National Heart, Lung, and Blood Institute

Virtual Workshop

Digital Twins in Heart, Lung, Blood, and Sleep Research

September 25-26, 2025

Program Book

NIH National Heart, Lung, and Blood Institute

National Heart, Lung, and Blood Institute (NHLBI) Virtual Workshop: Digital Twins in Heart, Lung, Blood, and Sleep Research Program Book

September 25–26, 2025

Scientific Co-Chairs: Dr. Colleen E. Clancy, University of California, Davis, and Dr. Bennett Landman, Vanderbilt University

NHLBI Co-Chairs: Dr. Julia Berzhanskaya and Dr. Keyvan Farahani, NHLBI

Workshop Objectives: To bring the multidisciplinary community of digital twin (DT) researchers together, explore state-of-the-art DT science across disciplines, and identify gaps and opportunities in the development and translation of heart, lung, blood, and sleep (HLBS) DT. The National Institutes of Health (NIH) is aligned with the National Academies of Sciences, Engineering, and Medicine's (NASEM) report "Foundational Research Gaps and Future Directions for Digital Twins" and its DT definition: "A DT is a set of virtual information constructs that mimics the structure, context, and behavior of a natural, engineered, or social system (or system-of-systems), is dynamically updated with data from its physical twin, has a predictive capability, and informs decisions that realize value. The bidirectional interaction between the virtual and the physical is central to the DT."

Overview: The workshop is organized into six sessions (aligned with NASEM report components) with several expert speakers each, plus an industry/translation panel (Day 1) and an integrative session (Day 2). Each session corresponds to a key aspect of biomedical DT: **physical**, **virtual**, **bidirectional interaction and data flows**, **data integration and infrastructure for DT**, **personalization**, and **human-in-the-loop.** NHLBI will strive to maintain balance across HLBS domains in each session or throughout the workshop. Each session will include several 10-minute speaker presentations followed by a 20-minute panel discussion at the end. To ensure that all themes are addressed, speakers will primarily cover the subtopic most closely aligned with their expertise while also touching on related key concepts and the session theme to facilitate a cohesive discussion. Interactive sessions on Day 2 will integrate key DT gaps and opportunities within each HLBS-specific use case.

NIH Organizing Committee:
Julia Berzhanskaya, PhD, Co-Chair
Keyvan Farahani, PhD, Co-Chair
Larry Baizer, PhD
Ravi Balijepalli, PhD
Zorina Galis, PhD
Nidhi Gera, PhD
Chris Miller, MD
Hiromi Ono, PhD
Pankaj Qasba, PhD
Siddharth Shenoy, PhD

Agenda

Day 1—September 25, 2025

10:00 a.m.–10:15 a.m. **Introduction by NHLBI and Co-Chairs**

10:15 a.m.–10:30 a.m. **Digital Twins: Finding the Balance Between Hype and Hope**
Robert Califf, MD, Duke University School of Medicine

10:30 a.m.–11:00 a.m. **Plenary Day 1: *Digital Twin for the Win: Molecules to Medicine***
Colleen E. Clancy, PhD, University of California, Davis

11:00 a.m.–11:15 a.m. **Break**

11:15 a.m.–12:15 p.m. **Session 1. Digital Twin—Virtual Component (Modeling and Simulation)**

Moderator: Pankaj Qasba, PhD, NHLBI

This session is about **virtual twins**, the suite of computational models and simulations that represent the patient's biology (and dynamically interact with it). In addition to highlighting state-of-the-art DT in each speaker's area of expertise, it will explore mechanistic modeling (first-principles modeling of organs and systems), data-driven modeling (AI/ML approaches), and hybrid combinations (e.g., physics-informed neural networks (PINN)) as well as efficiency strategies such as model order reduction and parameter estimation techniques. A series of short talks will be followed by a panel discussion.

