental neuroscience, molecular genetics, cell biology, biochemistry, imaging, physiology and high throughput laboratory system management. Prior to joining the Allen Institute, Dr. Bernard studied neural development as a research fellow at the University of Washington. She received a Ph.D. in Biophysics & Genetics from the University of Colorado, and a B.A. in Natural Sciences & Mathematics from Bard College. Dr. Bernard is an advocate of open science, inclusive approaches to STEM engagement, and serves on several advisory boards and review committees.

Emery Brown, M.D., Ph.D., is the Edward Hood Taplin Professor of Medical Engineering and Computational Neuroscience and an Investigator in the Picower Institute for Memory and Learning at MIT; the Warren M. Zapol Professor of Anaesthesia at Harvard Medical School and an anesthesiologist at Massachusetts General Hospital (MGH). Dr. Brown received his B.A (magna cum laude) in Applied Mathematics from Harvard College, his MA and PhD in Statistics from Harvard University and his MD (magna cum laude) from Harvard Medical School. He completed his internship in internal medicine at the Brigham and Women's Hospital and his residency in anesthesiology at MGH.

Dr. Brown's experimental research showed that a primary mechanism through which anesthetics work is by creating and maintaining oscillations that disrupt normal communications among brain regions. His statistics research develops point process, state-space and spectral analysis methods to characterize how the brain represents and transmits information.

Dr. Brown served on the NIH BRAIN Initiative Working Group and is the recipient of an NIH Pioneer Award, the National Institute of Statistical Sciences Sacks Award, the American Society of Anesthesiologists Excellence in Research Award and a Guggenheim Fellowship in Applied Mathematics. He is a Fellow of the American Statistical Association, Institute for Mathematical Statistics, IEEE, American Association for the Advancement of Science, American Academy of Arts and Sciences and National Academy of Inventors. Dr. Brown is a member of the National Academy of Medicine, National Academy of Sciences and National Academy of Engineering.

Kafui Dzirasa, M.D., Ph.D., is K. Ranga Rama Krishnan endowed Associate Professor at Duke University with appointments in the Departments of Psychiatry and Behavioral Sciences, Neurobiology, Biomedical Engineering, and Neurosurgery. He completed a Ph.D. in Neurobiology at Duke University. His research interests focus on understanding how changes in the brain produce neurological and mental illness, and his graduate work has led to several distinctions including: the Somjen Award for Most Outstanding Dissertation Thesis, the Ruth K. Broad Biomedical Research Fellowship, the UNCF·Merck Graduate Science Research Fellowship, and the Wakeman Fellowship. Dr. Dzirasa obtained an M.D. from the Duke University School of Medicine in 2009, and he completed residency training in General Psychiatry in 2016.

Dr. Dzirasa received the Charles Johnson Leadership Award in 2007, and he was recognized as one of Ebony magazine's 30 Young Leaders of the Future in February 2008. He has also been awarded the International Mental Health Research Organization Rising Star Award, the Sydney Baer Prize for Schizophrenia Research, and his laboratory was featured on CBS 60 Minutes in 2011. In 2016, he was awarded the inaugural Duke Medical Alumni Emerging Leader Award and the Presidential Early Career Award for Scientists and Engineers: The Nation's highest award for scientists and engineers in the early stages of their independent research careers. In 2017, he was recognized as 40 under 40 in Health by the National Minority Quality Forum, and the Engineering Alumni of the Year from UMBC. He was induced into the American Society for Clinical Investigation in 2019. Dr. Dzirasa has served as an Associate Scientific Advisor for the journal *Science Translational Medicine*, a member of the Congressional-mandated Next Generation Research Initiative, the Editorial Advisory Board for TEDMED, and on the NIH Director's guiding committee for the BRAIN Initiative. He currently serves on the NIH Director's NExTRAC Advisory committee and Brain Initiative Multi-council working group.

