



NATIONAL INSTITUTES OF HEALTH
Novel and Exceptional Technology and
Research Advisory Committee



NExTRAC Meeting
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Biographies- Speakers, Panelists and Moderators

SESSION I

Zach N. Adelman, PhD

Dr. Zach Adelman is a Professor and Presidential Impact Fellow in the Department of Entomology at Texas A&M University. Dr. Adelman's research is focused on the development of novel gene editing/gene replacement approaches for disease vector mosquitoes as well as understanding genetic interactions between arthropod-borne viruses and their mosquito vectors. Dr. Adelman's work has been featured in journals such as *Science* and *PNAS*; he has served as author or co-author on more than 50 peer-reviewed publications, including several recent papers on the handling, containment, and regulation of gene drive-containing arthropods. Dr. Adelman served as a member of his institution's IBC for seven years, including four years as chair. Dr. Adelman received his BA in Biochemistry from Ithaca College and PhD in Microbiology from Colorado State University; he joined the faculty at Virginia Tech in 2005 and moved to Texas A&M University in 2016.

Cinnamon Bloss, PhD

Dr. Cinnamon Bloss is an Associate Professor in the Departments of Psychiatry (primary) and Family Medicine and Public Health (secondary), Division of Health Policy at the University of California, San Diego (UCSD). Dr. Bloss has an adjunct appointment as a Policy Analyst at the J. Craig Venter Institute and is a licensed clinical psychologist. Dr. Bloss' current research focuses on the individual and societal impacts of emerging biomedical technologies. Her background is in clinical psychology, statistical genetics, genomic medicine, biomedical ethics, and health policy. Dr. Bloss has conducted both candidate gene and genome-wide association studies of neurocognitive phenotypes, as well as empirical work on biomedical ethics topics in the area of genetic testing, genome sequencing, and wireless sensors. Prior to joining UCSD, Dr. Bloss was Director of Social Sciences and Bioethics at the Scripps Translational Science Institute, where she was a member of the Scripps Clinical and Translational Science Award Executive Committee. Dr. Bloss has previously been the PI of a NIH/NHGRI R21 grant to study consumer psychological and behavioral response to direct-to-consumer genomic testing. From this work, she published a seminal article in the *New England Journal of Medicine* and presented invited testimony based on the findings before an FDA Advisory Panel to inform consumer genomics policy. Dr. Bloss has been a Co-Investigator on several previously funded NIH grants and has published over 60 papers and mentored over 30 students, ranging in level from high school to post-doctoral fellow.

Anthony A. James, PhD

Dr. Anthony James is Donald Bren Professor and Distinguished Professor of Microbiology & Molecular Genetics (School of Medicine) and Molecular Biology & Biochemistry (School of Biological Sciences) at the University of California, Irvine (UCI). His research group uses genetics as the basis for synthetic approaches

to prevent transmission of mosquito-borne diseases. Contributions include the development of mosquito transgenesis procedures, engineered genes that interfere with malaria parasite or dengue virus development in mosquitoes, a population-suppression strain based on flightless female mosquitoes and gene-drive systems to spread beneficial genes quickly through mosquito populations.

Dr. James received his BS and PhD degrees at UCI. He joined the faculty at the Harvard School of Public Health in 1985 and then returned to his alma mater in 1989, where he is today. In addition to being elected to the U.S. National Academy of Sciences (2006), he has received numerous other awards including the Nan-Yao Su Award for Innovation and Creativity in Entomology from the Entomological Society of America (2009), the Premio de Investigación Médica (co-recipient), the Burroughs-Wellcome New Initiatives in Malaria Award (2000), and the Burroughs-Wellcome Scholar Award in Molecular Parasitology (1994). He was named a Fellow of the Royal Entomological Society of London (1992), Fellow of the American Association for the Advancement of Science (1994), Fellow of the Entomological Society of America (2011) and Fellow of the American Society of Tropical Medicine and Hygiene (2012). In 2009, he was awarded the UCI Medal. He has published over 200 papers, reviews and policy documents and has provided guidance to 34 graduate students and postdoctoral fellows. He was a founding editor of the journal *Insect Molecular Biology* and has served on the editorial boards of *PLoS Neglected Tropical Diseases*, *Experimental Parasitology* and *Entomological Research*.

SESSION II

Kathryn Harris, PhD RBP

Dr. Kathryn Harris works in the Office of Science Policy (OSP), Division of Biosafety, Biosecurity and Emerging Biotechnology Policy at the NIH. For almost 20 years she has worked to develop national and regional programs of stakeholder relations, education, and outreach strategies relevant to the oversight of research with recombinant and synthetic nucleic acid molecules and research that has dual use potential. She also advises on biosafety and biosecurity policy and regulatory issues.

