



National Institute of Neurological Disorders and Stroke (NINDS) Workshop:

A Visionary Resource for Instilling Fundamental Principles of Rigorous Neuroscience Research

Natcher Building (Building 45), NIH Campus, Bethesda, Maryland
October 22-23, 2018

Panelists and Speakers



Dr. Shannon Behrman is the Associate Director of Scientific Training and Education at iBiology, a science education nonprofit that produces videos and online courses for scientists. Shannon is passionate about helping aspiring or current life scientists, no matter their identity or background, develop the skills it takes to succeed in research, and build confidence in their own scientific identities. As part of the iBiology team, Shannon co-produces a series of online courses that teaches “how to do good science” to students and junior scientists. In 2015 and 2016, she organized the iBiology Young Scientist Seminar competition and workshop in collaboration with the Alan Alda Center for Communicating Science. She received a Ph.D. in cell biology at the University of California, San Francisco in 2010. Before joining iBiology in 2014, Shannon was a science communications manager at the National Cancer Institute.



Laura Bonetta, Ph.D., is the Managing Director for BioInteractive at the Howard Hughes Medical Institute’s Department of Science Education. BioInteractive is a leading provider of educational multimedia resources and professional development for high school and undergraduate biology educators. All resources are provided free of charge through the BioInteractive website, key partnerships, and events—reaching thousands of classrooms and millions of students in the US and abroad. Dr. Bonetta serves on several panels aimed at improving science education at the undergraduate and high school level. Before joining BioInteractive, Dr. Bonetta held positions as an editor for *Nature*, *Nature Medicine*, *Molecular Medicine*, and *Nature Genetics*, where she was responsible for managing the peer-review and publication of scientific papers. In addition, Dr. Bonetta has worked for over a decade as a science writer and journalist for a broad range of publications, including several NIH magazines and reports, covering technical advances, careers, education, research, and policy.



Dr. Cynthia J. Brame is Associate Director of the Center for Teaching and Senior Lecturer in Biological Sciences at Vanderbilt University, where she leads efforts to promote the use of evidence-based teaching practices by STEM faculty. In addition, she has contributed to teaching development of future faculty, serving as one of the lead instructors of the Center for the Integration of Research, Teaching and Learning (CIRTL) MOOCs on evidence-based undergraduate STEM teaching and as director of the BOLD Fellows program, in which graduate students partner with faculty to design, implement, and assess online learning experiences for Vanderbilt students. Prior to Vanderbilt, Dr. Brame was an Associate Professor at Centenary College of Louisiana, where she gained extensive experience teaching undergraduate courses and mentoring undergraduate students in the lab.



Dr. Janet Branchaw is Assistant Professor of Kinesiology at the University of Wisconsin-Madison. She is the Director of the Wisconsin Institute for Science Education and Community Engagement (WISCIENCE), the Associate Director of the NIH-funded Mentor Training Core of the National Research Mentoring Network, the PI of UW-Madison’s HHMI Inclusive Excellence 2- to 4-year transfer student success project, and a member of the National Science Foundation (NSF) Biology Research Experiences for Undergraduates (REU) Leadership Committee. Dr. Branchaw directs a NSF-funded REU Site

program and has developed training curricula for research mentors, *Entering Mentoring*, and undergraduate and graduate research trainees, *Entering Research*. She also led a project to develop a common assessment tool for use across NSF's REU programs. Her scholarship focuses on the development, implementation, and evaluation of innovative approaches to undergraduate science education, with a special emphasis on undergraduate research, assessment of student learning, and broadening participation in science among underrepresented groups. She has taught undergraduate, graduate, and medical physiology and a freshman seminar course in biology. Her early career research was in cellular neurophysiology and membrane biophysics. She holds a B.S. in Zoology from Iowa State University and M.S. and Ph.D. in Physiology from the UW-Madison.