11:20 a.m.–11:30 a.m. **Digital Twins for Diagnosing and Managing Coronary Artery Disease**
Charles Taylor, PhD, University of Texas, Austin

11:30 a.m.–11:40 a.m. **Digital Twins as Decision Support Tools for Respiratory Diseases**
Reinhard Laubenbacher, PhD, University of Florida

11:40 a.m.–11:50 a.m. **Neural Operators as Foundation Models for Digital Twins**
George E. Karniadakis, PhD, Brown University

11:50 a.m.–12:00 p.m. **Bidirectional Nature of Digital Twins and the NASEM Report**
Grace C.Y. Peng, PhD, NIH/National Institute of Biomedical Imaging and Bioengineering (NIBIB)

12:00 p.m.–12:15 p.m. Discussion

12:15 p.m.–1:00 p.m. **Lunch Break/Networking**

1:00 p.m.–2:00 p.m.	**Session 2. Interactions Between Physical and Virtual Components of Digital Twins**
	Moderator: Julia Berzhanskaya, PhD, NHLBI
	This session examines the dynamic interplay and data flows **between the physical system** (e.g., patient, medical device, tissue chip) **and its virtual twin**. It will cover topics like data integration, assimilation, closed-loop control, feedback systems, modular interactive model design for effective bidirectional coupling, and maintaining synchronization between the virtual and physical (e.g., twin and patient).
1:05 p.m.–1:15 p.m.	**Practical Informatics for Digital Twins: Privacy, Cost, and Cohort Discovery** Bennett Landman, PhD, Vanderbilt University
1:15 p.m.–1:25 p.m.	**Constructing a Digital Twin of the Lung by Combining Forward and Inverse Modeling** Jason H. T. Bates, PhD, University of Vermont
1:25 p.m.–1:35 p.m.	**Bringing Shape to Biomedical Digital Twins, or How the Intersection of Computational Topology, Statistics, and Machine Learning can Improve Our Understanding of Digital Twin Functionality** Yulia Gel, PhD, Virginia Tech
1:35 p.m.–1:45 p.m.	**Modeling EM-Neuro Interactions for Device Design, Treatment Personalization, and Model-Predictive Control: Application to Heart Rhythm Regulation, Locomotion Restoration, and Sleep Modulation** Esra Neufeld, PhD, Foundation for Research on Information Technologies in Society (IT'IS)
1:45 p.m.–2:00 p.m.	Discussion
2:00 p.m.–2:15 p.m.	**Break**
2:15 p.m.–3:15 p.m.	**Session 3. Digital Twin—Physical Component**
	Moderator: Siddharth Shenoy, PhD, NHLBI
	This session focuses on the **physical counterpart of DTs—**the real-world system and how we capture its state through sensors and devices with the emphasis on fit-for-purpose examples of HLBS conditions. Speakers in this session will cover a range of data modalities and HLBS topics.
2:20 p.m.–2:30 p.m.	**The Roles of Microphysiological Systems for Digital Twins** Wilbur A. Lam, MD, PhD, Emory University and Georgia Tech

2:30 p.m.–2:40 p.m.	**Title: TBD** Roozbeh Jafari, PhD, Texas A&M & MIT
2:40 p.m.–2:50 p.m.	**Digital Twins at the Edge of Precision and Personalized Population Health** Azizi Seixas, PhD, University of Miami
2:50 p.m.–3:15 p.m.	Discussion: Discussant: Jeff Durmer, MD, PhD, Absolute Rest LLC
3:15 p.m.–3:30 p.m.	**Break**
3:30 p.m.–4:30 p.m.	**Session 4. Industry and Translation**
	Moderator: Julia Berzhanskaya, PhD, NHLBI The goal of this session is to understand the current state of industrial-level DTs and explore gaps and opportunities to DT implementation and/or commercialization.
3:35 p.m.–3:45 p.m.	**Practical Considerations for Realizing Digital Twins: An Industry Perspective** Jeff Bodner, Medtronic
3:45 p.m.–3:55 p.m.	**Sleep and Circadian Digital Twins for Personalized Interventions, Drug Discovery, and Chronomedicine** Olivia Walch, PhD, Arcascope
3:55 p.m.–4:05 p.m.	**Digital Health and Product Development Ecosystems** Erika Tyburski, Sanguina
4:05 p.m.–4:15 p.m.	**From Traditional to Generative: The Evolution of the Digital Twin** Dan Isaacs, Digital Twin Consortium
4:15 p.m.–4:30 p.m.	Discussion: Discussants: Jeff Durmer, MD, PhD, Absolute Rest LLC and Charles Taylor, PhD, Heartflow
4:30 p.m.–5:30 p.m.	**Discussion: HLBS Digital Twins—Gaps and Opportunities**