Prior to joining OSP she was the Biological Safety Officer at Northwestern University. Dr. Harris is a Registered Biosafety Professional and a member of the American Biological Safety Association (ABSA). She was a founding member and first president of the Midwest Area Biosafety Network (MABioN). She received her PhD from Cornell University and completed two years of postdoctoral training at Washington University in St Louis. Dr. Harris was the 2019 recipient of the ABSA Arnold G. Wedum Distinguished Achievement Award, for outstanding contributions to biological safety accomplished through teaching, research, service, and leadership.

Lyric Bartholomay, PhD

Dr. Lyric Bartholomay is a vector biologist with interest in disease agents that include nematode parasites and arboviruses. As a Professor in the Department of Pathobiological Sciences at the University of Wisconsin-Madison, she and her lab are studying mosquito-pathogen interactions with an emphasis on innate immunity in the mosquito host and are working to translate that knowledge into novel mosquito control methods. They are also interested in understanding when and where mosquitoes are present across the Midwest, and which of those mosquitoes present a risk to human and animal health. She earned her doctoral degree in comparative biomedical sciences and entomology from the University of Wisconsin-Madison. She continued on as an instructor and postdoctoral research associate before accepting an assistant professor position at Iowa State University. Most recently, she served as an associate professor in the Department of Entomology at Iowa State.

David Gillum, MS RBP

Mr. David Gillum is the Senior Director of Environmental Health and Safety at Arizona State University (ASU). As the Chief Safety Officer for ASU, Mr. Gillum has safety oversight responsibilities for over 2,400 laboratories, shops, studios, and makerspaces that use biological agents, chemicals, radiological materials, lasers, x-rays, and other hazardous materials. Mr. Gillum is the ASU Responsible Official for the Federal Select Agent and Toxin Program. Mr. Gillum is the 2020 President of ABSA International. In 2019, Mr. Gillum was presented with a Federal Bureau of Investigation Directors Community Leadership Award by Director Christopher Wray in Washington D.C. Mr. Gillum co-founded the Arizona Biosafety Alliance (AZBA), an ABSA-affiliate, and served as President, Past-President, and Treasurer of the organization. In 2015, Mr. Gillum established a partnership with ASU in Mexico and AMEXBIO to support biosafety collaborations within Mexico and other Central and South American countries.

Mr. Gillum's service includes contributions as Associate Editor of *Applied Biosafety* and a past judge at the International Genetically Engineered Machine Competition. His academic interests include biosecurity and the future of synthetic biology, gene editing, and gene drives, and how members of the public can have an active voice in the future of these technologies. Mr. Gillum has written two articles on biosecurity that have been published in *Science*, as well as several articles on biological safety that have been published in *Applied Biosafety*. Mr. Gillum has a bachelor's degree in chemistry from the University of Nevada, Las Vegas and a master's degree in Environmental Health Science from the University of Massachusetts, Amherst. Mr. Gillum has over 25 years of experience leading safety and compliance activities at several different academic, research and teaching institutions.

Ruth Müller, PhD

Dr. Ruth Müller is a Professor at the Institute of Tropical Medicine in Belgium. Her expertise lays in the fields of vector ecology, medical entomology, ecotoxicology, and aquatic biodiversity. Her aim is to better understand the relationships between biodiversity, climate change, and human health and to use this knowledge to protect environmental and human health. Her recent research projects address vector ecology and biology in the context of climate change, development of eco-friendly vector control tools, and integrative eco-bio-social concepts in Medical Entomology. She manages an ultra-modern ACL2 insectary for large cage trials with gene-drive mosquitoes. She is also an advisor on exotic and invasive mosquito species to several institutions and boards in Germany and Belgium and an advisor for mosquito-borne diseases and respective vectors for the National Health Research Council in Nepal. Dr. Müller is member of presidium European Entomology Congress, member of the National Board for Zoonotic Diseases and the Research Network Zoonotic Infectious Diseases Germany. She has been awarded as scientist of honor by Imperial College of London, UK in 2017.

SESSION III

Kathleen Boris-Lawrie, PhD

Dr. Kathleen Boris-Lawrie is a Professor in the Department of Veterinary and Biomedical Sciences at the University of Minnesota and has studied gene transfer by retroviruses since her post-doctoral training with Howard M. Temin at the McArdle Laboratory for Cancer Research, University of Wisconsin. Since 1997, her NIH-funded research has discovered retrovirus-host interactions necessary for post-transcriptional gene regulation, applying basic research findings to develop patent-protected retroviral vectors and co-viruses for gene transfer and prevention of viral infections. Most recently, Dr. Boris-Lawrie and her team discovered the noncanonical, nuclear protein-based, regulation of protein synthesis that enables cells and selected viruses to survive under stress, opening new lines of investigation fundamental to cancer and

aging. An elected fellow of the American Academy of Microbiology, Professor Boris-Lawrie received her PhD in Molecular Genetics at the George Washington University School of Medicine while serving as National Cancer Institute Intramural Research Training Predoctoral fellow. She has been David White Professor at the Ohio State University and is continually serving the NIH Center for Scientific Review and the NIH Office for Science Policy.

