External Review of Environmental, Biosafety, and Biosecurity Considerations for Synthetic Cell Research and Development– Committee Meeting #4

July 22-23, 2025 1-5pm ET

Virtual

DAY ONE: JULY 22ND 12:15-5:15 PM (ALL TIMES ET)

Purpose

This information gathering session will be held virtually over two days and include a mix of closed (i.e., only committee and NASEM staff) and open sessions. The meeting is intended to:

- Explore the cutting-edge science and multifaceted applications of synthetic cells, from biomedical and industrial uses to fundamental biological research and space-based technologies, while assessing their advantages, limitations, and broader implications including biosafety, biosecurity, and environmental impact.
- Advance understanding of contemporary biotechnology risk assessment and mitigation strategies, with a focus on exploring state-of-the-art approaches that can be applied or adapted to emerging biotechnologies like synthetic cells to ensure responsible innovation and risk management across diverse domains.
- Engage with key federal stakeholders—including OSTP, NSC, and relevant Congressional committees—to understand and incorporate their perspectives on biosafety, biosecurity, and environmental risk assessment and mitigation related to engineering biology, with a particular focus on synthetic cell research and development.

12:15-12:30 - Closed Session: Committee and National Academies Staff Only

Open Session: This discussion, held in open session, will be live-streamed, recorded, and made publicly available

Synthetic Cells at the Frontier: Navigating Innovation and Risk:

12:30-3:30 pm ET

Frontiers of Synthetic Cells: Applications, Insights, and Implications

This session will examine the cutting-edge research and development of synthetic cells across a wide range of applications, including biomedicine, biomanufacturing, biomining, and bioremediation. It will also delve into their use in probing the origins of life, exploring mirror biology, advancing fundamental biological understanding, and enabling space-based applications. The discussion will assess the current state of science in each domain, highlight the advantages and limitations of synthetic cells compared to conventional engineered organisms, and consider the associated biosafety, biosecurity, and environmental implications.

12:30–12:35 **Welcome and Committee Overview**

Felicia Wu & Peter Carr, Study Committee Co-Chairs

Introduction to Session

Cameron Kim, Committee Member

The presentations will be delivered across two sessions, followed by a moderated panel discussion focused on the biosafety, biosecurity, and environmental considerations of each application area, as well as potential approaches for risk assessment and mitigation.

12:35–1:20 **Applications and Insights Session 1**

- Lynn Rothschild, NASA
- John Glass, J. Craig Venter Institute
- George Church, Harvard University
- Elizabeth Strychalski, NIST

1:20–1:30 **Stretch Break**

1:30–2:15 **Applications and Insights Session 2**

- Cheemeng Tan, University of California, Davis
- Michael Booth, University College London
- Neha Kamat, Northwestern University
- Juan Perez-Mercader, Harvard University

2:15-3:15 **Moderated Discussion: Biosafety, Biosecurity, and Environmental Implications**

Cameron Kim, Committee Member

3:15–3:30 **Stretch Break**

3:30-5:15 pm ET

State-of-the-Art Approaches to Biotechnology Risk Assessment and Mitigation

This session will deepen understanding of contemporary biotechnology risk assessment and mitigation strategies, with a focus on how these approaches intersect with real-world practice. It will examine state-of-the-art methodologies that can be applied or adapted to synthetic cells and other emerging biotechnologies to promote responsible innovation and enable proactive risk management. Special attention will be given to biosafety, biosecurity, and environmental risk assessment. Discussions will encompass methodologies, regulatory perspectives, and practical tools for evaluating and managing risks across a wide range of biotechnology applications.

