NATIONAL ACADEMIES Sciences Engineering Medicine

Health and Medicine Division

Committee on the State of the Science and Future Needs for Nonhuman Primate Model Systems – Public Workshop

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Speaker Biographies

Matthew Bailey is the President of the National Association for Biomedical Research (NABR) and the Foundation for Biomedical Research. Originally from Arkansas, Mr. Bailey was appointed to serve as a Congressional Liaison for the U.S. Secretary of Commerce in 1996, and later went on to handle Congressional Affairs for the National Institute for Standards and Technology (NIST). Matt's bi-partisan Capitol Hill experience includes his time as both a legislative aide for Democratic Senator Dale Bumpers of Arkansas and as an aide for Republican Representative Connie Morella of Maryland where he managed legislative issues coming before the House Science Committee. Today, Mr. Bailey manages two premier national non-profit organizations, advises corporate and university institutions on crisis management issues and communicates the value of biomedical research to policy makers and the media.

Carol A. Barnes, Ph.D., is a Regents' Professor in the Department of Psychology, Neurology, Neuroscience and BIO5, Director of the Evelyn F. McKnight Brain Institute, Director of the ARL Division of Neural Systems, Memory & Aging, Associate Director of the BIO5 Institute, and the Evelyn F. McKnight Endowed Chair for Learning and Memory in Aging at the University of Arizona, Tucson, AZ. The central goal of Dr. Barnes' research program is to understand how the brain changes during the aging process and what the functional consequences of these changes are on information processing and memory in the elderly. Her research program involves behavioral, electrophysiological and molecular biological approaches to the study of young and aged rodents and non-human primates. This work provides a basis for understanding the basic mechanisms of normal aging in the brain and sets a background against which it is possible to assess the effects of pathological changes such as Alzheimer's disease.

Dan Barouch, M.D., Ph.D., received his Ph.D. in immunology from Oxford University and his M.D. from Harvard Medical School. He is currently the William Bosworth Castle Professor of Medicine and Professor of Immunology at Harvard Medical School, Director of the Center for Virology and Vaccine Research at Beth Israel Deaconess Medical Center, a member of the Ragon Institute of MGH, MIT, and Harvard, and part of the Bill & Melinda Gates Foundation Collaboration for AIDS Vaccine Discovery. His laboratory focuses on studying the immunology and pathogenesis of viral infections and developing novel vaccine and treatment strategies. His group has led the development of vaccine candidates for multiple pathogens of global significance, including HIV, Zika virus, tuberculosis, and most recently SARS-CoV-2. His recent work contributed to the development of the Johnson & Johnson COVID-19 vaccine, which is now being rolled out throughout the world. He was elected to the National Academy of Medicine in 2020.

Michele A. Basso, Ph.D., studied Neuroscience at Stony Brook University in NY and was a post-doctoral fellow at the National Eye Institute, NIH. After serving as a faculty member at the University of Wisconsin Madison, she moved to UCLA and was then recruited to the University of Washington to serve as Director of the Washington National Primate Research Center (WaNPRC). The work performed in Dr. Basso's laboratory is aimed at unravelling the neuronal circuits of decision-making in health and disease. Her work spans multiple species and employs multiple technologies designed to understand how memory and sensory information are combined to give rise to our decisions and choices of action.

Sonja Beken, Ph.D., holds a Master in Biological Sciences and PhD in Pharmaceutical Sciences from the Vrije Universiteit Brussel (VUB), Belgium and a Master in Applied Toxicology from the University of Surrey, UK. Sonja Beken is the Coordinator of the Unit of non-clinical assessors at the Belgian Federal Agency for Medicines and Health Products (FAMHP). This Unit is responsible for the evaluation of non-clinical data submitted to support all phases of drug development (e.g. marketing authorizations, clinical trials, EU/national scientific advice, etc). She was Member of the Safety Working Party (Vice-Chair 2013-2016) and of the CVMP/CHMP Joint 3Rs Working Group (Chair 2011-2016) at the European Medicines Agency (EMA) and ICH Rapporteur for the revision of the S5(R2) Guideline (2014-2016). Currently she is Member of the new Non-Clinical Working Party and the CVMP/CHMP Joint 3Rs Working Party at the EMA. Over the years, Sonja Beken has contributed to the direct identification of opportunities for regulatory implementation of 3R testing paradigms through her active involvement in large-scale international initiatives (EPAA, CAAT, ILSI HESI, NC3Rs, AIMBE & NIH, etc). Her main areas of expertise relate to regulatory science, non-clinical drug development, (in vitro) toxicology and metabolism as well as alternative models to animal experiments (3Rs).

