# Understanding Bias and Fairness in AI-enabled Healthcare Software

Duke-Robert J. Margolis, MD, Center for Health Policy
Virtual Public Meeting (Zoom)
December 17, 2021

## Speaker Biographies

**Mercy Aseidu** is a Schmidt Science Postdoctoral Research Fellow at the Massachusetts Institute of Technology (MIT) Jameel Clinic for AI in Healthcare where she develops deep neural networks to improve ultrasound imaging for low-powered portable devices. She is the CTO and co-founder of the Calla Health Foundation, which develops cervical cancer screening and treatment tools to democratize care. She is also the Co-founder and Co-CEO of GAPhealth Technologies, which seeks to improve accessibility to health specialists in sub-Saharan Africa. Prior to this, she received her PhD in Biomedical Engineering from Duke University, with a certificate in Global Health at the Center for Global Women's Health Technologies, and an undergraduate degree in Biomedical Engineering from the University of Rochester. She has won several awards for her work including the Computer History Museum Patrick J McGovern Changemaker Award, Lemelson-MIT Graduate Student Inventor Award (Cure-it category), CUGH/Wasserheit Young Leader in Global Health Award, and the Velji Emerging Leader in Global Health Award.

**Kasia Chmielinski** is the Co-Founder of The Data Nutrition Project, an initiative that builds tools to mitigate bias in artificial intelligence. They are also a Senior Researcher at the Partnership on AI, a Digital Expert at McKinsey & Company, and an affiliate at the Berkman Klein Center at Harvard University. Previously, Kasia held positions in the U.S. Digital Service in the White House and at the MIT Media Lab in Cambridge, Massachusetts. When not in front of a computer, Kasia can be found leading a Feminist Birdwatching event or cycling uncomfortably-long distances.

**Matthew Diamond** is the Chief Medical Officer for Digital Health at FDA's Center for Devices and Radiological Health (CDRH). At the CDRH Digital Health Center of Excellence, Dr. Diamond serves as the senior clinical expert for digital health medical devices and provides leadership for digital health policy development for emerging technologies including artificial intelligence. Prior to joining the Agency, Dr. Diamond served on leadership teams of large and small technology companies, including as Chief Medical Officer at Nokia, and as Medical Director at Fossil Group and the startup Misfit Wearables. Dr. Diamond served on numerous advisory boards including at the Center for Personalized Health Monitoring at UMass Amherst and for the venture firm NGP Capital. As Vice Chair of the Consumer Technology Association (CTA) Health & Fitness Technology Board of Directors, he promoted public health applications of mobile technology and established an ANSI-accredited standardization committee to develop standards in digital health for wellness-related hardware and mobile applications. Dr. Diamond earned his MD and PhD (biophysics) from the Mount Sinai School of Medicine, and he is board certified in rehabilitation medicine and sports medicine and certified in medical acupuncture. A faculty member at NYU, Dr. Diamond is passionate about helping people improve their mobility and performance through a holistic approach to rehabilitation and technology that promotes wellness.

**Kadija Ferryman** is a cultural anthropologist who studies the social, cultural, and ethical implications of health information technologies. Specifically, her research examines how genomics, digital medical records, artificial intelligence, and other technologies impact racial disparities in health. As a Postdoctoral Scholar at the Data & Society Research Institute in New York, she led the [Fairness in Precision Medicine](link) research study, which examines the potential for bias and discrimination in predictive precision medicine. She earned a BA in Anthropology from Yale University, and a PhD in Anthropology from The New School for Social Research. Before completing her PhD, she was a policy researcher at the Urban Institute where she studied how housing and neighborhoods impact well-being, specifically the effects of public housing redevelopment on children, families, and older adults. Dr. Ferryman is a member of the [Institutional Review Board for the All of Research Program](link), a [Mozilla Open Science Fellow](link), and an Affiliate at the [Center for Critical Race and Digital Studies](link). She has published research in journals such as *Journal of the American Medical Informatics Association, Paediatric and Perinatal Epidemiology*, the *Journal of Health Care for the Poor and Underserved*, *European Journal of Human Genetics*, and *Genetics in Medicine*. Dr. Ferryman's research has been featured in multiple publications including [Nature](link), [STAT](link), and [The Financial Times](link).