Dr. Emery N. Brown is the Warren M. Zapol Professor of Anesthesia at Harvard Medical School, an anesthesiologist at Massachusetts General Hospital (MGH), and the Edward Hood Taplin Professor of Medical Engineering and Computational Neuroscience at MIT. Dr. Brown received his B.A. in Applied Mathematics (magna cum laude) from Harvard College, his M.A. and 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 to defining the neuroscience mechanisms of how anesthetics create the states of general anesthesia. He is also widely recognized for his development of statistical methods to analyze dynamic processes in neuroscience. Dr. Brown served on President Obama's BRAIN Initiative Working Group. He is the recipient of an NIH Director's Pioneer Award, a Guggenheim Fellowship in Applied Mathematics, and the American Society of Anesthesiologists Excellence in Research Award. Dr. Brown is a fellow of the American Academy of Arts & Sciences and the National Academy of Inventors. He is also a member of the National Academy of Medicine, the National Academy of Sciences, and the National Academy of Engineering.



Dr. Erin A. Clark is a Postdoctoral Associate at Brandeis University in the lab of Dr. Sacha Nelson and is studying the epigenetic regulatory mechanisms that maintain the expression of genes critical for neuronal function in adulthood. Her graduate work focused on the role of histone modification and gene activation. Dr. Clark has taught and co-taught multiple courses at the Harvard Extension School, which caters to adult learners at all stages of career development, and has experience with course formats ranging from lecture-based to online flipped classrooms for students registered world-wide.



Dr. Devon C. Crawford is a Health Program Specialist at the NIH National Institute of Neurological Disorders and Stroke. Her focus is on improving experimental rigor and transparency within the biomedical research community as well as supporting efforts within the trans-NIH and trans-agency Brain Research through Advancing Innovative Neurotechnologies® (BRAIN) Initiative. She also strives to promote mentoring, diversity, and career development for trainees. She received her Ph.D. in Neuroscience from Washington University in St. Louis before conducting postdoctoral training at the University of Texas Southwestern Medical Center, where she received NIH funding for her training and research in synaptic physiology.



Dr. Jeffrey Diamond studies synaptic, cellular, and circuit physiology in the hippocampus and now primarily in the retina. His work in the hippocampus concerns primarily the dynamics of evoked neurotransmitter release, the role of glutamate transporters in taking up neurotransmitter, and the mechanisms underlying plasticity of CA1 hippocampal synapses. His work in the retina combines single-cell electrophysiology, two-photon fluorescent imaging, and mathematical modeling to explore how the structure and function of synapses, neurons and small circuits are optimized to accomplish the physiological signal processing required by the surrounding network.



Dr. David Dockterman, a Lecturer at the Harvard Graduate School of Education in Cambridge, MA, operates at the intersection of research and practice. In 1982 he helped found Tom Snyder Productions, an early pioneer in educational technology, while getting his doctorate at Harvard. Over the last 35 plus years, he has continued to balance lives in the academic and publishing worlds, supporting the development and implementation of research-driven innovative practices to tackle challenging educational problems. His Harvard courses focus on evidence-inspired innovation and responding to the

multiple dimensions of learner variability. He has led and supported the creation of scores of educational programs, serves as a judge for the Global Learning XPrize, and is an Editorial Board Member for the journal *npj Science of Learning*. Part of his current work involves exploring new approaches to adult capacity building to support early literacy development.



Jordan J. Elm, Ph.D., is an Associate Professor of Biostatistics at the Medical University of South Carolina, and is a part of the Data Coordination Unit (DCU) which specializes in the design, conduct, and analysis of multicenter clinical trials. She has served as lead biostatistician for clinical trials in several areas of Neurology including Parkinson's disease, stroke, and status epilepticus. She was lead statistician for the FS-ZONE trial (phase II trial of pioglitazone in Parkinson's disease funded by NINDS). For the NETT network, she is lead biostatistician for POINT (randomized trial of clopidogrel plus aspirin for TIA/minor stroke) and for the ESETT trial (an adaptive, comparative effectiveness trial of status epilepticus). She is biostatistician for the Multi-arm Optimization of Stroke Thrombolysis (MOST) Stroke Trial. Dr. Elm has served on DSMBs, NIH Panels, the NINDS Common Data Elements Steering Committee, the Parkinson Study Group Scientific Review Committee, and teaches Biostatistics graduate courses.