April Brys, Ph.D., is the Director of the Division of Non-Clinical Development (DNCD). The DNCD manages the Nonclinical Development Network and is responsible for the coordination, oversight and execution of the critical path nonclinical efforts supporting BARDA's medical countermeasure enterprise. Prior to joining BARDA, Dr. Brys, served as the Vice President of the Drug Development Division at Southern Research and the Director of the Clinical and Nonclinical Business Unit for Battelle. Dr. Brys has worked closely with industry to advance a range of candidate MCM portfolios and has extensive experience working in partnership with the U.S. Government. She has overseen complex nonclinical and clinical product development programs including those on vaccines, small molecules, and immunotherapies.

Namandjé N. Bumpus, Ph.D., serves as the FDA Chief Scientist where she provides strategic leadership and expertise to support scientific excellence, innovation, collaboration, and capacity to achieve FDA's public health mission. Prior to this, Dr. Bumpus was on the faculty at Johns Hopkins University School of Medicine for 12 years, most recently as the E.K. Marshall and Thomas H. Maren Professor and chair of the Department of Pharmacology and Molecular Sciences. She also served previously as associate dean for basic research. Dr. Bumpus' research expertise is in pharmacology with a particular focus on drug metabolism, pharmacogenetics, bioanalytical chemistry, and infectious disease. She earned a BA in biology at Occidental College in 2003, a PhD in pharmacology at the University of Michigan in 2007 and completed a postdoctoral fellowship in molecular and experimental medicine at The Scripps Research Institute in La Jolla, CA in 2010. Dr. Bumpus currently serves as president-elect of the American Society

for Pharmacology and Experimental Therapeutics (ASPET). She previously served as chair of the NIH Xenobiotic and Nutrient Disposition and Action study section. Her many honors include the Leon I. Goldberg Award from the American Society for Clinical Pharmacology and Therapeutics, the James Gillette Award from the International Society for the Study of Xenobiotics, the John J. Abel Award in Pharmacology from the American Society for Pharmacology and Experimental Therapeutics and the Presidential Early Career Award for Scientists and Engineers, which is the highest honor bestowed by the United States government on early career scientists and engineers. Dr. Bumpus is an elected fellow of the American Association for the Advancement of Science (AAAS).

Shawn L. Chavez, Ph.D., is an Associate Professor in the Division of Reproductive & Developmental Sciences at the Oregon National Primate Research Center (ONPRC) as well as in the Departments of Obstetrics & Gynecology and Molecular & Medical Genetics at Oregon Health & Science University (OHSU), where she has been a faculty member since September of 2013. She obtained her Ph.D. in Molecular, Cellular and Developmental Biology from Yale University and her B.S. in Biological Sciences from the University of California, Santa Barbara. Dr. Chavez completed her Postdoctoral training at the University of California, San Francisco and Stanford University, where she was a NIH/NICHD Ruth L. Kirschstein National Research Service Award (NRSA) Fellow. Her research interests focus on the use of real-time imaging and low-input next-generation sequencing to investigate the genetic, epigenetic, and chromosomal requirements of early embryogenesis and placentation in humans, non-human primates (NHPs), and other mammals. In particular, her laboratory is investigating the underlying mechanisms mediating mitotic chromosome mis-segregation, embryonic micronuclei formation, and potential aneuploidy resolution during mammalian preimplantation development. Moreover, she is also examining the molecular connections between the formation of the placental-derived trophectoderm layer in embryos and subsequent placentation in normal versus abnormal pregnancies in both humans and NHPs. Collectively, the goals of this research are to enhance our understanding of embryogenesis and placentation across primate species, whilst improving assisted reproduction outcomes for infertile couples by preventing embryo or fetal loss during pregnancy.

Stephen Denny, D.V.M., M.S., DACLAM, DACVPM, serves as the Director of the Office of Animal Care and Use. Dr. Denny received his Doctorate of Veterinary Medicine from the University of Missouri in 1981 prior to starting a 26 year career in the US Army Veterinary Corps and an M.S. in laboratory animal medicine from the University of Missouri in 1995 where his research focus was immunology. He served as the US Army Surgeon General's Consultant for Laboratory Animal Medicine from 2005–2007, and as the President of the American Society of Laboratory Animal Practitioners in 2007. He is a Diplomate of the American College of Veterinary Preventive Medicine and the American College of Laboratory Animal Medicine. He came to the OACU in 2011.