**Benjamin Goldstein** is an Associate Professor of Biostatistics and Bioinformatics at Duke University. His is an expert on the meaningful use of electronic health records data for clinical analytics. His research focuses on how what we observe in EHR data can lead to biases. He is also involved in the development, evaluation and monitoring of clinical decision support tools at Duke University Health System.

**Chris Hemphill** is VP of Applied AI and host of the Hello Healthcare Podcast at Actium Health. They focus on using data science and machine learning to aid strategic projects for health systems. Chris's mission is to help people make healthy decisions based on evidence and science. Their 10+ year career has focused on prescriptive analytics, personalization, and data ethics at major US health systems. Outside of health tech, Chris has taught data science at General Assembly and Birmingham Quants. For fun, Chris loves making music with synthesizers with synthesizers and running long trails!

**Eric Henry** is a Senior Quality Systems and Compliance Advisor in the FDA and Life Sciences practice of the law firm King & Spalding. Eric is a 30-year industry veteran having led and coached global organizations through a wide variety of quality and compliance challenges. Complementing his leadership experience is an extensive hands-on skillset including audit management and response, Quality System remediation, software quality (including cybersecurity and AI/ML), medical device design controls, risk management, and regulatory due diligence. Prior to King & Spalding, Eric led global technical and quality functions at Philips, Medtronic, GE Healthcare, Boston Scientific, and Hologic. Prior to entering the medical device industry, Eric led a software quality management and program management office consulting capability in the Washington, DC area and held software design and development leadership roles in a small startup, a mid-size healthcare software company, a large financial services regulator and stock market, and a large retail organization.

**Stephen Konya** is the Senior Advisor to the Deputy National Coordinator, and Innovation Portfolio Lead for the Office of the National Coordinator for Health IT (ONC), U.S. Department of Health and Human Services (HHS). In addition to his role in helping shape the Agency's long term strategy, he also serves as the Agency's primary liaison for innovation related projects and challenges, specifically targeting engagement opportunities with the healthcare startup and investor communities. Prior to his position with the Federal Government, he served concurrently as Chief of Staff, Chief Operating Officer, and Chief Results Officer for the Illinois Department of Public Health, and Chief of Staff for the IL Department of Commerce and Economic Opportunity. He holds a BBA in Finance and International Business from Loyola University of Chicago, and was both a Fellow and Mentor of the Mid-America Regional Public Health Leadership Institute (MARPHLI) program, at the University of Illinois-Chicago (UIC), School of Public Health.

**Sara Murray** is an Associate Professor of Clinical Medicine and serves as Associate Chief Medical Information Officer for Inpatient Care and Data Science at UCSF Health. She also directs the Advanced Analytics and Innovation (A2I) team, which uses data science to understand and address the most pressing issues facing the health system. Dr. Murray is a strategic health system leader for clinical informatics, digital health, and data science. She strives to leverage healthcare data in new and impactful ways that allow for improvements in quality, safety, and value for patients and experience for providers, while also working to harmonize analytics across the organization. She has a focus on predictive analytics, including evaluation of commercially available tools and algorithms for trustworthiness prior to implementation. She also works to optimize the EHR to support clinical workflows and deploy tools to improve quality and safety, partnering with stakeholders both at UCSF and partner institutions. Dr. Murray received her BS in Chemistry from the College of William and Mary and her MD from University of California, San Francisco. She completed her internship and residency in Internal Medicine at UCSF as well as a MAS in Clinical Research and joined the Division of Hospital Medicine as faculty in 2015. She spends her clinical time caring for patients and teaching medical students and residents on the Hospital Medicine service at UCSF.

**Ziad Obermeyer** is Associate Professor and Blue Cross of California Distinguished Professor at UC Berkeley, where he does research and teaches at the intersection of machine learning and health. He has been named an Emerging Leader by the National Academy of Medicine, and received an Early Independence Award from the Office of the Director of the National Institutes of Health. His work has been published in a wide range of journals, including Science, Nature Medicine, New England Journal of Medicine, JAMA, and ICML, and has won awards from professional societies in medicine and economics. He is a Faculty Research Fellow at the National Bureau of Economic Research, and continues to practice emergency medicine in underserved communities. Previously, he was a consultant at McKinsey & Co., and an Assistant Professor at Harvard Medical School.