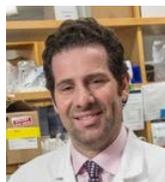
Dr. Pamela L. Gay is an astronomer, writer, and streamer focused on using new media to engage people in science and technology. Through CosmoQuest.org, she enables people to both learn and do science. Join her in mapping our Solar System in unprecedented detail through our citizen science projects, and learn astronomy through media productions like Astronomy Cast. Through this weekly podcast, she and cohost Fraser Cain take you on a facts-based journey through our Cosmos, exploring not only what we know, but how we know it. Dr. Gay is the Director of Technology and Citizen Science at the Astronomical Society of the Pacific.



Katelyn Green is a 5th year graduate student in the Cellular and Molecular Biology Program at the University of Michigan. As a member of Peter Todd's lab, her thesis work focuses on understanding how non-coding repeat expansion mutations become translated into toxic proteins in multiple different neurodegenerative diseases. Prior to graduate school, Katelyn worked as a laboratory technician for two years. She enjoys teaching science to undergraduate and high school students, and in the summers, she helps direct the Biology Labs for a Pre-College Exposure Academy at the University of Michigan. Her long-term career goal is to head a research lab that investigates the molecular mechanisms of neurodegeneration.



Sherry Hsi, Ph.D., is the Executive Vice President of the Concord Consortium, a nonprofit research and development organization dedicated to transforming education through technology. She also leads two grants from the National Science Foundation to improve computational thinking in high school biology and to open new pathways for creative engineering education with paper mechatronics. Prior to joining the Concord Consortium, Dr. Hsi worked at the UC Berkeley Lawrence Hall of Science and the Exploratorium, a hands-on science museum in San Francisco, where she directed R&D projects in innovative learning technologies. With support from the National Institutes of Health Science Education Partnership Award, she co-led a team that developed and evaluated mobile health education games and story apps for use with children and families. She serves on the editorial board of the *Journal of the Learning Sciences* and the *International Journal of Science Education*.



Michael G. Kaplitt, M.D., Ph.D., is currently Professor of Neurological Surgery with tenure, Residency Program Director, and Vice-Chairman for Research in the Department of Neurological Surgery at Weill Cornell Medical College-New York Presbyterian Hospital. He is also an Adjunct Faculty at The Rockefeller University and in the Department of Biomedical Engineering of Cornell University. He is an internationally known expert in gene therapy and functional neurosurgery. In 1994, he reported on the first use of adeno-associated virus (AAV) in the mammalian brain, and in 2003 he performed the first human gene therapy procedure for Parkinson's disease. He then designed and helped lead a subsequent phase II study which was the first randomized, blinded study to show success for a CNS gene therapy. He has also been a lead or key investigator in several other gene therapy trials and studies of neurological

devices for degenerative disorders. His laboratory continues to focus upon these technologies and has made important contributions to understanding gene targets in specific brain regions which profoundly influence Parkinson's disease, major depression, and drug addiction. More recently, he has been working to translate optogenetics and chemogenetics into human therapeutic applications and using non-invasive MR-guided focused ultrasound in the brain.



Dr. Benedict Kolber is an Associate Professor in the Department of Biological Sciences and the Research and Education Coordinator for the Chronic Pain Research Consortium at Duquesne University, Pittsburgh, PA. His laboratory research focuses on understanding the interactions between stress and pain that impact the development, maintenance, and treatment of chronic pain. Projects span basic science approaches through clinical translational studies in human patients. Dr. Kolber's experience in developing curricula for training in Rigor and Reproducibility centers on his role as a director of the Pain Undergraduate Research Experience and Neurodegeneration Undergraduate Research Experience summer research programs. As part of these programs, Kolber coordinates workshops for undergraduate researchers and the Entering Mentoring workshop for faculty mentors.