K. Ranga Rama Krishnan, MB, ChB, became the second CEO of the Rush University System for Health in May, 2019. He previously was dean of Rush Medical College from October 2015 to May 2019. Since joining Rush, Dr. Krishnan has reorganized the college's curriculum to keep the college at the vanguard of medical education. Among other features, the new curriculum provides students with prerecorded instructional content. This innovation reduces class time spent on lectures and shifts the emphasis to teams of students collaborating on case studies. Dr. Krishnan is leading innovation of care delivery at Rush as well, organizing providers around patients and diseases and conditions, rather than by department or division, to enable greater collaboration. This service line approach enables providers to share expertise, ultimately improving patient care, quality and safety. Sharing resources allows Rush to operate more efficiently and to create an integrated network of care across the system. Service lines established to date include liver, cancer, cardiac, neurology and neurosurgery, and mental health.

In addition, Dr. Krishnan has been instrumental in forging key external partnerships, including one with Tempus — a Chicago-based technology company with expertise in gene sequencing and analysis — to search for potentially relevant genetic patterns in cancer patients who are unlikely to respond to conventional therapies. Dr. Krishnan also has restructured Rush's innovation and technology strategy, including the Innovation and Technology Transfer Office, which manages Rush intellectual properties (IP) and assists inventors, authors and other creators of intellectual property at Rush in the process of IP disclosure, protection, marketing and licensing. He is currently working to launch Rush3D (Design, Demonstrate, Deliver), through which Rush will work with external inventors needing a "sandbox" for exploring opportunities and co-development. Rush3D was created to streamline the interaction of the entire Rush organization with external companies needing to leverage the unique capabilities of Rush.

Prior to joining Rush, Dr. Krishnan served for eight years as dean of the Duke–NUS Graduate Medical School Singapore (now Duke-NUS Medical School), a joint venture between Duke University in Durham, North Carolina, and the National University of Singapore. During his tenure, Duke–NUS developed a new teaching method called Team LEAD (for Learn, Engage, Apply, Develop) that since has been adopted by other universities and by high schools.

Dr. Krishnan arrived at Duke University Medical Center in 1981, when he began a residency in psychiatry, which he followed with a fellowship in neurobiology. He joined the Duke faculty in 1985 and was a professor in the Department of Psychiatry and Behavioral Sciences from 1995 to 2015. As chairman of the department from 1998 until 2009, he implemented an innovative continuing-education network while overseeing more than 490 faculty members.

A native of Madras, India, Krishnan received his medical degree from Madras Medical College in 1978, after which he served a rotating internship at Madras Medical College Government General Hospital. Beginning in 1980, he served as senior house officer at Queen Elizabeth Hospital at the University of West Indies in Barbados. A member of several editorial boards at various scientific journals, Dr. Krishnan has written two books on, as one title has it, "the art of learning." He authored more than 50 textbook chapters and 450 peer-reviewed papers on the subjects of elderly depression, dementia, Alzheimer's, panic disorder, bipolar disorder in late life and obsessive-compulsive disorder. A member of the National Academy of Medicine (formerly known as the Institute of Medicine), Dr. Krishnan has received numerous honors and awards, including the Distinguished Scientist Award from the American Association for Geriatric Psychiatry; the Edward Strecker Award from the University of Pennsylvania; the research award for mood disorders, 2015, and the research award for geriatric psychiatry 2009, both from the American College of Psychiatry; the Gerald Klerman Award for Research in Mood Disorders from the Depressive and Bipolar Support Alliance, 2002; and the C. Charles Burlingame Award for his lifetime achievements in psychiatric research and education. For his service to Singapore he received the Public Service Medal (Friend of Singapore) from the president of Singapore.

John Krystal, Ph.D., is the Robert L. McNeil, Jr. Professor of Translational Research; Professor of Psychiatry, Neuroscience, and Psychology; Chair of the Department of Psychiatry at Yale University; and Chief of Psychiatry and Behavioral Health at Yale-New Haven Hospital. He is a graduate of the University of Chicago, Yale University School of Medicine, and the Yale Psychiatry Residency Training Program. Dr. Krystal has published extensively on the neurobiology and treatment of schizophrenia, alcoholism, PTSD, and depression. Notably, his laboratory discovered the rapid antidepressant effects of ketamine in humans. He directs/co-directs the Yale Center for Clinical Investigation (CTSA), NIAAA Center for the Translational Neuroscience of Alcoholism, and Clinical Neuroscience Division of the VA National Center for PTSD. Dr. Krystal is a member of the U.S. National Academy of Medicine. Currently, he is a member of the NIMH National Mental Health Advisory Council; co-director of the Neuroscience Forum of the U.S. National Academies of Sciences, Engineering, and Medicine; and editor of Biological Psychiatry (IF=12.1). Dr. Krystal is past president of the American College of Neuropsychopharmacology (ACNP) and the International College of Neuropsychopharmacology (CINP).