Day 2—September 26, 2025

10:00 a.m.–10:30 a.m.	**Workshop Recap of Day 1 and Questions for Day 2**
10:30 a.m.–11:00 a.m.	**Plenary Day 2: *AI, Imaging, and Digital Twins: Anatomy of Hope*** Bennett Landman, PhD, Vanderbilt University
11:00 a.m.–12:00 p.m.	**Session 5. Data Ecosystems to Support Digital Twins**
	Moderator: Keyvan Farahani, PhD, NHLBI
	This session addresses the computational and data infrastructure required to implement biomedical DTs at scale. Robust data systems are critical as DTs integrate large volumes of heterogeneous data and complex models. Discussion will include platform architectures, databases, standards, knowledge graphs, and ontologies for managing DT data and simulations as well as high-performance computing and cloud resources, data interoperability, security/privacy of sensitive health data, and collaborative frameworks such as federated learning (for training models on distributed clinical data).
11:05 a.m.–11:15 a.m.	**AI and Simulation: From Training Surgical Robots to Driving Personalized Medicine** Stephen Aylward, PhD, NVIDIA
11:15 a.m.–11:25 a.m.	**SlicerHeart: A Foundation for Image-Derived Precision Cardiac Medicine** Matthew Jolley, MD, Children's Hospital of Philadelphia
11:25 a.m.–11:35 a.m.	**Human Reference Atlas: Methods, Data, and Code for Digital Twin R&D** Katy Börner, PhD, Indiana University Bloomington
11:35 a.m.–11:45 a.m.	**Data and Compute Resources in BioData Catalyst Available for the Digital Twins Projects** Ashok Krishnamurthy, PhD, Renaissance Computing Institute (RENCI)
11:45 a.m.–12:00 p.m.	Discussion
12:00 p.m.–12:45 p.m.	**Lunch Break/Networking**
12:45 p.m.–1:45 p.m.	**Integrative Session: Patrick Boyle, PhD, University of Washington** Reinhard Laubenbacher, PhD, University of Florida
	HLBS domain experts will lead discussions to encourage vertical integration of key NASEM loop areas within the same discipline/use case.
1:45 p.m.–2:00 p.m.	**Break**

2:00 p.m.–3:00 p.m.	**Session 6. Personalization and Predictive Analytics**
	Moderator: Nidhi Gera, PhD, NHLBI
	This session focuses on tailoring DTs to individual patients, moving from systems to individuals for precision medicine, building virtual patient populations (to represent variability across a population), and using those to stratify risk and design personalized therapies as well as clinical decision support.
2:05 p.m.–2:15 p.m.	**Digital Twins from the Atom to the Rhythm** Colleen E. Clancy, PhD, University of California, Davis
2:15 p.m.–2:25 p.m.	**A Digital Hemodynamic Twin to Diagnose Right Ventricular Dysfunction** Nicholas Houstis, MD, PhD, Massachusetts General Hospital
2:25 p.m.–2:35 p.m.	**Individualized Digital Twins of Cardiac Hemodynamics Using Physics-Informed Neural Networks** Ahmed Alaa, PhD, University of California, Berkeley
2:35 p.m.–2:45 p.m.	**Multi-Physics Modeling for Pediatric Cardiac Surgery** Alison Marsden, PhD, Stanford University
2:45 p.m.–2:50 p.m.	**Sleep and Circadian Digital Twins for Personalized Interventions, Drug Discovery, and Chronomedicine** Olivia Walch, PhD, Arcascope
2:50 p.m.–3:00 p.m.	Discussion
3:00 p.m.–3:15 p.m.	**Break**
3:15 p.m.–4:15 p.m.	**Session 7. Human in the Decision Loop**
	Moderator: Larry Baizer, PhD, NHLBI
	This session addresses the human elements and governance of deploying DTs in health care. Topics include how to validate and verify twin models (both technical validation against data and clinical validation in trials), how to quantify uncertainty and convey it to users, and how to ensure transparency/explainability of twin predictions and earn clinician buy-in.
3:20 p.m.–3:30 p.m.	**Synthetic Cardiac Ultrasound Imaging for Early Cardiovascular Disease Detection** Partho P. Sengupta, MD, Rutgers University
3:30 p.m.–3:40 p.m.	**Humans in the Loop** Ida Sim, MD, PhD, University of California, San Francisco