**Pilar Ossorio** is Professor of Law and Bioethics at University of Wisconsin, Madison, where she is on the faculties of the Law School and the Department of Medical History and Bioethics at the Medical School. In 2011 she became the inaugural Ethics Scholar-in-Residence at the Morgridge Institute for Research, the private, nonprofit research institute that is part of the Wisconsin Institutes of Discovery. She also serves as the co-director of UW's Law and Neuroscience Program, as a faculty member in the UW Masters in Biotechnology Studies program, and as Program Faculty in the Graduate Program in Population Health. Prior to taking her position at UW, she was Director of the Genetics Section of the Institute for Ethics at the American Medical Association, and taught as adjunct faculty at the University of Chicago Law School. Dr. Ossorio received her PhD in Microbiology and Immunology in 1990 from Stanford University. She completed a post-doctoral fellowship in cell biology at Yale University School of Medicine. She received her JD from the University of California at Berkeley School of Law in 1997. While at Berkeley she was elected to the legal honor society Order of the Coif and received several awards for outstanding legal scholarship. Throughout her career Dr. Ossorio has participated in numerous advisory committees and boards that aid governments in setting science policy. She has advised the U.S. National Institutes of Health and the FDA, Genome Canada, and Health Canada. In 2012 she was appointed to a four year term on the Secretary's Advisory Committee on Health Research Protections, a committee to advise the Secretary of Health and Human Services on how to improve protections for people who participate in biomedical and behavioral research. She recently completed a term on the National Advisory Council for Human Genome Research, and she has served on or chaired numerous committees and working groups that advise large-scale genome research initiatives, such as the 1000 Genomes Project and the Human Microbiome project. She has also served as a member of, or liaison to, several Boards and Committees for the Institute of Medicine and the National Research Council (both part of the National Academies of Science), including the National Cancer Policy Board, the Human Embryonic Stem Cell Advisory Committee, and the Committee on Intellectual Property Rights. She is an elected fellow of the American Association for the Advancement of Science (AAAS). Since 2005, Dr. Ossorio has worked helping American Indian communities to develop research governance and oversight processes. For five years she consulted on the Havasupai tribe's research-related litigation, which settled in 2010.

**Art Papier** is a founder of VisualDx and CEO. A dermatologist, Art has a particular interest in designing clinical systems that leverage the human ability for pattern recognition, thereby increasing clinical accuracy and reducing diagnostic error at the point of care. In line with this goal, he has led the development of VisualDx, the first diagnostic clinical decision support system to be widely used, and to incorporate machine learning for skin rashes and lesions. Art is also passionate about the engagement of people in their medical decisions, in consumer health, and developing tools to educate and empower patients in their homes and on their mobile devices. The focus of his work is to assist medical decisions by professionals and people alike, with decision support and AI augmenting human intelligence. A graduate of Wesleyan University, Art received his MD from the University of Vermont College of Medicine, and completed his graduate medical training at the University of Rochester Medical Center. He is also an Associate Professor of Dermatology and Medical Informatics at the University of Rochester School of Medicine and Dentistry.

**Saman Parvaneh** is senior manager of Data Science and AI at Edwards Lifesciences. Saman received his bachelor's in Electrical Engineering in 2003, followed by MSc and PhD degrees in Biomedical Engineering in 2005 and 2011, respectively. His primary focus was on algorithm development, bio-signal processing, and machine learning to predict spontaneous termination of atrial fibrillation during his PhD. During his service at the University of Arizona as a postdoctoral research associate, he worked on algorithm development using wearable sensors data for objective risk and performance assessment (e.g., stress monitoring, frailty, and risk of fall assessment). Before joining Edwards, he worked at Philips Research where he gained exposure to the integration of clinical decision support systems and predictive modeling for medical devices. He has authored and co-authored more than 40 scientific papers published in peer-reviewed journals and presented at many international conferences.

**Emma Pierson is** an assistant professor of computer science at the Jacobs Technion-Cornell Institute at Cornell Tech and the Technion, and a computer science field member at Cornell University. She develops data science and machine learning methods to study inequality and healthcare. Her work has been recognized by a Rhodes Scholarship, Hertz Fellowship, Rising Star in EECS, MIT Technology Review 35 Innovators Under 35, and Forbes 30 Under 30 in Science. She has written for The New York Times, FiveThirtyEight, The Atlantic, The Washington Post, Wired, and various other publications.