Sharon Milgram, Ph.D., received a B.S. degree in Physical Therapy from Temple University and a Ph.D. in Cell Biology from Emory University. She completed postdoctoral training at The Johns Hopkins University before joining the faculty at The University of North Carolina at Chapel Hill. There, she rose

to the rank of Full Professor in the Department of Cell & Developmental Biology. Dr. Milgram served as the Associate Director of the Medical Scientist Training Program, Director of the Interdisciplinary Biomedical Sciences Graduate Program, and the Director of the Summer Undergraduate Research Experience. In 2007 she joined the NIH Office of the Director as the Director of the Office of Intramural Training and Education (OITE) where she directs a trans-NIH Office dedicated to the career advancement of over 5000 trainees. Dr. Milgram lectures widely on science careers, mentorship, leadership, and management in research environments. She lives in Takoma Park, Maryland with her wife and son.

M. Morgan Taylor, Ph.D., is a Field Engineer for the Data Sciences Platform at the Broad Institute of MIT and Harvard. Her current role is part software engineer, part research facilitator supporting scientists using Terra, the open-source, cloud-based platform enabling data access, analysis tools, and collaboration, developed at the Broad Institute. Dr. Taylor earned a B.A. in Psychology and Behavioral Neuroscience from Yale University and subsequently earned her Ph.D. in Neuroscience from the University of Pennsylvania, where she studied the role of inhibition in early visual circuits. She ran a health data science training program for PhDs looking to move into industry before joining the Data Sciences Platform at the Broad.

Anne Urai, Ph.D., is an Assistant Professor at Leiden University's Cognitive Psychology Unit. She studied cognitive neuroscience and philosophy at University College Utrecht, Xiamen University in China, University College London and École Normale Supérieure, Paris. During her doctoral research in the lab of Tobias Donner at the Universitätsklinikum Hamburg-Eppendorf and University of Amsterdam, she investigated how our previous choices bias the way we interpret later information, and how this process is affected by the confidence in our decisions. Dr. Urai joined Cold Spring Harbor Laboratory in New York as a postdoctoral fellow, investigating the neurophysiology of decision-making using high-density neural recordings in the mouse brain. During this time she was a core member of the International Brain Laboratory collaboration, working as part of a global team of systems and computational neuroscientists. Dr. Urai's research in general focuses on the neural basis of decision-making across mammalian species, the interaction between learning and perception, and the neural basis of cognitive aging.

Andrew Welchman, Ph.D., is Head of Neuroscience and Mental Health at the Wellcome Trust and Professor of Neural Intelligence at the University of Cambridge. He is an internationally recognized authority in the use of brain imaging and AI to understand the computations and functions of the human brain. Dr. Welchman directs Wellcome's funding strategy for a broad £500M portfolio in brain sciences, and recently won support for a new £200M investment in mental health. He is a Trustee of The India Alliance, The Royal College of Ophthalmologists, and an advisor to Children In Need's A Million and Me initiative focused on young people's mental health.

Alik Widge, MD, Ph.D., is a brain stimulation psychiatrist and biomedical engineer. He is an Assistant Professor of Psychiatry at the University of Minnesota, where he directs the Translational NeuroEngineering Lab. Dr. Widge completed his M.D. at the University of Pittsburgh, his Ph.D. in Robotics at Carnegie Mellon University, psychiatry residency at the University of Washington, and fellowships at Massachusetts General Hospital and the Massachusetts Institute of Technology. His research focuses on brain stimulation for severe and treatment-resistant mental illness, with particular emphasis on deep brain stimulation and related implantable technologies. Dr. Widge's recent work has

demonstrated new algorithms for closed-loop brain stimulation and stimulation methods for modifying connectivity in the distributed circuits of mental illness. His laboratory studies rodent models for prototyping these new technologies and human patients to identify biomarkers and targets for future intervention. He also co-leads programs to design new neurostimulation technologies in the central and peripheral nervous systems, to evaluate technologies for safety and efficacy in humans, and to improve the quality of clinical biomarker research nationwide.