Robert W. Eisinger, Ph.D., was named, effective July 1, 2022, as the Acting Director of the Division of Program Coordination, Planning, and Strategic Initiatives (DPCPSI) in the Office of the Director, NIH. DPCPSI's mission includes identifying emerging scientific opportunities, rising public health challenges, and scientific knowledge gaps that merit further research. The Division plans and implements NIH-wide initiatives supported by the Common Fund and coordinates activities and research related to AIDS, behavioral and social sciences, women's health, disease prevention, dietary supplements, sexual and

gender minorities, tribal health, and research infrastructure, data science, and nutrition. Dr. Eisinger has served in a number of leadership roles at the NIH including Senior Science Advisor to the DPCPSI Director, Special Assistant for Scientific Projects to the NIAID Director, and Acting NIH Associate Director for AIDS Research and Acting Director of the Office of AIDS Research (OAR). For 24 years prior to this, he served as the Director of Scientific and Program Operations and Therapeutics Research Coordinator in the OAR. His career at the NIH began as a Program Virologist in the NIAID Division of AIDS where he coordinated the 45 Virology Laboratories supporting the AIDS clinical trials networks. He also has served in the Department of State as the Director, Office of Research and Science, in the Office of the U.S. Global AIDS Coordinator (OGAC). At the OGAC, he was responsible for managing a portfolio of three large international combination HIV prevention clinical studies, a program of implementation science and impact evaluation projects, as well as the Scientific Advisory Board for OGAC. Before joining the NIH, Bob worked in the medical diagnostics industry successfully developing proprietary diagnostic immunoassay systems bringing these from the bench to clinical trials and through FDA licensure. His postdoctoral training on the immunochemistry of cell surface antigens associated with murine alveolar cell carcinomas was conducted at the Oak Ridge National Laboratories in conjunction with the University of Tennessee. Dr. Eisinger received his Ph.D. in Microbiology from North Texas State University where his research focused on Cell Surface Antigens Present on AKR/J Leukemic Lymphocytes.

Guoping Feng, Ph.D., is the Poitras Chair Professor of Neuroscience and Associate Director of the McGovern Institute for Brain Research, Department of Brain and Cognitive Sciences, Massachusetts Institute of Technology. He is also the Director of Model Systems and Neurobiology at the Stanley Center for Psychiatric Research at Broad Institute. Dr. Feng's research is devoted to understanding the mechanisms regulating the development and function of synapses in the brain and how synaptic dysfunction may contribute to brain disorders. Using genetically engineered animal models, Dr. Feng's laboratory combines cutting-edge technologies and multidisciplinary approaches to unravel the neurobiological mechanisms of neurodevelopmental and psychiatric disorders.

JoAnne L. Flynn, Ph.D., has a Bachelor of Science in Biochemistry, from the University of California at Davis and a PhD from University of California at Berkeley in Microbiology and Immunology. Dr. Flynn's first post-doc was with Dr. Magdalene So at the Scripps Clinic Research Institute and then a Howard Hughes Research Associate with Dr. Barry Bloom at Albert Einstein College of Medicine where she began her studies in tuberculosis. Dr. Flynn joined the Department of Microbiology and Molecular Genetics at the University of Pittsburgh School of Medicine in 1994 and in 2019 was awarded the title of Distinguished Professor. Dr. Flynn directs a NIH T32 Training Program and has multiple grants from NIH and the Gates Foundation. She is a former Editor at Infection and Immunity and Section Editor for The Journal of Immunology, a current Section Editor for PLoS Pathogens and member of the NIH NIAID Board of Scientific Counselors. She served as a Councilor for the American Association of Immunologists and as President in 2018. Dr. Flynn is a Fellow of the American Academy of Microbiologists and a Distinguished Fellow of the American Association of Immunology. She has published over 200 papers (see link to publications below). Dr. Flynn won the University of Pittsburgh School of Medicine Distinguished Mentor Award in 2018 and the Distinguished Research Award in 2019. Her research in tuberculosis is focused on immunology, host-pathogen interactions, vaccines, and drugs, and she has developed and used non-

human primate models for TB research for more than 20 years. Dr. Flynn's research uses cutting-edge tools and technologies to investigate the complexities of Mycobacterium tuberculosis infection, with a particular focus on lung and lymph node granulomas, vaccines and treatments.

Nancy Haigwood, Ph.D., has spent 17 years in the biotechnology and pharmaceutical sector, principally at Chiron Corporation (Novartis) in Emeryville, California, and at the Bristol-Myers Squibb Pharmaceutical Research Institute in Seattle, Washington following her postdoctoral training. From 1997-2007, she was a Professor of Microbiology and Pathobiology at the University of Washington and Member at the Center for Infectious Disease Research, both in Seattle. Since 1986, the focus of her research has been on HIV and AIDS, with a focus on halting mother to child transmission and on vaccines for children and adults. She was recruited to OHSU in 2007 to become the fifth director of the Oregon National Primate Research Center and a Professor of Pathobiology & Immunology to continue a highly funded research program. Dr. Haigwood served for many years as a volunteer board member for the local AIDS service organization in Portland, the Cascade AIDS Project. She is an advocate for science education and outreach to the public and frequently speaks both locally and nationally on this subject.