Dr. Alex L. Kolodkin is the Homcy-Margolis Professor in the Department of Neuroscience at the Johns Hopkins University School of Medicine. He recently served as the Chair of the Dean's Task Force on Research Reproducibility at Johns Hopkins and over the past several years has devoted effort toward improving the quality and integrity of biomedical research. Dr. Kolodkin received his Ph.D. in Molecular Biology from the University of Oregon at Eugene and conducted postdoctoral work at The University of California at Berkeley, joining the faculty of the Department of Neuroscience at Hopkins 1995. Dr. Kolodkin's laboratory studies how neurons in the brain are wired up during development. Their recent work identifies molecular mechanisms that orchestrate connectivity in the mammalian visual system and includes developing strategies for promoting optic nerve regeneration.



Walter J. Koroshetz, M.D., has been the Director of the National Institute of Neurological Disorders and Stroke (NINDS) since 2015. As NINDS Director, Dr. Koroshetz directs program planning and budgeting and oversees the scientific and administrative functions of the Institute. He has held leadership roles in many NIH and NINDS programs, including the NIH's Brain Research through Advancing Innovative Neurotechnologies® (BRAIN) Initiative, the NIH Blueprint for Neuroscience Research, the Traumatic Brain Injury Center collaborative effort between the NIH intramural program and the Uniformed Health Services University, and the establishment of the NIH Office of Emergency Care Research. Additionally, Dr. Koroshetz serves as Chair of the Interagency Pain Research Coordinating Committee and the Executive Committee for the NIH Pain Consortium. Before joining NINDS, Dr. Koroshetz served as Vice Chair of the neurology service and Director of stroke and neurointensive care services at Massachusetts General Hospital (MGH). He was a professor of neurology at Harvard Medical School (HMS) and led neurology resident training at MGH between 1990 and 2007. Over that same period, he co-directed the HMS Neurobiology of Disease course with Drs. Edward Kravitz and Robert H. Brown.



Dr. Diane Lipscombe is the Director of the Carney Institute for Brain Science and Professor of Neuroscience at Brown University. Dr. Lipscombe will serve as President of the Society for Neuroscience starting November 2018, and she is currently on the NINDS Board of Scientific Counsellors. Dr. Lipscombe studies the basic mechanisms that regulate ion channel expression, modulation, and function with particular interest in the cellular mechanisms that underlie acute and chronic pain. In collaboration, the lab is also studying animal models of amyotrophic lateral sclerosis. At Brown, Dr. Lipscombe directs NINDS and NIMH predoctoral training programs and has for >20 years been involved in the education and training of undergraduate and graduate students. Dr. Lipscombe has particular interest in developing new programs to integrate quantitative skills and scientific rigor into all aspects of neuroscience research training.



Dr. Malcolm Macleod is Professor of Neurology and Translational Neuroscience at the University of Edinburgh. For 15 years his research has focused on the identification of risks of bias in research reports as a route to research improvement activity. With colleagues he developed good laboratory practice guidelines for *in vivo* stroke research, published in 2009. He has evaluated changes in reporting quality following a change in editorial policy at NPG and the effect of mandatory completion of the ARRIVE checklist in reporting quality at *PLoS One*. He is academic coordinator of the EQIPD Innovative Medicines Initiative, developing a quality framework for *in vivo* research, and a founder member of the UK Reproducibility Network.



Dr. Caleb McKinney is Assistant Dean for Graduate and Postdoctoral Training & Development at Georgetown University Medical Center – Biomedical Graduate Education. He oversees career and professional development programs and initiatives across the medical center for graduate students and postdoctoral research fellows. Through teaching, advising, specialized programming, and collaborations with administrators and faculty, he has integrated career development with research activities with the goal of incorporating research rigor and scientific ethics into career motivation.



Dr. Marcus Munafò is Professor of Biological Psychology at the University of Bristol, and Programme Lead within the MRC Integrative Epidemiology Unit. Together with Angela Attwood and Olivia Maynard, he leads the Tobacco and Alcohol Research Group. His research interests focus on causal influences on and consequences of health behaviours, using approaches that include epidemiology, human laboratory studies, and field trials. He is also interested in how current incentive structures within science shape the behaviour of scientists and have an impact on the quality of published work. This extends to an interest in developing management and leadership skills in early career researchers, to provide them the skills for careers both within and outside academia. He completed his undergraduate degree at the University of Oxford and his Ph.D. at the University of Southampton, before returning to Oxford for his postdoctoral research. He moved to Bristol in 2005.