Antoinette Piaggio, PhD

Dr. Antoinette Piaggio is a Research Molecular Biologist at the USDA APHIS Wildlife Services, National Wildlife Research Center (NWRC) in Fort Collins, Colorado. Her research studies focus on developing genetic approaches to inform wildlife damage management efforts. Population-level investigations can determine geographical boundaries of populations, gene flow between populations (population connectivity), and genetic diversity within populations. Phylogenetic studies can test hypotheses of taxonomic definitions and evolutionary relationships. Research data gathered in any of these areas can enhance effectiveness of management efforts. Because wildlife genetics data can elucidate population dynamics in host populations, they also may be useful in the management of wildlife diseases.

Through her work, continuing education, and professional contacts, Dr. Piaggio stays current with the latest developments in her field, ensuring that the NWRC wildlife genetics lab will always be a leader in the use of exciting, cutting-edge tools and techniques and the application of robust scientific methods for the investigation of wildlife-human conflicts. Lab results will allow wildlife managers not only to use the best genetic tools available but also to maintain genetic diversity and evolutionary potential of the wildlife species under investigation.

Omar Akbari, PhD

Dr. Omar Akbari received a BS/MS in Biotechnology and a PhD in Cell and Molecular Biology from the University of Nevada, Reno, where he studied the role cis-regulatory modules play in cellular identity along the antero-posterior axis in developing *Drosophila melanogaster* embryos. In 2009, he joined the laboratory of Dr. Bruce A. Hay at the California Institute of Technology as a Postdoctoral Scholar to innovate synthetic biology of flies and disease vectors. In 2015, he became an Assistant Professor of Entomology in the Center for Infectious Disease Vector Research (CIDVR) at the University of California, Riverside. In 2017, he joined the faculty as an Assistant Professor in the Cell and Developmental Biology Section, within the Division of Biological Sciences, and a member of the TATA institute for Genetics and Society at the University of California, San Diego (UCSD). In 2018 he co-founded and became a scientific advisor for Agragene, a biotechnology based startup in San Diego. In 2019 he was promoted to Associate Professor (with tenure) in the Cell and Developmental Biology Section, within the Division of Biological Sciences at UCSD. The Akbari Lab focuses on developing innovative molecular genetic technologies to combat pathogens, pests, and vectors that transmit human disease.

Fred Gould, PhD

Dr. Fred Gould is Co-Director of the Genetic Engineering and Society Center of North Carolina State University and Director of the NSF-sponsored graduate training program on Agricultural Biotechnology. He conducts research on the application of evolutionary biology and population genetics to enable sustainable use of insect resistant crops and genetically engineered agricultural pests. He also does research aimed at development of gene drive strategies for development and use of engineered mosquitoes to decrease human disease. In 2011, he was elected to the U.S. National Academy of Sciences (NAS). Dr. Gould has served on several National Academy of Sciences, Engineering, and Medicine (NASEM) committees studying the environmental and health effects of the commercialization of genetically engineered crops. He chaired the

2014-2016 NASEM committee on “Genetically Engineered Crops: Experiences and Prospects”. He serves on the NASEM’s Board on Agriculture and Natural Resources. Dr. Gould received his BS in biology from Queens College and a PhD in ecology and evolutionary biology from the State University of New York at Stony Brook.

Philipp Messer, PhD

Dr. Philipp Messer studied physics at the University of Cologne. After receiving his PhD in Computational Biology from the Max-Planck-Institute for Molecular Genetics in Berlin, he worked for several years in Dr. Dmitri Petrov’s lab at Stanford as a Human Frontiers Science Program long-term postdoctoral fellow. In 2014, Dr. Messer joined the Department of Computational Biology at Cornell University as an Assistant Professor and was promoted to Associate Professor (with tenure) in 2020. Research in the Messer lab centers on improving our understanding of the fundamental processes that govern molecular evolution, with a specific focus on cases of rapid adaptation that allow us to study evolution in real-time. Throughout his career, Dr. Messer has contributed to a wide spectrum of topics in population and evolutionary genetics, including theoretical work on adaptation by hard and soft selective sweeps, the design and application of methods for inference of selection from population genomic data, and the development of evolutionary simulation software. His research projects often involve integrated approaches that combine evolutionary experiments with modeling and the analysis of large-scale population genomic data. One area of recent focus has been the study of CRISPR gene drive systems, which promise a mechanism for rapidly spreading genetic modifications throughout a population. The Messer lab has contributed to both our theoretical understanding of the expected population dynamics of gene drives in natural populations as well as the experimental design and study of new gene drive systems in the laboratory.