William D. Hopkins, Ph.D., is a Professor of Comparative Medicine and Director of the Michale E. Keeling Center for Comparative Medicine and Research at the University of Texas MD Anderson Cancer Center.

Eric K. Hutchinson, D.V.M., is the Director of Research Animal Resources, the Assistant Vice Provost for Animal Research, and an Assistant Professor in the Department of Molecular and Comparative Pathobiology at the Johns Hopkins University School of Medicine. His research focuses on the behavioral and physiological consequences of laboratory environments for research animals, and how those may impact experiments. Dr. Hutchinson studied English and psychology at Georgetown University, then worked as an animal behavior and enrichment specialist at the National Institutes of Health Division of Veterinary Resources for four years before attending veterinary school at Colorado State University. At CSU, he worked as the enrichment coordinator for Laboratory Animal Resources and conducted research on the effects of typical cage enrichments on the physiology and behavior of mice. He completed the laboratory animal medicine residency at the Johns Hopkins School of Medicine and became a diplomate of the American College of Laboratory Animal Medicine in 2012. He directed the behavioral management program at NIH's Division of Veterinary Resources from 2014-2016 before returning to Johns Hopkins.

R. Paul Johnson, M.D., is the Director of the Emory National Primate Research Center and a Professor of Medicine at Emory University. Prior to his Emory appointment in 2014, Dr. Johnson served as Director of the New England Primate Research Center (NEPRC), Chair of the NEPRC Division of Immunology, and Professor of Medicine at Harvard Medical School and Massachusetts General Hospital. Dr. Johnson received his undergraduate degree in psychology from Duke University in 1980 and his Doctor of Medicine from Harvard Medical School in 1984. He completed a residency in internal medicine at Yale-New Haven Hospital, where he also served as chief resident. He then entered the infectious disease fellowship program at Massachusetts General Hospital and joined the faculty of Harvard Medical School in 1992. His research has focused on the immunology of HIV and SIV infection, including analysis of the

immunopathogenesis of AIDS, development of novel therapeutic strategies for HIV/SIV infection, and analysis of protective immunity in macaques vaccinated with attenuated SIV. Dr. Johnson is board certified in internal medicine and infectious diseases. He is a member of the American Society for Clinical Investigation, a Fellow of the Infectious Disease Society of America and the recipient of multiple national and international awards in AIDS research, including the Elizabeth Glaser Scientist Award. He has published over 150 peer-reviewed scientific papers, in addition to over 40 book chapters, monographs and editorials. Dr. Johnson has served as the principal investigator of numerous NIH grants and as the overall principal investigator of several program project grants. He has also served on multiple scientific advisory boards, editorial boards, advisory committees and NIH study sections.

Matthew Jorgensen, Ph.D., is an Associate Professor in the Department of Pathology, Section on Comparative Medicine, at Wake Forest School of Medicine. He has over 30 years of experience working with nonhuman primate models of human disease and has dedicated his career to facilitating the use of nonhuman primates in multi-categorical translational research. He serves as the director of the Vervet Research Colony (VRC), an NIH-supported national biomedical research resource (P40-OD010965). The VRC is a multi-generational, pedigreed and genomically sequenced breeding colony of US-born, known age vervet/African green monkeys (Chlorocebus aethiops sabaeus). The colony is managed to optimize studies related to growth, development, temperament, aging, and chronic disease risk across the life span. This unique biomedical resource has supported the use of the vervet/AGM as a model for a wide variety of preclinical research including immunology and vaccine development, neuroscience and behavior, obesity/diabetes/metabolic syndrome, reproduction, genetics, substance abuse, and Alzheimer's disease (AD), among others. Dr. Jorgensen has worked with the VRC since 1998, initially collaborating on research projects and then serving as scientific manager of the colony prior to becoming director in 2016. Throughout that time, he has promoted the VRC as a national research resource, advocated for the use of the vervet as an alternative nonhuman primate model and supported numerous research projects utilizing vervets and VRC resources across a diverse range of scientific disciplines.