3:30–3:35pm **Introduction to Session**

Emma Frow, Committee Member

3:35–4:20 **Presentations**

- Rebecca Moritz, Colorado State University
- Ben Trump, University of Michigan
- Richard Lenski, Michigan State University
- Greg Jaffe, Jaffe Policy Consulting LLC

4:20–5:10 **Moderated Panel Discussion**
Emma Frow, Committee Member

5:10-5:15 pm **Thank you and Items for tomorrow**
Peter Carr & **Felicia Wu**, Study Committee Co-Chairs

END OF DAY 1

DAY TWO: JULY 23RD 1:00-5:00 PM (ALL TIMES ET)

1:00-5:00 - Closed Session: Committee and National Academies Staff Only

MEETING ADJOURNS

END OF DAY 2

SPEAKER BIOGRAPHIES

Michael Booth

Michael Booth is an Associate Professor of Chemical Biology and Organic Chemistry at the Department of Chemistry at University College London. He received his MChem degree from the University of Southampton and Ph.D. at the University of Cambridge, under the supervision of Professor Sir Shankar Balasubramanian. He carried out postdoctoral research and a Junior Research Fellowship at the University of Oxford, with Professor Hagan Bayley. Michael started his independent research career with a Royal Society University Research Fellowship in the Department of Chemistry at the University of Oxford and then moved to his current position at University College London.

George Church

George Church is Professor of Genetics at Harvard Medical School. He has co-authored 750 papers, 168 patent publications, and a book, "Regenesis." George has also developed methods used for the first genome sequence in 1994, million-fold cost reductions in genome engineering and whole gene synthesizing, molecular multiplexing/barcoding, DNA assembly from chips, and more. He co-initiated the BRAIN (Brain Research through Advancing Innovative Neurotechnologies) Initiative in 2011 and the following Genome Projects: Human Genome Project in 1984, Genome Project-Write in 2016, and Personal Genome Project in 2005. George's research also includes AI-machine learning for protein engineering, tissue reprogramming, organoids, gene therapy, aging reversal, xeno-transplantation, in situ 3D DNA/RNA/protein/connectome imaging. He received a B.S. in Microbiology and Biochemistry from Duke University and Ph.D. in Biochemistry and Molecular Biology from Harvard University.

John Glass

John Glass is a Synthetic Biology professor at the J. Craig Venter Institute (JCVI). He was a leader of the JCVI team that constructed the first bacterial cell with a synthetic genome in 2010. That effort led to the JCVI's design, synthesis and construction of a bacterium with a near minimal bacterial genome in 2016. That microbe, JCVI-syn3A, is being used to investigate the first principles of cellular life. John leads an ad hoc consortium of more than 90 research groups using the JCVI minimal cell. His lab's fundamental expertise is designing and building synthetic genomes and installing those genomes to enable small and grand scale changes in viruses, bacteria, yeasts and mammalian cells. Glass part of the Build-a-Cell consortium steering group and has been a leader in the effort to alert the world to the potential synthetic mirror bacteria might pose if they are ever constructed. John earned his B.S. in Biology, M.S. in genetics from the University of North Carolina at Chapel Hil, and Ph.D. in RNA virus genetics at the School of Medicine at the University of Virginia.

Gregory Jaffe

Gregory Jaffe is President of Jaffe Policy Consulting, which provides strategic advice on national and international policies involving agriculture and food, with specific expertise in sustainability, climate, bioeconomy, biotechnology, biofuels, sustainable proteins, biomanufacturing, Per- and polyfluoroalkyl substances (PFAS), pesticides, food safety, and food loss and waste. He recently worked as the Senior Advisor for Regulatory Affairs in USDA's Office of the Secretary. Greg was the Department's Chief Regulatory Officer responsible for managing the Department's regulatory agenda, interdepartmental review of all significant regulations, and engagement with EPA and FDA on their regulations and policies that impact USDA programs or stakeholders. He managed a broad portfolio of policy issues that included bioeconomy, biotechnology, biofuels, pesticides, PFAS, food safety, sustainability, and scientific research and development. Before joining USDA, Greg worked for at the Center for Science in Public Interest, a non-profit consumer organization working on food and nutrition issues. Greg received his B.A in Biology and Government from Wesleyan University and his J.D. from Harvard Law School.