**Jana Schaich Borg** is an Associate Research Professor at Duke's Social Science Research Institute, co-Director of Duke's Moral Attitudes and Decision-Making Lab, co-Director of Duke's Moral Artificial Intelligence Lab, and was formerly the Director of Duke's Master in Interdisciplinary Data Science program. Dr. Schaich Borg is also an affiliate of Duke's Center for Cognitive Neuroscience and Duke's Institute for Brain Science, and teaches at Duke's Master of Quantitative Management at Fuqua School of Business. Dr. Jana Schaich Borg received her PhD in Neuroscience from Stanford University, and uses neuroscience, computational modeling, and emerging technologies to develop strategies to improve social interactions and optimize the outcome of decisions that affect other people. As a neuroscientist, she employs a diverse set of "big data" and signal processing techniques to gain insight into how humans and rodents make social decisions, especially those influenced by empathy and social synchrony. As a data scientist, she develops new approaches for analyzing these high-dimensional multi-modal data to uncover principles of how both human and artificial "brains" can integrate complex social information with internal representations of value to motivate social decisions and actions. Issues related to these research initiatives have led her to become involved in national efforts to develop ethical guidelines for AI development and data sharing, to mobilize translational Ethical AI research, and to leverage storytelling and data visualization to communicate the social impact of complex analytical problems to diverse audiences. She is currently co-authoring a book on Moral Artificial Intelligence that discusses the ethical issues raised by recent developments in artificial intelligence.

**Elham Tabassi** is the Chief of Staff in the Information Technology Laboratory (ITL) at the National Institute of Standards and Technology (NIST). She leads NIST Trustworthy and Responsible AI program that aims to cultivate trust in the design, development, and use of AI technologies by improving measurement science, standards, and related tools in ways that enhance economic security and improve quality of life. She has been working on various machine learning and computer vision research projects with applications in biometrics evaluation and standards since she joined NIST in 1999. She is a member of the National AI Resource Research Task Force, a senior member of IEEE, and a fellow of Washington Academy of Sciences.

**Sonoo Thadaney Israni** is executive director, Presence (a Center at Stanford Medicine) & The Program in Bedside Medicine, Stanford University. Sonoo Co-chaired the National Academy of Medicine's AI in Healthcare Working Group + co-shepherds their Technology across the Lifecourse Group. She has co-hosted teaching conferences at Stanford University: Human & Artificial Intelligence for Diagnostics; AI in Medicine: Inclusion & Equity; AI in Healthcare: The Hope, The Hype, The Promise, The Peril (pre-launching NAM publication, she co-led), Human Intelligence and AI in Healthcare, etc. She serves on the AAMC Restorative Justice for Academic Medicine Committee, teaching curricula to address diversity in healthcare. After 25+ years in Silicon Valley, now a Stanford intrapreneur for 12+ years - launching centers and programs: In addition to the Presence Center and its Racial Justice Lab, other initiatives she has created and led include the MSc. in Community Health and Prevention Research, Stanford WSDM (Women and Sex Differences in Medicine) Center, Diversity-First Gen Office, Restorative Justice Pilot, and more. She teaches coursework in Leveraging Conflict for Constructive Change, Leadership Skills, and Mediation. Sonoo serves on the boards of UNICEF (Northwestern Region) and SCIENTS.

**Robin Wetherill** is an attorney in the Division of Privacy and Identity Protection at the Federal Trade Commission, focusing on matters involving consumer privacy and data security. Ms. Wetherill is a graduate of the University of California, Berkeley School of Law and Grinnell College.

**Gigi Yuen-Reed** is the Chief Data Scientist at IBM Watson Health. She received her PhD in Operations Research from Northwestern University, Evanston, IL. Prior to joining IBM, she worked for HSBC, General Motor Research Lab, ZS Associates. Throughout her tenure in IBM, she held several leadership positions in analytic consulting, computational health research, and data science innovation. As one of the early members of Watson Health, Gigi has built a cross-functional data science technical community and an early advocate of AI transparency and ethics. She has led numerous multi-disciplinary teams to design and implement cutting edge AI technologies and modernize legacy solutions in areas of payer, provider, and life science. Gigi has authored over 20 peer-review articles and is a certified IBM Master Inventor for her patent contribution.