Norma Sue Kenyon, Ph.D., is Vice Provost for Innovation at the University of Miami and Chief Innovation Officer of the Miller School of Medicine. Under her leadership, the U Innovation team, including the Office of Technology Transfer and the Wallace H. Coulter Center for Translational Research has successfully increased the number of licensing agreements and startups emanating from faculty innovations across the university's 11 schools and colleges. The Launch Pad provides mentoring for emerging student, alumni and faculty entrepreneurs throughout the university community, and Kenyon established the ‘Cane Angel Network to provide investment opportunities to all startups connected to the university. The Martin Kleiman Professor of Surgery, Microbiology & Immunology and Biomedical Engineering at the Diabetes Research Institute, Dr. Kenyon and her research team have focused on ways to transplant insulin producing islet cells, in both clinically relevant transplant models and in clinical studies, without the need for life-long anti-rejection drugs. Kenyon has received research funding from the National Institute of Allergy and Infectious Disease, the National Institute of Diabetes, Digestive and Kidney Diseases, the Juvenile Diabetes Research Foundation International, the Diabetes Research Institute Foundation and several industry collaborators. She has served as a member of both the

National Advisory Allergy and Infectious Disease Council and the NIH Council of Councils. Kenyon was a scientific advisor to the Food and Drug Administration and has participated in several panels involving islet transplantation and stem cells. Kenyon earned her undergraduate degree from Duke University and her Ph.D. from Virginia Commonwealth University, followed by post-doctoral positions at UCLA and the University of Miami. Subsequent to post-doctoral training, Kenyon was a Senior Scientist and Lab Head at Coulter Corporation, holding positions in both research and product development.

Christian Larsen, M.D., D.Phil., serves as the Carlos and Marguerite Mason Professor in Transplantation and Co-Director of the Emory Transplant Center. His clinical practice is focused on kidney transplantation in adults and children. Together with his colleague, Dr. Thomas Pearson, Dr. Larsen played a leading role in development of Belatacept, a new anti-rejection medication that protects kidney transplant function and improves long-survival. His basic, translational and clinical research efforts focus on the development of the next generation of safer and more effective anti-rejection methods and immune tolerance. As Founding Director of the Emory Transplant Center, Dr. Larsen led the development of the team-based multidisciplinary approach to life-long care of transplant recipients. He also previously served as Chairman of the Department of Surgery, Surgeon-in-Chief for Emory Healthcare, and Dean of Emory University School of Medicine.

Jon Levine, Ph.D., is a Professor and Director of the Wisconsin National Primate Research Center. His laboratory studies the synthesis, secretion, and actions of gonadotropin-releasing hormone (GnRH), a brain peptide that governs secretion of reproductive hormones from the anterior pituitary gland. They are particularly interested in the cellular mechanisms that mediate the physiological regulation of GnRH neurosecretion during the female ovulatory cycle. Their studies utilize a variety of experimental approaches and animal models to ascertain the molecular processes by which gonadal steroids, diet, stress, and neuroendocrine signals for sexual maturation can exert their effects on GnRH release. Much of their work is focused on the regulation of GnRH neurosecretion by the gonadal steroid hormones, estrogen and progesterone. Throughout the normal ovulatory cycle, these hormones exert homeostatic feedback control over GnRH neurosecretion. However, in certain reproductive and metabolic disorders, such as polycystic ovarian syndrome (PCOS), brain circuitries controlling GnRH release become resistant to these feedback control mechanisms, leading to hypersecretion of GnRH and hence, infertility. They are attempting to gain an understanding of the cellular basis of this PCOS pathophysiology, and the early developmental factors that may be responsible for its manifestation. From a broader perspective, they hope that their studies will provide new insights as to the mechanisms by which steroid hormones govern reproductive physiology, neural development, and behavior.

Sean Maguire is a Director, Integrated Biological Platform Sciences and Associate Fellow at GSK. He has over 30 years' experience in biomedical research, with a focus on the BioPharma sector, spanning various roles and organizations. He is a diplomate of the American College of Laboratory Animal Medicine and a member of the Royal College of Veterinary Surgeons. Sean received his veterinary medical degree from the University of Pennsylvania, did his postdoctoral training in laboratory animal medicine at the SmithKlineBeecham, and earned a Master's degree in Pharmaceutical Chemistry from Lehigh University. Sean has been with GSK since 2008, in addition to providing laboratory animal medicine subject matter expertise for both internal and external in vivo efforts, he has been

collaborating with therapeutic area investigators in the animal model space, with a current focus on infectious disease and the use non-human primate models. His professional service includes roles with the American College of Laboratory Animal Medicine, American Society of Laboratory Animal Practitioners, International Consortium for Innovation and Quality in Pharmaceutical Development, North American 3Rs Collaborative and AAALAC (joining the Council on Accreditation in 2022).