Neha Kamat

Neha Kamat is an Associate Professor at Northwestern University in the Biomedical Engineering Department in Evanston, Illinois. She was trained as a bioengineer with special emphasis in biophysical analysis of biological and

synthetic membranes, and in the production and characterization of membrane proteins using cell-free protein expression systems. She received a B.S. in Bioengineering from Rice University, a Ph.D. in Bioengineering from the University of Pennsylvania, and completed a postdoctoral fellowship at Harvard University Massachusetts General Hospital. At Northwestern University, the Kamat lab's main research interests are to understand and harness biological membranes as a biomaterial for (1) fundamental biological studies related to membrane protein folding and function and (2) translational applications in diagnostics and disease. Neha is the recipient of a Young Investigator Award from the Air Force Research Office, an NSF CAREER Award, and the American Chemical Society's Synthetic Biology Young Innovator Award.

Richard Lenski

Richard Lenski is the John A. Hannah Professor of Microbial Ecology and a University Distinguished Professor at Michigan State University. He did his undergraduate studies at Oberlin College, majoring in biology, and received his Ph.D. from the University of North Carolina, Chapel Hill, where he did ecological research on insects. Wanting a system where he could study evolution in action, Dr. Lenski switched to microbiology for a postdoc at the University of Massachusetts, Amherst. He joined the faculty at the University of California, Irvine, in 1985, before moving to Michigan State in 1991. Richard is best known for the Long-Term Evolution Experiment that he started in 1988, and which continues to this day. He and his team have maintained and studied 12 populations of E. coli for 75,000 generations, providing insights into the dynamics of adaptation by natural selection, the tempo and mode of genome evolution, the repeatability of evolution, and even the origin of new functions. Richard is a member of the National Academy of Sciences, the American Academy of Arts and Sciences, and the American Philosophical Society. He has authored over 290 papers, including more than a dozen each in Nature and Science. He is a past President of the Society for the Study of Evolution, and he co-founded the NSF-funded BEACON Center for the Study of Evolution in Action, which brought together biologists, computer scientists, and engineers. He has held fellowships from the Guggenheim and MacArthur Foundations, and he received a Friend of Darwin award from the National Center for Science Education for his public-facing work on evolution. Richard has mentored some 30 graduate students and postdoctoral scientists who are now on the faculties of universities around the US and the world. He has served on National Academies committees that developed frameworks for field testing of genetically modified organisms (1989 report), and that reviewed the scientific approaches used in the FBI's investigation of the anthrax letters (2011 report). Richard was also a coauthor on the recent Science paper and technical report examining the risks of producing mirror life (2024).

Rebecca Moritz

Rebecca Moritz is the Biosafety Director, Director of the Office of Research Collaboration and Compliance, Responsible Official (RO), and Institutional Contact for Dual Use Research (ICDUR) at Colorado State University (CSU). In addition, Rebecca has an adjunct teaching appointment in CSU's Department of Microbiology, Immunology, and Pathology. Previously, she was the RO for the University of Wisconsin-Madison Select Agent Program as well as the chair of the Dual Use Research of Concern Subcommittee, the ICDUR, and a lead member of the Biosecurity Task Force. She is a Certified Biosafety Professional with the American Biological Safety Association International (ABSA), a former ABSA Councilor, and past President of ABSA. Additionally, Rebecca is a Specialist Microbiologist with the National Registry of Certified Microbiologists and one of the co-founders of Tutela Strategies. Rebecca has conducted research in both private sector and academic laboratories, including in high containment laboratories. She received her B.S. degree in Bacteriology and M.S. in Medical Microbiology and Immunology from the University of Wisconsin-Madison.

Juan Perez-Mercader

Juan Perez-Mercader, Senior Research Fellow at Harvard University, is a Theoretical Physicist and Experimental Polymer Chemist/Condensed Matter Physicist with broad interests in Astrobiology and the origin and evolution of life in the Universe. The focus of his research is on the ex-novo laboratory synthesis of the simplest emergent and self-booting material systems that are non-biochemical, but chemistry-based, and capable of mimicking natural life and chemically evolving into more complex systems. Juan earned his B.S. from the Universidad de Sevilla, his M.S. in Mathematics and Physics from Trinity College, Dublin, and his Ph.D. from City College of New York.