SESSION IV

Jason Delborne, PhD

Dr. Jason Delborne joined North Carolina State University in 2013 and is a Professor of Science, Policy and Society in the Chancellor’s Faculty Excellence Program cluster in Genetic Engineering and Society (GES), in the Department of Forestry and Environmental Resources in the College of Natural Resources. He serves on the executive committee of the Genetic Engineering and Society Center and was named a University Faculty Scholar in 2019. Dr. Delborne’s research focuses on challenges and potentials of public and stakeholder engagement surrounding emerging biotechnologies. Drawing upon the highly interdisciplinary field of Science, Technology, and Society, he engages various qualitative research methodologies to ask questions about how policymakers and members of the public interface with controversial science.

Dr. Delborne served on two expert committees at the National Academies of Sciences, Engineering, and Medicine (NASEM), co-authoring *Gene Drives on the Horizon: Advancing Science, Navigating Uncertainty, and Aligning Research with Public Values* (2016) and *Forest Health and Biotechnology: Possibilities and Considerations* (2019). He was also appointed to the International Union for Conservation of Nature Task Force on Synthetic Biology and Biodiversity Conservation, which published *Genetic Frontiers for Conservation: An assessment of synthetic biology and biodiversity conservation* (2019). Dr. Delborne is a member of the Council for the Engineering Biology Research Consortium and serves on multiple advisory boards. He holds a bachelor’s degree in human biology from Stanford University and a doctorate in environmental science, policy and management from the University of California, Berkeley.

Sarah Hartley, PhD

Dr. Sarah Hartley joined the Business School at the University of Exeter in 2016 as Senior Lecturer in Management. She is an interdisciplinary social scientist working closely with natural scientists, engineers,

regulators, and policy-makers. Her research and teaching revolve around the responsible governance of science, technology, and innovation as it moves from the lab to commercialization. She takes a qualitative methodological approach to understand the factors that shape the innovation process for emerging technologies, particularly the biotechnologies including GM insects, gene drive, and genome-editing. In addition, she explores responsible research and innovation at a policy and institutional level. Dr. Hartley has advised the House of Lords Select Committee on Science and Technology on GM insects, the Nuffield Council on Bioethics on genome-editing, and the Biotechnology and Biological Sciences Research Council on stakeholder engagement.

Dr. Hartley obtained a PhD in Politics and Environmental Studies with a specialization in Public Policy from the University of Toronto. She has an MSc (distinction) in European Social Policy Analysis and a BSc (first class) in Environmental Management and Policy. After her PhD, Dr. Hartley took a professional position at Genome British Columbia, a Canadian funding agency, where she established an interdisciplinary social science research programme in genomics and engaged policy-makers, industry, and other stakeholders to explore the role of genomics in addressing societal challenges.

Keith Hayes, PhD

Dr. Keith Hayes started his research career with the Institute of Offshore Engineering, Heriot-Watt University, where he developed quantitative risk assessment techniques for demersal fishing gear interactions with subsea infrastructure and the abandonment and disposal of offshore oil and gas platforms. Dr. Hayes joined the Commonwealth Science and Industrial Research Organisation (CSIRO) in 1997 and completed his PhD in Quantitative Ecological Risk Assessment in 2000. He spent his first 13 years with division of Marine and Atmospheric Research working principally on the ecological risks associated with invasive species, transgenic organisms and major coastal developments. He played an instrumental role in the development of Australia's new National Strategy for the Prevention and Management of marine pest incursions, including the world's first quantitative ballast water risk assessment for Australian domestic shipping, estimated in Regulatory Impact Statements to have an accumulated net benefit of \$59-289 million.

Dr. Hayes is now a senior research scientist at CSIRO Data61, and leads the Data61 Ecological and Environmental Risk Assessment (DEERA) team in the Hobart laboratories (<https://data61.csiro.au/en/Who-we-are/Our-programs/Expertise-Analytics/DEERA>). The team conducts probabilistic risk assessments, and supporting studies, across a variety of domains, typically for challenging problems across large spatio-temporal scales. Recent applications include hazard analysis and risk assessments for genetic control of malaria vectors in Africa (<https://fnih.org/what-we-do/geneconvene/impact/technical-advice>), cumulative risk assessments of the impacts of new coal resource developments on water resources and water-dependent assets (<http://www.bioregionalassessments.gov.au/>), and risk assessments for the spread of antimicrobial resistance (<https://outbreakproject.com.au/>). Dr. Hayes is the statistical advisor on the science leadership team for the Marine Biodiversity Hub under the National Environmental Science Plan, and is currently assisting the Australian federal government design and implement a Monitoring Evaluation Reporting and Improvement (MERI) framework for Australia's Marine Parks, including cumulative risk calculations for Australia's marine regions.