Melween Martinez, D.V.M., has been the Director of the Animal Resources Center and Associate Director of the Comparative Medicine Unit of the Medical Sciences Campus/ University of Puerto Rico (MSC-UPR) for the last 22 of her 33 years' career. In addition, for ten years she has been the Director of the Caribbean Primate Research Center, a multiple facility structure. The Animal Resources and Primate Center are two of the only three AAALAC accredited animal programs in Puerto Rico. Carrying out her duties as an institutional veterinarian for 6 years, in addition to serving as director of these centers, while also a member of some of the regulatory committees at the Institution, she has gained the necessary expertise to oversee, monitor, develop, and evaluate operations, processes and/or practices involving animal use and veterinary care of rhesus macaques as well as other animal species. Thus, she can ensure that all procedures are following the recommendations set in the "Guide for the Care and Use of Laboratory Animals", as well as with all laws, regulations, and policies governing the use of laboratory animals. She has participated in many research projects involving non-human primates, particularly those investigating pathogenesis and vaccine studies using BSL-2 pathogens, as well as in several NIH review panels. Over the last 15 years, she also collaborated on projects studying the pathogenesis of zika, dengue viruses, as well as the development of its vaccine. She was part of the team working with Morehouse Medical School and the MSC to develop a stroke model in rhesus monkeys. She also have had long term collaboration with the CDC in Atlanta Georgia, and with Wistar Institute involving several projects, including the development of an HIV/SIV vaccine and elaboration of the SIV pathogenesis. In addition to my work-related experiences, She has further developed managerial and leadership skills in my role as president of some professional associations in the Island, and by participating on several committees. In the last ten years she has been closely working in all managerial and logistic decisions and implementations related to the Unit of Comparative Medicine (which includes the CPRC and the ARC) including the renewal of the P40 and the U42 supporting the CPRC and the SPF programs at the Center, respectively. After all these years of experience, She feels confident that she has the expertise, leadership and motivation to support the management of the CPRC's colonies and resources.

John Morrison, Ph.D., leads a research program focused primarily on the neurobiology of aging and neurodegenerative disorders, particularly as they relate to cellular and synaptic organization of the cerebral cortex. His lab is developing a comprehensive model of synaptic health in the cerebral cortex and how molecular and structural deviations from this profile induced by age and endocrine disruption impact cognitive performance. Dr. Morrison is also investigating the degree to which age-related alterations in structural and molecular attributes of the synapse that lead to cognitive decline leave the brain vulnerable to Alzheimer's Disease.

Joel Perlmutter, M.D., received his AB in Biochemistry in 1975 from Princeton University, and his MD from the University of Missouri, Columbia in 1979. He completed Neurology residency in 1983 at Washington University School of Medicine. He is Head of Movement Disorders; the Elliot Stein Family

Professor of Neurology; Professor of Radiology, Neuroscience, Physical Therapy, and Occupational Therapy; Director of the American Parkinson Disease Association Advanced Research Center for Parkinson Disease; and Director of the Huntington Disease Center of Excellence at Washington University in St. Louis. He leads a research group that focuses on biomarker discovery and studies of the pathophysiology of Parkinson disease, dystonia and related conditions. His research spans basic, translational and patient-oriented studies that includes more than 35 years of work with nonhuman primates to develop, validate and apply new neuroimaging methods with a particular emphasis on parkinsonism. These fundamental methods then have been applied to multiple human studies of people with Parkinson disease, dystonia and related disorders. He has had continuous NIH funding for 37 years and published more than 350 peer-reviewed manuscripts.

Mark Prescott, Ph.D., has worked at the UK's national centre for the 3Rs since its establishment by Government in 2004. He is Director of Policy and Outreach, providing strategic oversight of the centre's relationships with the academic community, including other research funding organisations, regional staff within UK universities, experimental design and animal welfare programmes, and peer review and advice service. He trained as a zoologist and primatologist and has more than 25 years-experience in primatology, animal behaviour and animal welfare science, authoring close to 70 publications in these areas. He serves on several ethics committees and scientific advisory boards at project, institution, journal and governmental levels, and is best known as an authority on applying the 3Rs to the use and care of non-human primates in research.