Lynn Rothschild

Lynn Rothschild is an evolutionary biologist, astrobiologist, and synthetic biologist at NASA's Ames Research Center as well as adjunct professor at both Brown University and Stanford University. Lynn received a B.S. in biology from Yale University, an M.A degree in zoology, and a Ph.D. in Molecular and Cell Biology from Brown University. Her research spans into how life—especially microbes—evolved in Earth's unique environments and how these lessons could apply to potential life beyond our planet. Lynn founded NASA's program in synthetic biology and explores how it could play a pivotal role in the future of space travel. Rothschild was the principal investigator of the first free-flyer synthetic biology payload, which flew on the Deutsches Zentrum für Luft- und Raumfahrt's Euglena and Combined Regenerative Organic-Food Production in Space (EuCROPIS) mission. Lynn's interest in synthetic cells is two-fold: how it can inform the origin, evolution and search for life elsewhere as well as how they could aid in space exploration and settlement. She has been named a NASA Innovative Advanced Concepts fellow five times and in 2015, Rothschild was awarded the Horace Mann Medal by the Brown University Graduate School as well as the American Humanist Association's Isaac Asimov Science Award. She is a fellow of the Linnean Society of London, the California Academy of Sciences, and the Explorer's Club. She also held the role of president of the Society of Protozoologists from 2002 to 2003.

Elizabeth Strychalski

Elizabeth Strychalski founded and leads the Cellular Engineering Group at the National Institute of Standards and Technology, whose mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology to enhance economic security and improve quality of life. The Cellular Engineering Group works to provide a foundation of measurements to support the design and control of engineered function in living systems. Previously, Elizabeth served as a Program Manager in the Biological Technologies Office at the Defense Advanced Research Projects Agency, where she managed a portfolio to aggressively advance experimental and theoretical research at the interface of synthetic biology, control engineering, nanobiotechnology, and fluidic devices. She is the recipient of numerous awards, such as the University of Rochester's Harry W. Fullbright Prize and Janet Howell Clark Award, the National Research Council Postdoctoral Research Associateship, and the Maryland Academy of Sciences Young Scientist Award. Elizabeth received her B.S. in Physics and Astronomy and B.A. in Religious Studies, from the University of Rochester. She earned an M.A. and a Ph.D. in Physics from Cornell University.

Cheemeng Tan

Cheemeng Tan is a Professor of Biomedical Engineering at the University of California Davis. His group integrates synthetic and systems biology to engineer nanovesicles and "cyborg" cells for disease therapy and diagnostics. His work has been recognized with several awards, including the Medtronic Fellowship, Young Investigator Grant from the Human Frontier Science Program, Scialog Fellow, Cellular and Molecular Bioengineering New Innovator, UC Davis Chancellor's Fellow award, UC Davis' Lab Safety Award, Branco Weiss Fellowship - Society in Science, National Institute of Biomedical Imaging and Bioengineering's Trailblazer Award, and National Institute for General Medical Sciences' Maximizing Investigators' Research Award. Cheemeng serves on multiple editorial boards and scientific panels, notably as a standing member in the National Institutes of Health's Cellular and Molecular Technologies study section. He has published extensively on cell-free systems and cell engineering, helping to shape the emerging discipline of translational synthetic biology. Cheemeng earned a B.Eng. (First-Class Honor) from the National University of Singapore, an M.Sc. in High-Performance Computing from the Singapore-MIT Alliance, and a Ph.D. in Biomedical Engineering from Duke University, after which he completed a Lane Postdoctoral Fellowship at Carnegie Mellon University before joining UC Davis in 2013.

Benjamin D. Trump

Benjamin D. Trump is a resilience and risk governance expert with over a decade of experience analyzing complex systems under conditions of uncertainty, fragility, and rapid change. He most recently served as a Senior Research Social Scientist and Lead of the Center for Health Engineering at the U.S. Army Engineer Research and Development Center, where he led interdisciplinary projects on infrastructure, public health, environmental security, and systemic risk. Benjamin has authored over 100 peer-reviewed articles and nine books, with publications appearing in Nature, Nature Communications, and other leading journals in engineering, public policy, and emerging technology. He was awarded the Presidential Early Career Award for Scientists and Engineers (PECASE) for his work in these areas. Benjamin currently serves as the President-Elect of the Society for Risk Analysis and is an Adjunct Associate Professor at the University of Michigan School of Public Health. He received his B.S. in

Political Science and M.S. in Public Policy and Management from Carnegie Mellon University, and Ph.D. in Risk Governance of Emerging Technologies from the University of Michigan.