Raul Medina, PhD

Dr. Raul Medina is a Professor at the Department of Entomology and a Research Fellow of the Institute for Science, Technology and Public Policy (ISTPP) in the Bush School of Government and Public Service at Texas A&M University in College Station. His research centers on the role that ecological factors play in the

population genetics of arthropods, and he is particularly interested in the incorporation of evolutionary ecology theory into pest control practices. His laboratory conducts research aimed to understand how species interactions among parasites and their hosts are modulated by the structuring of their genetic variation and by their microbiota. Dr. Medina is also interested in understanding the factors that modulate public perception of novel products of biotechnology in agriculture. He was appointed by the U.S. National Academies of Sciences, Engineering and Medicine to co-author the 2017 report on *Preparing for Future Products of Biotechnology*. He is currently serving as an ELSI advisor to the U.S. Department of Defense Advanced Research Projects Agency and as a content advisor to the Foundation for the National Institutes of Health Gene Convene Virtual Institute. He received PhD and MS degrees from the University of Maryland working on predation of forest caterpillars and parasitoid population genetics, respectively. He also holds a Graduate Certificate in Conservation Biology from the University of Missouri in St. Louis and an undergraduate degree in biology from the Universidad Nacional Agraria La Molina in Lima, Peru.

SESSION V

James P. Collins, PhD

Dr. James Collins has been a faculty member at Arizona State University (ASU) since 1975, where he is currently the Virginia M. Ullman Professor of Natural History and the Environment. His research group studies host-pathogen biology and its relationship to the decline of species, at times even to extinction. Dr. Collins' research also focuses on the intellectual history of ecology's development as a science; ecological ethics; and adaptation to change in academic and research institutions. From 1989 to 2002, he was Chairman of ASU's Zoology, then Biology Department. At the National Science Foundation (NSF), Dr. Collins was Director of the Population Biology and Physiological Ecology program from 1985 to 1986. From 2005 to 2009, he was a member of NSF's senior management team as head of the Biological Sciences Directorate.

Dr. Collins is a Fellow of the American Association for the Advancement of Science, a Fellow of the Association for Women in Science, and Past President of the American Institute of Biological Sciences. He is a past chair of the Board of Directors for the Association of American Colleges and Universities. He is currently chair of the Board on Life Sciences of the U.S. National Academies of Sciences, Engineering, and Medicine (NASEM) and was on the Board of Delegates for Oxford University Press. Dr. Collins is the author of numerous peer reviewed papers and book chapters and co-author with Martha Crump of *Extinction in Our Times: Global Amphibian Decline* (2009). He is co-author with Ben Minteer and Jane Maienschein of *The Ark and Beyond: The Evolution of Zoo and Aquarium Conservation* (2018). Dr. Collins co-chaired the NASEM committee that produced the consensus report, *Gene Drives on the Horizon: Advancing Science, Navigating Uncertainty, and Aligning Research with Public Values* (2016).

Elizabeth Heitman, PhD

Dr. Elizabeth Heitman is Professor at University of Texas Southwestern in the Department of Psychiatry's Division of Ethics and the Program in Ethics in Science and Medicine. Her work focuses on cultural aspects of ethics in clinical medicine, biomedical science, and public health, particularly international standards of research ethics and education in the responsible conduct of research (RCR). Dr. Heitman teaches research ethics and RCR in the Center for Translational Medicine and Graduate School of Biomedical Sciences and is an ethics facilitator for medical students.

Dr. Heitman is a National Associate of the U.S. National Research Council and has been chair or member of eight U.S. National Academy of Sciences programs in research integrity education in the Middle East, North Africa, Indonesia, and Malaysia. In 2015-16, Dr. Heitman co-chaired the National Academies' Committee on Gene Drive Research with Non-Human Organisms, and she is currently a member of the NExTRAC Working

Group on Gene Drive Research. Dr. Heitman is Co-director of the NIH Fogarty International Center-sponsored Collaborative Research Ethics Education Program between Mozambique's Universidade Eduardo Mondlane, Vanderbilt University Medical Center, and UT Southwestern.

Prior to UT Southwestern, Dr. Heitman was at Vanderbilt University Medical Center's Center for Biomedical Ethics and Society, where she was a member of the Academy for Excellence in Teaching and served as a clinical ethics consultant and chair of the Ethics Committee. She was previously on the faculty of the University of Texas School of Public Health and was clinical ethicist at Hermann Hospital and Lyndon Baines Johnson General Hospital. Dr. Heitman received her PhD in Religious Studies from Rice University's joint program in biomedical ethics with the University of Texas Houston Health Science Center.