Barbara Oakley, Ph.D., P.E., is a Professor of Engineering at Oakland University in Rochester, Michigan; Michigan's Distinguished Professor of the Year; and Coursera's inaugural "Innovation Instructor." Her work focuses on the complex relationship between neuroscience and social behavior. She has won numerous teaching awards, including the American Society of Engineering Education's Chester F. Carlson Award for technical innovation in engineering education. Together with Terrence Sejnowski at the Salk Institute, she co-teaches Coursera – UC San Diego's "Learning How to Learn," one of the world's most popular MOOCs with over two million registered students. Dr. Oakley is a *New York Times* best-selling author—her upcoming book *Learning How to Learn* gives kids aged ten and older neuroscientific tools to help their learning. Dr. Oakley rose from the ranks of Private to Captain in the U.S. Army, during which time she was recognized as a Distinguished Military Scholar. She also worked as a communications expert at the South Pole Station in Antarctica and served as a Russian translator on board Soviet trawlers on the Bering Sea. Dr. Oakley is an elected Fellow of the American Institute for Medical and Biological Engineering and of the Institute of Electrical and Electronics Engineers.



Dr. Jeffrey Olimpo, Assistant Professor in Biological Sciences at The University of Texas at El Paso (UTEP), is a discipline-based education researcher with more than five years of experience in the development, implementation, and evaluation of course-based undergraduate research experiences (CUREs). His research focuses on the cognitive and non-cognitive outcomes associated with novices' participation in authentic research opportunities as well as the impact of professional development experiences on the career growth of graduate, postdoctoral, and faculty instructors. Furthermore, Dr. Olimpo's recent work has centered on the integration of ethics/RCR education within CURE environments and the mechanisms that facilitate this process. At UTEP, Olimpo serves as chair of the Department of Biological Sciences' committee on curriculum development in the introductory biology series and likewise facilitates coursework on scientific teaching for upperclassmen, pre-service, and in-service teachers. He is currently PI of the

NSF-funded *Tigriopus* CURE and Ethics Network for Course-based Opportunities in Undergraduate Research (ENCOUR) initiatives and is a Tips & Tools Section Editor for the *Journal of Microbiology & Biology Education*.



Dr. Nathalie Percie du Sert is Head of Experimental Design and Reporting at the National Centre for the Replacement, Refinement, and Reduction of Animals in Research (NC3Rs) in the UK. Since 2010 she has been leading the Centre's work to improve the reliability of preclinical and basic research, both in terms of the work funded by NC3Rs and work funded elsewhere. The NC3Rs provides an extensive library of freely-available, online resources for researchers. This includes the Experimental Design Assistant, an online expert system to guide researchers through the design of *in vivo* experiments and the ARRIVE guidelines to improve the design and reporting of animal research in scientific publications. Prior to joining the NC3Rs, Dr. Percie du Sert worked as a post-doctoral researcher in the field of nausea and emesis at the University of California, San Francisco and at the Chinese University of Hong Kong, where she developed expertise in *in vivo* research and systematic reviews and meta-analysis of animal models. She also serves on the editorial board of *BMJ Open Science*, a journal dedicated to improving the transparency, integrity, and reproducibility of biomedical research closely aligned to medicine.



Dr. Indira M. Raman is a Professor in the Department of Neurobiology at Northwestern University, where she holds the Bill and Gayle Cook Chair in Biological Sciences. She completed her Ph.D. in Neuroscience at the University of Wisconsin-Madison (with Larry Trussell) and postdoctoral training at the Vollum Institute (with Craig Jahr) and Harvard Medical School (with Bruce Bean). Her research is in the areas of ion channel biophysics, synaptic transmission, and cerebellar physiology, and she is the recipient of a Javits Neuroscience Investigator Award from NINDS. She has served on NIH study sections, the NINDS Board of Scientific Counselors, and is currently a member of the NINDS Advisory Council. She has been a reviewing editor for the *Journal of Neuroscience*, *Biophysical Journal*, and *eLife*. She has also served as Director of the Northwestern University Interdepartmental Neuroscience (NUIN) graduate training program. She has received awards for her teaching and scientific training of graduate and undergraduate students, including a Charles Deering McCormick Professorship of Teaching Excellence. Essays in which she has expressed her perspectives on scientific research and training have been published in *Neuron* and *eLife*.