COMMITTEE BIOGRAPHIES

Peter Carr - co-chair

Peter Carr is a Senior Scientist at RTX BBN Technologies, where he is building a research and development portfolio at the intersection of synthetic biology and national security. Prior to joining BBN, Carr worked from 2001-2023 at the Massachusetts Institute of Technology (MIT), first as a research scientist at the MIT Media Lab and then as a senior staff scientist at MIT Lincoln Laboratory. His research interests include genome engineering, combatting infectious disease, DNA synthesis and error correction, biomanufacturing, biocontainment, and biodefense, and his research efforts have included developing new technologies for DNA synthesis and assembly and the engineering of an organism with a new genetic code. He has advised the U.S. government on the promise and perils of synthetic biology in various capacities, was a founding member of the Synthetic Biology Center at MIT and has served many roles with the International Genetically Engineered Machine (iGEM) competition, currently serving as Special Advisor to iGEM Judging. Carr received his bachelor's degree in Biochemistry from Harvard University, and his Ph.D. in Biochemistry and Molecular Biophysics from Columbia University. Carr was a member of the 2018 National Academies study committee on Biodefense in the Age of Synthetic Biology.

Felicia Wu – co-chair

Felicia Wu is the John A. Hannah Distinguished Professor of Food Safety, Toxicology, and Risk Assessment, and one of ten 2023 University Distinguished Professors, at Michigan State University. She served as the 2023-2024 President of the Society for Risk Analysis and is a governor-appointed Commissioner of Agriculture for the state of Michigan. Wu works at the nexus of agriculture, biotechnology, food safety, nutrition, and public health to improve national and global health outcomes. Her research ranges from assessing impacts of climate change and transgenic Bt corn production on aflatoxin risks, improving resilience of food systems against shocks, and reducing presence of mycotoxins, heavy metals, and pathogens in food worldwide. She is a member of the Joint FAO/WHO Expert Committee on Food Additives, the WHO Food-Based Dietary Guidelines Committee, and an elected Fellow of the Society for Risk Analysis. Wu earned her Ph.D. in Engineering and Public Policy at Carnegie Mellon University, and AB and SM in Applied Mathematics/Medical Sciences at Harvard University. She has previously served on NASEM's Committee on Sustainability Considerations for the Future of Animal Agriculture Science Research and as a National Academies speaker on food safety of lab-grown foods.

Kata Adamala

Kate Adamala is McKnight Presidential Fellow Associate Professor at the University of Minnesota. Her research focuses on synthetic cell engineering, with the aim of understanding chemical principles of biology, using artificial cells to create new tools for bioengineering, medicine, and foundational research. The interests of Adamala's lab span questions from the origin and earliest evolution of life, using synthetic biology to colonize space, to the future of biotechnology and medicine. Her biosafety and biosecurity work focuses on frameworks for safeguarding emerging synthetic biology technologies, with particular focus on synthetic cell and cell-free platforms. Adamala is a Polymath Fellow of the Geneva Center for Security Policy, leader of the BioBOLD Initiative, and co-founder and coordinator of the international synthetic cell engineering consortium Build-a-Cell. She received her Ph.D. in biophysics from the University Roma Tre, and postdoctoral training in neurobiology at MIT.

Maria Chavez

Maria Chavez is president of BioCurious, a community biotechnology lab where she has volunteered since 2011. Chavez has been the co-organizer of the Global Community Bio Summit for the past six years where she has spoken publicly on biosafety, and is co-organizer of the Bio Summit Leadership Fellows program. She serves on the board of the Momental Foundation, a grantmaking foundation whose grants support independence in early-career scientific research. She also serves on the board of the Real Vegan Cheese Project, has led two International Genetically Engineered Machine (iGEM) teams, was a member of the Open Insulin Project, and has been in a leadership position for multiple community lab science projects. Chavez has a BS/IT in Programming and Operating Systems and an MBA in Global Management, both from the University of Phoenix.