Stephanie James, PhD

Dr. Stephanie James is the Senior Vice President for Science at the Foundation for the National Institutes of Health (FNIH), where she leads several research partnerships with an emphasis on global health research. Prior to joining FNIH in 2004, Dr. James served as Chief of the Parasitology and International Programs Branch in the NIAID Division of Microbiology and Infectious Diseases, and subsequently as Deputy Director and director of the Global Infectious Disease program at The Ellison Medical Foundation. While at NIH, Dr. James was responsible for programmatic development of the Tropical Medicine Research Centers and the International Centers for Excellence in Research, co-authored the institute's Research Plan for Malaria Vaccine Development and Research Agenda for Emerging Infectious Diseases, and was instrumental in the formation of the International Centers for Tropical Disease Research and the Multilateral Initiative on Malaria. At FNIH, she was part of the team that developed the original Grand Challenges in Global Health (GCGH) initiative and has been program officer for a number of GCGH projects. These include research on development of innovative methods for controlling mosquito vectors of human disease, as well as projects on discovery of new targets for TB drugs, HIV/AIDS vaccine discovery, and biomarkers for onchocerciasis infection. Dr. James has served on multiple advisory committees, including to the World Health Organization, the U.S. Agency for International Development, the Burroughs Wellcome Fund, Merck Foundation, and the U.S.-Japan Cooperative Medical Sciences Program.

Wadzanayi Mandivenyi, MS

Ms. Wadzanayi Mandivenyi is the Head of the Biosafety Unit of the Secretariat of the Convention on Biological Diversity. She has worked in the biotechnology, biosafety, and biodiversity sector for the past 24 years. In 2005, she joined the Government of South Africa as a Biosafety Regulator, where she oversaw the development of environmental risk assessment and biosafety policy at the national and regional levels. In 2012 she was appointed as the Senior Manager responsible for promoting international cooperation for biodiversity as well as monitoring and reporting and bridging the science and policy interface. Prior to joining the Government of South Africa, Ms. Mandivenyi worked in the development sector for stakeholder organizations on biotechnology in Zimbabwe and South Africa. Ms. Mandivenyi has a Master of Science degree in Molecular Genetics from the University of KwaZulu-Natal, South Africa, and an Honors degree in biological sciences from the University of Zimbabwe.

Todd Kuiken, PhD

Dr. Todd Kuiken is a Senior Research Scholar at North Carolina State's Genetic Engineering and Society Center. His work explores the environmental opportunities/risks associated with emerging technologies.

Previously, he spent eight years at the Woodrow Wilson Center's Science and Technology Innovation Program where he led the Synthetic Biology Project along with other emerging technology related projects,

such as the Project on Emerging Nanotechnologies. During that time, he developed and managed numerous projects related to the environment and public policy; ranging from synthetic biology to rare earth materials. That work, in part, led to his appointment to the U.N. Convention on Biological Diversity's Ad-Hoc-Technical Expert Group on synthetic biology.

Since moving to NC State, he has expanded his work to include numerous international environmental and conservation related projects; as well as global study on the biosafety, security and overall impacts of the DIYbio community. In addition, he was appointed to the International Union for Conservation of Nature's technical and policy task force on synthetic biology and gene drives, which culminated in the first comprehensive assessment of the impacts of synthetic biology and gene drives on conservation. He plays an active role in the International Genetically Engineered Machines competition as a long-time judge and by serving as the co-chair of its sustainable development goals program and as the former co-chair of the human practices program.

Lisa Knolhoff, PhD

Dr. Lisa Knolhoff works for the U.S. Department of Agriculture (USDA) in Biotechnology Regulatory Services, within the Animal and Plant Health Inspection Service. She has been in her current role at USDA since 2016, where she performs technical reviews and risk assessments of genetically engineered plants and insects. She obtained her PhD in entomology from the University of Illinois, after which she conducted postdoctoral research at the Max Planck Institute for Chemical Ecology. She has worked in private industry conducting research on transgenic insecticidal crops. Her background includes insect behavior, genetics, host plant adaptation, and evolution of resistance.

SESSION VI

F. Stephen (Steve) Mulligan

Mr. Stephen Mulligan is District Manager of the Consolidated Mosquito Abatement District (CMAD) in Parlier, California. Prior he was Staff Research Associate with the University of California Mosquito Control Research Laboratory. Mr. Mulligan has an MA in Biology, is a Past President of the American Mosquito Control Association and is currently Vice President of the Society for Vector Ecology.

Mr. Mulligan's research experience is in biology and control of mosquitoes, with emphasis on laboratory and field evaluations of chemical and biological mosquito control agents. Such studies involved early work with methoprene, diflubenzuron, pyriproxyfen, *Bacillus thuringiensis israelensis* and *Bacillus sphaericus*. He has authored/coauthored over 30 peer-reviewed scientific publications. Most recently, Mr. Mulligan was a primary collaborator in a project (Debug Fresno) to evaluate the efficacy of *Wolbachia* to suppress *Aedes aegypti* mosquito populations within large residential areas in CMAD under an EPA EUP. He has participated in numerous state and national meetings and has been invited to present at international conferences, panels and workgroups, including as keynote speaker.