# Duke-Margolis Moderators

**Mark McClellan,** MD, PhD, is the Robert J. Margolis, MD, Professor of Business, Medicine and Policy and Director of the Duke-Margolis Center for Health Policy. A physician-economist focused on advancing quality and value in health care, his COVID-19 response work spans virus containment and testing strategies, resilient care delivery, and accelerating therapeutics and vaccine development. He is a former leader of the Centers for Medicare & Medicaid Services and the U.S. Food and Drug Administration. An independent director on the boards of Johnson & Johnson, Cigna, Alignment Healthcare, and PrognomIQ, Dr. McClellan co-chairs the Guiding Committee for the Health Care Payment Learning and Action Network and serves as an advisor for Arsenal Capital Partners, Blackstone Life Sciences, and MITRE.

**Gillian Sanders-Schmidler** is Professor of Population Health Sciences and Medicine at Duke University and Deputy Director of the Duke-Margolis Center for Health Policy. She served as Director of Duke's Evidence-based Practice Center (EPC) from 2009 through 2020. Dr. Sanders-Schmidler received her PhD in Medical Informatics from Stanford and was an Assistant Professor of Medicine at Stanford's Center for Primary Care and Outcomes Research from 1998 until the fall of 2003 when she joined the faculty at Duke University. In addition to her leadership role within the Duke-Margolis Center, she is core faculty within the Duke Clinical Research Institute. Dr. Sanders-Schmidler's research focuses on the development of evidence-based decision models to evaluate the comparative effectiveness of alternative prevention, treatment, and management strategies for chronic diseases – and the translation of such models into formats/tools that patients, healthcare providers, and policymakers can use in their decision-making process. Dr. Sanders-Schmidler is Past President of the Society for Medical Decision Making (SMDM) and she co-chaired the Second Panel on Cost Effectiveness in Health and Medicine.

**Christina SIlcox** is the Digital Health Policy Fellow at the Duke-Margolis Center for Health Policy, working on policy solutions to advance innovation in health and health care and improve regulation, reimbursement, and long-term evaluation of medical products, with a focus on digital health. Dr. Silcox's portfolio includes multiple areas in digital health policy and real-world evidence, with a focus on medical devices. Currently, she is concentrating on challenges to regulating and adopting of artificial intelligence-enabled software as a medical device, using mHealth to collect real-world data, and characterizing real-world data quality and relevancy. Her projects have included the use of patient-generated health data in medical device evaluations, the exploration of value-based payments for medical devices, and the convening the National Evaluation System for health Technology (NEST) Planning Board. Before she joined Duke-Margolis, Dr. Silcox was a senior fellow at the National Center for Health Research, focused on federal regulation of and policies for medical products. She earned a M.S. from the Massachusetts Institute of Technology (MIT) in Electrical Engineering and a PhD in Medical Engineering and Medical Physics from the Harvard-MIT Division of Health Sciences and Technology (HST).

**Andrea Thoumi** is the Health Equity Policy Fellow at Duke-Margolis. In this capacity, she advances the Center's aim to enhance policy analysis, research, and education in health equity. Her research interests include mitigating structural and social determinants of health that create health inequities among Latine/x communities in the US and among women accessing reproductive health prevention, screening, and treatment globally. She is also an instructor on Bass Connections courses and a research collaborator with LATIN-19, RADx-UP, and Women-Inspired Strategies for Healthcare. She previously served as a Research Director for the Center's global health portfolio. She is a recipient of the 2020 Duke Presidential Award and AcademyHealth Disparities Interest Group Early-Stage Distinguished Investigator Award (2021). She is published in American Journal of Managed Care, Annals of Global Health, BMJ Global Health, Brookings Future Development, Health Affairs, Health Research Policy and Systems, Journal of Oncology Practice, and Vaccine. Prior to joining Duke-Margolis, she was a Research Associate at the Brookings Institution and Senior Analyst at PwC. She has consulted for the Institute for Healthcare Improvement, Pan American Health Organization/World Health Organization, and the World Bank. She holds a MSc in Health Policy, Planning, and Financing from the London School of Economics and London School of Hygiene and Tropical Medicine, a Master in Public Policy from the McCourt School of Public Policy, Georgetown University, and a BA in Community Health and International Relations from Tufts University.