Christopher L. Cummings

Christopher L. Cummings is a Research Social Scientist at the U.S. Army Engineer Research and Development Center (ERDC). He also serves as a Senior Research Fellow at North Carolina State University and Iowa State University. Previously, he served as an Assistant Professor of Strategic Risk and Health Communication at Nanyang Technological University, Singapore. Cummings brings extensive experience in risk communication, specializing in advancing public engagement in science, particularly in high-stakes contexts such as synthetic biology and convergence, biotechnology governance, and consumer product safety risk estimation. His research employs mixed-method social science approaches to examine ethical, legal, and social implications of emerging technologies. Cummings is the author of Secondary Risk Theory which enhances understanding of risk perceptions and decision-making in complex scenarios. His recent honors include the 2024 Lab Innovation of the Year Award from ERDC, the 2024 International Research and Development Award from ERDC, and the 2021 Excellence in Research and Practice Award from the Society for Risk Analysis for his work in service to various government agencies and public organizations for COVID-19 risk communication. Cummings holds a Ph.D. and M.S. in Communication from North Carolina State University and a B.A. in Communication from California State University, Chico.

Jason Delborne

Jason Delborne is Associate Professor of Science and Technology Policy at the La Follette School of Public Affairs at the University of Wisconsin-Madison and was previously Professor of Science, Policy, and Society at North Carolina State University's Genetic Engineering and Society Center from 2013 to 2024. He was a 2023-2024 American Association for the Advancement of Science (AAAS) Science and Technology Policy Fellow at the National Nanotechnology Coordination Office, was a member of the Subcommittee on Social and Behavioral Sciences of the Committee on Science of the National Science and Technology Council, and served on a Gene Drives advisory committee for the National Institutes of Health. Delborne's research focuses on public and stakeholder engagement surrounding the development and governance of emerging technologies, especially environmental and agricultural biotechnologies. His recent research projects have included the genetically engineered American chestnut tree, genetic biocontrol of aquatic invasive species in the Great Lakes region, and gene drive rodents to protect island biodiversity. Delborne was honored as an AAAS Fellow in 2021 and a University Faculty Scholar in 2019. He earned his bachelor's degree in human biology from Stanford University and his Ph.D. in environmental science, policy, and management from University of California, Berkeley. Delborne previously served on two National Academies

study committees, Gene Drive Research in Non-Human Organisms: Recommendations for Responsible Conduct and Potential for Biotechnology to Address Forest Health.

David A. Dunning

David A. Dunning is Walgreen Professor of the Study of Human Understanding, and Professor of Psychology, at the University of Michigan. He is also Professor Emeritus at Cornell University, where he taught for 29 years, and previously spent a year as a fellow at the Center for Advanced Studies in the Behavioral Sciences at Stanford. Dunning has served as president of the Society of Experimental Social Psychology and the Society for the Science of Motivation and was on the board and chair of the Publication and Communication Board of the American Psychological Association. Dunning has expertise in the field of experimental social psychology, focusing on the psychological processes underlying self-misjudgment and social misunderstanding, with applications to economics, medicine, organizations, and the law. His most cited work, which is supported by the National Institute of Mental Health, the National Science Foundation, and the Templeton Foundation, shows that people typically hold flattering self-opinions that cannot be justified from objective evidence. For this work Dunning received the Grawemeyer Award in Psychology in 2023. He received a Ph.D. from Stanford and his BA from Michigan State, both in psychology.

Emma Frow

Emma Frow is an Associate Professor at Arizona State University (ASU), where she holds a joint appointment between the School for the Future of Innovation in Society and the School of Biological & Health Systems Engineering. She is also an appointed Lincoln Professor of Applied Ethics at ASU. Prior to joining ASU, she was an Assistant Professor in Science, Technology & Innovation Studies at the University of Edinburgh, UK. Frow's research focuses on the governance of emerging biotechnologies, with a particular focus on governance of the STEM research community. She has studied and worked with the synthetic biology research community in the US and Europe since 2008, including current uncompensated fieldwork at Ginkgo Bioworks. Frow has received the NSF CAREER award. She is also a Council Member of the Engineering Biology Research Consortium. Frow trained in both the natural and social sciences, having obtained a Ph.D. in biochemistry from the University of Cambridge and subsequently an MSc in science & technology studies from the University of Edinburgh.