Jay Rappaport, Ph.D., is the director and chief academic officer of the Tulane National Primate Research (TNPRC) and a professor within the Division of Comparative Pathology at the TNPRC. He is also a tenured professor of pathology and laboratory medicine in the Tulane University of School of Medicine. He transferred his research program from Temple University to the TNPRC in 2018 when he became the director of the TNPRC and has been remarkably successful in directing center operations, obtaining funding for the center and university in general, and maintaining a successful research program. Rappaport has co-authored 30 papers since his arrival in 2018 and is supported by seven grants including the NIH/NIAID supported NPRC Coordinating Center grant for COVID-19 research and a Bill and Melinda Gates Foundation grant. In response to the COVID-19 emergency, Rappaport serves as a member of the NIH-Public-Private Partnership under the NIH Director's Office known as the Accelerating Coronavirus Therapeutic Interventions (ACTIV) Preclinical Committee and is a member of the Animal Models Working Group. In collaboration with a large expert team at the TNPRC, Rappaport initiated studies to develop NHP models for COVID-19 infection in rhesus macaques and African green monkeys using multiple routes of infection including aerosol inoculation and studies to develop vaccines are in planning stages with collaborators at Tulane and outside investigators. Under Dr. Rappaport's direction, the TNPRC has established collaborations with NIH-supported investigators and private sector entities on the development of COVID-19 therapeutic strategies and vaccines, and is undertaking research on post-acute COVID sequelae in African green monkeys. The NIH selected the TNPRC to coordinate the new partnership between the seven federally funded National Primate Research Centers to combine efforts and accelerate promising COVID-19 vaccine and drug research. His laboratory is developing novel therapeutic and vaccine strategies targeting infectious diseases.

Corinna Ross, Ph.D., is Associate Director of Research at the Southwest National Primate Research Center, where she conducts research focused on the development of the marmoset as a model for human health and disease. In characterizing aging in the marmoset, Dr. Ross is evaluating potential interventional treatments to increase health span in geriatric populations. Dr. Ross' laboratory team is developing new phenotypic tools to assess marmoset health and behavior as a biomedical model of human disease. The team integrates behavioral, physiological and molecular markers to explore mechanisms that influence developmental programming, reproduction, obesity, health span and longevity in nonhuman primates.

Nakissa Sadrieh, Ph.D., received a doctorate in Toxicology and completed a postdoctoral fellowship in the Laboratory of Chemical Carcinogenesis at the National Cancer Institute/NIH. Nakissa joined the Food and Drug Administration in 1996 as a pharmacology and toxicology reviewer and in 1998 she became a supervisory pharmacologist in CDER's Division of Medical Imaging and Radiopharmaceutical Drug Products. In 2002 Nakissa joined CDER's Office of Pharmaceutical Science (now called Office of Pharmaceutical Quality), as the Associate Director for Research Policy and Implementation. During her time in OPS, Nakissa worked on numerous projects focusing on research and policy development in drug quality, drug safety, bioequivalence of generic drugs, biopharmaceutics, nanotechnology, computational toxicology and environmental assessment. In 2013, Nakissa joined the Center for Food Safety and Nutrition (CFSAN), as the Director of the Cosmetics Division, in the Office of Cosmetics and Colors (OCAC). Currently, Nakissa is back in CDER/OND where her work is focused on developing and implementing a roadmap which will facilitate the incorporation of New Alternative Methods into the drug approval process.

Afonso Silva, Ph.D., received his BS and MS degrees in 1990 and 1992 in Electrical Engineering from Universidade Federal de Pernambuco in Recife, Brazil. He then moved to Pittsburgh, where he obtained his Ph.D. in 1996 in Bioengineering from Carnegie Mellon University, where he worked on non-invasive MRI measurements of cerebral blood flow using the arterial spin labeling technique. He then went on to do post-doctoral training in the Center for Magnetic Resonance Research at the University of Minnesota, where he studied the temporal and spatial characteristics of functional brain hemodynamics. Dr. Silva joined NINDS as a Staff Scientist in 1999 and became a principal investigator in 2004. In 2018, Dr. Silva moved to the University of Pittsburgh, where he occupies an Endowed Professor of Translational Neuroimaging chair in the Department of Neurobiology. Dr. Silva is a neuroscientist with extensive training and experience in developing and applying multimodal neuroimaging methods to study the anatomical and functional organization of the brain. Dr. Silva is an expert in working with marmosets, a New World non-human primate with several advantages as an experimental model in neuroscience and neurological disorders. He is also an expert in the genomic engineering of small animal models, having generated transgenic marmosets expressing GCaMP6s and genetically engineered marmosets containing NOTCH3 mutations as a model for cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL). Dr. Silva is currently generating marmosets expressing PSEN1 mutations as an early-onset Alzheimer's disease model. He has established a track record of being a successful leader of a fully funded, productive, and fruitful research program to

advance our current understanding of the anatomical and functional organization of the primate brain in health and disease.

Francois Villinger, D.V.M., Ph.D., is the Director of the New Iberia Research Center. Dr. Villinger received his Federal Veterinary Medicine License at the University of Zurich, Switzerland in 1984 and a Doctor of Veterinary Medicine in Virology in 1986.