Fredros Okumu, PhD

Dr. Fredros Okumu is director of Science at Ifakara Health Institute; associate professor of Public Health at the University of Witwatersrand, South Africa; a visiting researcher at the Federal University of Minas Gerais, Brazil; and an honorary research fellow at the Institute of Biodiversity, Animal Health and Comparative Medicine at the University of Glasgow. Since 2008, Dr. Okumu has been studying human-mosquito interactions and developing new techniques to complement existing malaria interventions and accelerate efforts towards elimination.

He was awarded by the American Society of Tropical Medicine & Hygiene the Young Investigator Award in 2009, a Wellcome Trust Intermediate Research Fellowship in Public Health and Tropical Medicine (2014–2019), and a Howard Hughes-Gates International Research Scholarship (2018–2023). He is currently a co-chair of the Malaria Eradication Research Agenda consultative group on Tools for Elimination, an associate editor of the journal *Parasites & Vectors*, and co-Chair of the Vector Control Working Group on New Tools for Malaria Vector Control at the World Health Organization. He was inducted in 2016 as a Young Affiliate of the African Academy of Sciences and named among the 2016 Top 100 Global Thinkers by the US-based Foreign Policy Magazine.

He originally trained as a Public Health Officer in the College of Health Sciences at the Moi University in Kenya. He later earned a Master's degree in Applied Parasitology from the University of Nairobi, Kenya, and a second Master's degree in Geo-information Science, Earth Observation, and Environmental Modeling from Lund University, Sweden. He earned a Doctor of Philosophy degree in Infectious Tropical Diseases from London School of Hygiene and Tropical Medicine and is currently working towards a Master of Business Administration in International Health Management at the Swiss Tropical and Public Health Institute, University of Basel, Switzerland.

SESSION VII

James Lavery, PhD

Dr. James Lavery is the inaugural Hilton Chair in Global Health Ethics, Professor in the Hubert Department of Global Health in the Rollins School of Public Health, and Faculty of the Center for Ethics, Emory University. Prior to joining Emory, he was a Research Scientist and Managing Director of the Centre for Ethical, Social & Cultural Risk at the Li Ka Shing Knowledge Institute of St. Michael's Hospital, and an Associate Professor in the Dalla Lana School of Public Health, Institute of Medical Science, and Joint Centre for Bioethics at the University of Toronto.

Dr. Lavery received MSc and PhD degrees from the Institute of Medical Science and Centre for Bioethics at the University of Toronto. He spent three years at the Fogarty International Center, and Warren G. Magnuson Clinical Center Department of Clinical Bioethics, at the NIH. Dr. Lavery was the co-principal investigator of the Ethical, Social and Cultural Program for the Bill & Melinda Gates Foundation's Global Health and Global Development programs from 2005-2015. He is currently leading the development of a global "Learning Platform" for community and stakeholder engagement to support funders and implementation partners in global health and global development, in partnership with the Bill & Melinda Gates Foundation. He is also an Associate of the Council on Health Research for Development in Geneva, and a technical advisor for its Research Fairness Initiative, and a member of the Bioethics Advisory Panel of Pfizer, Inc.

Abdoulaye Diabaté, PhD

Dr. Abdoulaye Diabaté is the head of the medical entomology laboratory of the Institut de Recherche en Science de la Santé/Centre Muraz, Burkina Faso. He received his Master's degree at the University of Ouagadougou, Burkina Faso, and did his PhD on insecticide resistance at the University of Montpellier, France. He worked as a postdoctoral fellow at NIH researching "ecological specialisation" in *Anopheles gambiae* as major evolutionary force generating biological diversity. He has co-chaired several scientific sessions at international conferences and was an invited speaker at Harvard and George Washington Universities. He won the best oral presentation award in the 9th International Meeting "Molecular

Epidemiology and Evolutionary Genetics of Infectious Diseases.” Dr. Diabaté is a reviewer of several journals, including *BMC Ecology*, *PlosOne*, and *Malaria Journal*; member of several professional bodies; and member of the Organizing Committee of the Workshop on Population and Molecular Biology of Disease Vectors. He is a fellow of the African Leader scheme grant funded by the British MRC/DFID.

Thomas Dietz, PhD

Dr. Thomas Dietz is a Professor of Sociology and Environmental Science and Policy at Michigan State University (MSU). As a human ecologist and environmental sociologist, his research focuses on the drivers of environmental change and human well-being, on the social psychology of environmental decision making, and on the interplay between science and values in decision making. He was founding director of the Environmental Science and Policy Program at MSU, and remains active there, in the Animal Studies Program and at the Center for Systems Integration and Sustainability. Dr. Dietz has served as chair of the U.S. National Research Council Committee on Human Dimensions of Global Change and as Vice-Chair of the Committee on Advancing the Science of Climate Change. He is a Fellow of the American Association for the Advancement of Science, has been awarded the Sustainability Science Award from the Ecological Society of America, and has won research awards from the American Sociological Association sections on Environment and on Animals and Society. In 2017 he was named University Distinguished Professor at MSU. He is an Affiliate of the Gund Institute of Environment at the University of Vermont.