David Gillum

David Gillum is currently the Associate Vice President of Compliance and Research Administration at the University of Nevada, Reno, and formerly served as Assistant Vice President of Environmental Health and Safety at Arizona State University. Gillum is also co-owner of Tutela Strategies, LLC, a private regulatory compliance consulting company. He has more than 30 years of leadership experience in compliance, safety, and risk management across major research universities. His primary areas of expertise include biosafety, biosecurity, research compliance, and emergency preparedness, with a strong focus on dual-use research of concern, potential pandemic pathogens, synthetic biology, and biotechnology governance. Gillum is a past president of the American Biological Safety Association (ABSA) International and recipient of the FBI Director's Community Leadership Award (2018), the ABSA International Everett Hanel, Jr. Presidential Award (2024), and the Campus Safety, Health, and Environmental Management Association (CSHEMA) Innovation Award (2018). He is an Associate Editor for Applied Biosafety and actively contributes to national and international biosafety and biosecurity policy initiatives. He holds

a B.A. in Chemistry from the University of Nevada, Las Vegas, an M.S. in Environmental Health Sciences from the University of Massachusetts, Amherst, and a Ph.D. in the Human and Social Dimensions of Science and Technology at Arizona State University.

Gregory Jaffe

Gregory Jaffe is President of Jaffe Policy Consulting, which provides strategic advice on national and international policies involving agriculture and food, with specific expertise in sustainability, climate, bioeconomy, biotechnology, biofuels, sustainable proteins, biomanufacturing, Per- and polyfluoroalkyl substances (PFAS), pesticides, food safety, and food loss and waste. He recently worked as the Senior Advisor for Regulatory Affairs in USDA's Office of the Secretary. Greg was the Department's Chief Regulatory Officer responsible for managing the Department's regulatory agenda, interdepartmental review of all significant regulations, and engagement with EPA and FDA on their regulations and policies that impact USDA programs or stakeholders. He managed a broad portfolio of policy issues that included bioeconomy, biotechnology, biofuels, pesticides, PFAS, food safety, sustainability, and scientific research and development. Before joining USDA, Greg worked for at the Center for Science in Public Interest, a non-profit consumer organization working on food and nutrition issues. Greg received his B.A in Biology and Government from Wesleyan University and his J.D. from Harvard Law School.

India Hook-Barnard

India Hook-Barnard is Executive Director of the Engineering Biology Research Consortium (EBRC), a non-profit public-private partnership dedicated to advancing engineering biology to address national and global needs. Prior to joining EBRC, Hook-Barnard served as the Director of Research Strategy and Associate Director, Precision Medicine at the University of California, San Francisco, as the Executive Director for the California Initiative to Advance Precision Medicine. Additionally, Hook-Barnard served on Schmidt Future's Task Force on Synthetic Biology and the Bioeconomy, and the WEF Global Futures Council for Synthetic Biology. Earlier in her career, Hook-Barnard worked at the National Academies where she directed standing committees, workshops, and six consensus reports, including Toward Precision Medicine: Building a Knowledge Network for Biomedical Research and a New Taxonomy of Disease (2011). Her primary interests are in the areas of engineering biology, precision medicine, responsible innovation, and biosecurity. She earned her PhD in Microbiology-Medicine from the Department of Molecular Microbiology and Immunology at the University of Missouri.