Greg Westergaard, Ph.D., is the President and CEO of Alpha Genesis, Inc., located in Yemassee, South Carolina, working to serve the primate research community. Alpha Genesis Inc. (AGI) provides high quality nonhuman primate products and bio-research services world-wide.

Joseph C. Wu, M.D., Ph.D., is Director of Stanford Cardiovascular Institute and Simon H. Stertzer, MD, Professor of Medicine and Radiology at Stanford University. His lab works on cardiovascular genomics and induced pluripotent stem cells (iPSCs). The main goals are to (i) understand basic disease mechanisms, (ii) accelerate drug discovery and screening, (iii) develop "clinical trial in a dish" concept, and (iv) implement precision medicine for patients. Dr. Wu has published >450 manuscripts with H-index of 114 on Google scholar. He is listed as top 1% of highly cited researchers by Web of Science for past 4 years (2018, 2019, 2020, 2021). Dr. Wu serves on the FDA Cellular, Tissue, and Gene Therapies Advisory Committee. He is on the Board of the Keystone Symposia. He is President-Elect of the American Heart Association. Dr. Wu is an elected member of American Society for Clinical Investigation (ASCI), Association of University Cardiologists (AUC), American Institute for Medical and Biological Engineering (AIMBE), American Association for the Advancement of Science (AAAS), American Association of Physicians (AAP), Academia Sinica, and National Academy of Medicine (NAM).

Richard Wyatt, M.D., is the Deputy Director in the Office of Intramural Research, where he was appointed in 1984 as a member of the leadership team and has served with increasing responsibilities under three Deputy Directors for Intramural Research: Drs. J.E. Rall, Lance Liotta, and Michael Gottesman. In addition to his management duties, his responsibilities include participation in overseeing the scientific quality of intramural research and developing policies that govern and provide oversight to OIR program offices. His programmatic areas of interest entail primarily the NIH Human Research Protection Program; the NIH Animal Care and Use Program; NIH history; intramural clinical research and the Deputy Director for Intramural Clinical Research; and interactions with foundations that support NIH, particularly the Foundation for the NIH and the Foundation for Advanced Education in the Sciences. Richard is currently a Scientific Executive and earlier served for 36 years in the USPHS Commissioned Corps. He was promoted to the rank of Rear Admiral (upper half) in the Corps and served on the Surgeon General's Policy Advisory Council as NIH representative from 1987 to 2007. During his medical education, Richard was supported by an NIH training grant for international studies at the Institute of Nutrition of Central America and Panama (1967–1968). He completed residency training in pediatrics at St. Louis Children's Hospital with an emphasis on pediatric infectious diseases under the mentorship of the late Dr. Ralph Feigin. He was commissioned in the USPHS Commissioned Corps in 1971 as a Research Associate in the Epidemiology Section in the NIH NIAID Laboratory of Infectious Diseases (LID) under the leadership of the late Drs. Robert M. Chanock and Albert Z. Kapikian. He became a Senior Investigator in 1976. In the LID, Richard conducted basic and clinical studies centered on the etiology, epidemiology,

and pathogenesis of viral diarrhea (with an emphasis on norovirus and rotavirus). During his service at the NIH, Richard has received Commissioned Honor Awards, including the Commendation Medal, Meritorious Service Medal, Surgeon General's Exemplary Service Medal, Surgeon General's Medallion, Distinguished Service Medal, Outstanding Unit Citation, and Outstanding Service Medal. Richard also received the Secretary's Award for Distinguished Service, the USPHS Physician Executive of the Year Award and the NIH Directors Award. In addition, he was awarded the Distinguished Alumni Citation for "Meritorious Distinction" from his undergraduate alma mater.

Bill Yates, Ph.D., is Vice-Chancellor for Research Protections at the University of Pittsburgh. In this role, he is responsible for oversight of research regulatory functions at the University, including the oversight of both animal and human subject research. He has published a book and several articles on research regulatory compliance. He has also a Professor in the School of Medicine and an active investigator; he has received continuous NIH support since 1990 to examine the influences of the vestibular system on autonomic regulation. He is the former Editor-in-Chief of the Journal of Neurophysiology, and is currently Editor-in-Chief of Experimental Brain Research.

Jan Zimmermann, Ph.D., is an Assistant Professor in the Department of Neuroscience and the Center for Magnetic Resonance Research at the University of Minnesota Medical School. His primary research goal is to better understand decision making. Making a choice, independent of it being a complex decision about your retirement allocations or which flavor of ice-cream to pick, is the normative consequence of any behavior that is observable. To understand this process, he combines a multitude of tools that allows him to study neural function of non human primates associated to decision making. He combines single cell electrophysiology, computational modeling of neural responses as well as careful behavioral analysis and ultra high field functional magnetic resonance imaging.