Jennifer Kuzma, PhD

Dr. Jennifer Kuzma is a Goodnight-NCGSK Foundation Distinguished Professor in the School of Public and International Affairs, and co-founder and co-director of the Genetic Engineering and Society (GES) Center at North Carolina State University. Prior to her current position, she was associate professor at the Humphrey School of Public Affairs, University of Minnesota; study director at the National Academies of Sciences, Engineering, and Medicine (NASEM); and an AAAS Risk Policy Fellow at the USDA. She has over 140 scholarly publications on emerging technologies, their societal and ethical implications, and governance systems and has been studying these areas for over 25 years. Dr. Kuzma has held several national and international leadership positions, including a member of the World Economic Forum Council on Technology, Values and Policy; the NASEM Committee on Preparing for Future Biotechnology, Society for Risk Analysis (SRA) Council Member and Secretary, FAO Expert Group on Food and Nanotechnology, Council of Agricultural Science and Technology Committee on Gene Editing, and the AAAS-ABA National Council of Scientists and Lawyers. In 2014, she received the SRA Sigma Xi Distinguished Lecturer Award for her contributions to the field of risk analysis and in 2017-2018 she was awarded the Fulbright Canada Research Chair in Science Policy. In 2019 she was elected a lifetime Fellow of AAAS for her distinguished work in anticipatory governance of new technologies, and methods for oversight policy analysis. She earned her PhD in biochemistry at University of Colorado Boulder and did a postdoc in plant molecular biology at Rockefeller University.

SESSION VIII

Margaret F. Riley, JD

Ms. Margaret Riley is a professor at the University of Virginia (UVA) with appointments in the Law School, the School of Medicine (Public Health Sciences) and as an affiliated faculty member of the Batten School of Leadership and Public Policy. She received her JD from Columbia University and her BA from Duke University. At UVA, she is chair of the university’s SCRO and is the legal member of the Health Sciences IRB. She frequently advises the university’s IACUC and Biosafety committees. Ms. Riley is the director of UVA’s Animal Law program. With a special interest in the institutional aspects of the intersection of law, regulation, and

ethics, she teaches food and drug law, health law, animal law, bioethics, regulation of clinical research, public health law, and environmental ethics. She has written and presented extensively in many areas, including biomedical research, genomics, stem cell research, human and animal biotechnology, and biosafety. She served on four committees of the National Academies of Sciences, Engineering, and Medicine (NASEM): The Committee on Revisions to the Common Rule for the Protection of Human Subjects, Assessing Toxicological Risks to Human Subjects, Assessment of the Care and Use of Dogs in Biomedical Research Funded by or Conducted at the U.S. Department Of Veterans Affairs (current) and Pain Management and Regulatory Strategies to Reduce Prescription Opioid Abuse (consultant to the committee). She has advised numerous state and federal agencies, including the FDA, the EPA, and the Department of Defense, and committees of the NIH, the NSF, the NASEM, and the Virginia Bar.

Gigi Kwik Gronvall, PhD

Dr. Gigi Kwik Gronvall is a Senior Scholar at the Johns Hopkins Center for Health Security and an Associate Professor in the Department of Environmental Health and Engineering at the Johns Hopkins Bloomberg School of Public Health. Dr. Gronvall is the author of the book *Synthetic Biology: Safety, Security, and Promise*. While the synthetic biology discipline is poised to revolutionize important sectors for national security, there are technical and social risks. Dr. Gronvall describes what can be done to minimize risks and maximize the benefits of synthetic biology, focusing on biosecurity, biosafety, ethics, and U.S. national competitiveness. Dr. Gronvall is also the author of the book *Preparing for Bioterrorism: The Alfred P. Sloan Foundation's Leadership in Biosecurity*. Dr. Gronvall constructed, for a nontechnical audience, a chronicle of early gains in U.S. efforts to confront the threat of bioterrorism. Dr. Gronvall is a member of the Threat Reduction Advisory Committee (TRAC), which provides the Secretary of Defense with independent advice and recommendations on reducing the risk to the U.S., its military forces, and its allies and partners posed by nuclear, biological, chemical, and conventional threats. She served as the Science Advisor for the Commission on the Prevention of Weapons of Mass Destruction Proliferation and Terrorism from 2009-2010.

Dr. Gronvall received a BS in biology from Indiana University, Bloomington. She subsequently worked as a protein chemist at the Memorial Sloan-Kettering Cancer Center and received a PhD from Johns Hopkins University for work on T-cell receptor/MHC I interactions. She was a National Research Council Postdoctoral Associate at the US Army Medical Research Institute of Infectious Diseases (USAMRIID).