Cameron Kim

Cameron Kim is Assistant Professor of the Practice in Biomedical Engineering (BME) at Duke University and Associate Director of Undergraduate Studies in BME. He also holds appointments as Associate Faculty in the Duke Science & Society Initiative and member of the Duke Center for Advanced Genomic Technologies. His research focuses on developing pedagogical frameworks for ethics-guided design in emerging biotechnologies, with an emphasis in gene and cell-based therapies. Using mixed methods research to measure student self-efficacy with ethics training, Kim is establishing best practices in engineering education for ethics and character development in intellectual curiosity and humility across STEM fields. This work has culminated in the Duke BME "Ethics Everywhere" model of broad ethics education within technical biomedical engineering training. He also researches experiential education in molecular and cellular engineering through design thinking and project-based learning to promote "biotech-to-bedside" innovations. He currently serves as the research advisor for Duke International Genetically Engineered Machine (iGEM) and a

member of the Engineering Biology Research Consortium. Kim earned his Ph.D. in Bioengineering at Stanford.

Richard M. Murray

Richard M. Murray is the Thomas E. and Doris Everhart Professor of Control & Dynamical Systems and Bioengineering at the California Institute of Technology. Murray's research is in the application of feedback and control to networked systems, with applications in synthetic biology and autonomy. His research has included publishing at the intersection of synthetic biology and ethics. He is an elected member of the National Academy of Engineering (NAE), an international fellow of the Royal Swedish Academy of Engineering Sciences (IVA), and a founding member of the Defense Innovation Board. He received a B.S. in Electrical Engineering from the California Institute of Technology and both a M.S. and Ph.D. in Electrical Engineering and Computer Sciences from the University of California, Berkeley. Murray served as the chair of the National Academies consensus study on Future Biotechnology Products and Opportunities to Enhance Capabilities of the Biotechnology Regulatory System and has served as a committee member on several other National Academies studies on national security, defense research, synthetic biology, and other related topics.

Roni Reiter-Palmon

Roni Reiter-Palmon is Distinguished professor of Industrial/Organizational Psychology, and Director of Innovation for the Center of Collaboration Science, at the University of Nebraska at Omaha. She is a founding member of the International Society for the Study of Creativity and Innovation, and a member of Interdisciplinary Network for Group Research. Her research focus is on individual and team creativity and innovation. At the team level, Reiter-Palmon is primarily interested in interdisciplinary teams, including engineering and design teams, healthcare teams, and science teams, and her efforts have included how AI can be incorporated into teamwork for creativity and innovation. Reiter-Palmon received the University of Nebraska system research award and was recognized for lifetime achievement by the American Psychological Association (APA). She is also a fellow at APA, recognized for her significant research achievements in applying creativity and innovation work to teams. She received her Ph.D. in I/O Psychology in 1993 at George Mason University.

Robin Scheffler

Robin Wolfe Scheffler is an Associate Professor at the Program in Science, Technology, and Society at the Massachusetts Institute of Technology. Previously, he was a visiting fellow at the American Academy of Arts and Sciences. His research focuses on the history of the modern biomedical and life sciences and their intersections with American social, economic, and political life, and his work has explored the roots and impact of federal research policymaking around the development of a cancer vaccine during the War on Cancer. His current efforts, supported by the National Science Foundation, uses the development of the biotechnology industry in the Greater Boston Area as a case study for thinking about the social and spatial relationships of the bioeconomy. Scheffler obtained his Ph.D. in the History of Science and Medicine from Yale University, M.Phil in the History and Philosophy of Science from the University of Cambridge, and undergraduate degrees in History and Chemistry at the University of Chicago.

Zara Summers

Zara Summers is the Chief Science Officer at LanzaTech, where she oversees the Science division, including Synthetic Biology, Fermentation, Global Services, and the Freedom Pines, GA division. There, she leads a team of over 200 scientists dedicated to pioneering novel biorecycling technologies that capture carbon emissions from energy-intensive industries and transforms waste carbon into sustainable fuels, chemicals, materials, and protein for everyday products. Her work at LanzaTech includes advancing a circular carbon economy through strategic partnerships with companies such as ArcelorMittal, Zara, H&M Move, Coty, On, and LanzaJet. Before joining LanzaTech, Summers spearheaded the creation of ExxonMobil's R&D Bioscience division and managed a comprehensive portfolio of bio-based programs, including strategies for nature-based solutions. Summers' expertise lies in the field of biology and engineering, with a particular focus on sustainability and environmental research. Summers holds a Ph.D. in Microbiology from the University of Massachusetts, Amherst and a BA in Biology from the California State University, Northridge.