Ceri Riley is a Script Editor at Complexly, a video production company that creates some of YouTube's leading educational channels *SciShow* (5M subscribers) and *Crash Course* (8M subscribers). Ceri helps curate, write, edit, and fact-check content for *SciShow*, *SciShow Space*, *SciShow Psychology*, and *Crash Course Film*. She also co-hosts the *SciShow Tangents* podcast, a lightly competitive science talk show that is co-produced by WNYC Studios. In 2016, Ceri completed her S.B. in Biology and Comparative Media Studies at the Massachusetts Institute of Technology (MIT), where she worked with MITx Biology to conduct research and create videos for the massive open online course provider edX, notably a 3-part Molecular Biology series (7.28x). At MIT, she was also an Educational Media Fellow with MIT+K12 Videos and assistant taught several courses about educational video to both undergraduate and graduate students.



Amy Lynne Shelton, Ph.D., is the Director of Research for the Center for Talented Youth and a professor and Associate Dean for Research at the School of Education at Johns Hopkins University. She holds a joint appointment in the School of Medicine and Krieger School of Arts & Sciences, and she serves on the steering committees for the university-wide Science of Learning Initiative. Amy was on the faculty in psychological and brain sciences at JHU from 2002 to 2013. Her research in cognitive psychology and cognitive neuroscience focuses on spatial skills, individual differences, and mechanisms of learning, couched in the broad context of understanding the characterization and needs of the individual learner. She has a track record of publications in major academic journals and grant support, and her professional orientation takes a strong basic science approach that is informed by the problems and questions of practice and application.



Dr. Shai D. Silberberg is the Director for Research Quality at the NIH National Institute of Neurological Disorders and Stroke (NINDS) and has been leading Institute efforts to increase the excellence of science and the completeness of research reporting since 2008. In addition, Dr. Silberberg is a Program Director at NINDS with a focus on basic research related to the molecular structure, function, and regulation of ion channels and transporters. Prior to joining NINDS, Dr. Silberberg was an Associate Professor at Ben-Gurion University of the Negev in Israel, where he gained extensive experience teaching undergraduate and graduate courses as well as training undergraduate and graduate students in the lab.



Dr. Lawrence Tabak is the principal deputy director of the National Institutes of Health (NIH). He previously served as the acting principal deputy director of NIH (2009), and prior to that as director of the National Institute of Dental and Craniofacial Research from 2000-10. Dr. Tabak has provided leadership for several trans-NIH activities, including the Enhancement of Rigor and Reproducibility of Research Findings, strategic planning for health research related to sexual and gender minorities (SGM), and the NIH's implementation of the American Recovery and Reinvestment Act. He also led the efforts to develop the NIH-wide Strategic Plan, as well as the Environmental influences on Child Health Outcomes (ECHO) program – a strategic pediatric environmental research program. Prior to joining NIH, Dr. Tabak was the senior associate dean for research and professor of dentistry and biochemistry & biophysics in the School of Medicine and Dentistry at the University of Rochester in New York. A former NIH MERIT recipient, Dr. Tabak's major research focus has been on the structure, biosynthesis and function of glycoproteins. He continues work in this area, maintaining an active research laboratory within the NIH intramural program in addition to his administrative duties.



Dr. Stephen Uzzo, Chief Scientist for the New York Hall of Science in New York City, does research and development of public programs and experiences on complex science as well as program development and instruction for graduate level pre-service teacher education. His background includes over twenty years professional experience in teaching and learning in STEM and, prior to that, ten years in computer graphics systems engineering. Dr. Uzzo's research interests include cognitive and social network models for learning, collaboration in free-choice learning environments, and the teaching and learning of data driven science. There is a need for better educational resources to help connect neurosciences and connectomics to learning and cognitive sciences at all levels of learning.