3:40 p.m.–3:50 p.m.	**Developing and Using Vascular Digital Twins** Amanda Randles, PhD, Duke University
3:50 p.m.–4:00 p.m.	**Generative Health Science with Large Models** James Evans, PhD, The University of Chicago
4:00 p.m.–4:15 p.m.	Discussion
4:15 p.m.–5:00 p.m.	**Discussion: Digital Twins Gaps and Opportunities**

Speaker Biographies

Colleen E. Clancy, PhD, University of California, Davis (Co-Chair)

Colleen E. Clancy serves as the director of the Center for Precision Medicine and Data Sciences at UC Davis School of Medicine and Associate Dean for Faculty Development and is a professor in the Departments of Physiology and Membrane Biology and Pharmacology. She is the inaugural editor in chief of the *Journal of Precision Medicine: Health and Disease*. She has authored more than 100 published works and serves on the editorial board of *The Journal of General Physiology*. Dr. Clancy has also been an associate editor for *the Journal of the American College of Cardiology: Clinical Electrophysiology* and has served on the advisory board of the National Biomedical Computation Resource, as a member of the NIH Multiscale Modeling Consortium, and on the Heart Rhythm Society Fellowship Subcommittee. Additionally, she regularly participates in peer review for numerous national and international funding agencies and scientific journals. She leads a multidisciplinary team of junior and senior investigators focused on computational modeling and simulation of complex biomedical problems.

Bennett Landman, PhD, Vanderbilt University (Co-Chair)

Bennett Landman, PhD, is the Stevenson Chair of Engineering and a professor of electrical and computer engineering at Vanderbilt University, with appointments in computer science, biomedical engineering, radiology and radiological sciences, psychiatry and behavioral sciences, biomedical informatics, and neurology. He graduated with a bachelor of science ('01) and master of engineering ('02) in electrical engineering and computer science from the Massachusetts Institute of Technology (MIT), Cambridge, Massachusetts. After graduation, he worked in an image processing startup company and a private medical imaging research firm before returning for a doctorate in biomedical engineering ('08) from Johns Hopkins University School of Medicine, Baltimore, Maryland. From 2010 to 2021, Landman served in the Electrical Engineering and Computer Science Department, Vanderbilt University, Nashville, Tennessee. In July 2021, he joined and became the first chair of the newly formed Electrical and Computer Engineering Department. He is a fellow at the Society of Photo-Optical Instrumentation Engineers (SPIE), Institute of Electrical and Electronics Engineers (IEEE), and American Institute for Medical and Biological Engineering (AIMBE). His research concentrates on applying image-processing technologies to leverage large-scale imaging studies to improve understanding of individual anatomy and personalized medicine. He currently serves as director of the Vanderbilt Lab for Immersive AI Translation.

Dr. Landman has received grant funding from NIH, the National Science Foundation, the Department of Defense (DoD), and industry support. He is highly collaborative with 340+ co-authors across disciplines, career stages, and institutions, resulting in 450+ peer-reviewed publications and 24,000+ citations. He served on the Medical Image Computing and Computer-Assisted Intervention Society (MICCAI) Challenge Working Group, as co-chair of the SPIE Medical Imaging Image Processing conference (2017–2021), as co-chair of the SIIM Machine Learning Tools Committee (2018–2021), and on the editorial boards of the *IEEE Transactions of Medical Imaging*

(2015–present) and *SIIM Journal of Digital Imaging*. He has organized 11 workshops and challenges at MICCAI since 2011 and has supported challenges with SPIE, the International Symposium on Biomedical Imaging, the International Society for Magnetic Resonance in Medicine, and Kaggle. He serves as satellite chair of MICCAI 2023 and co-general chair of MIDL 2023. He served as founding director of the Center for Computational Imaging at the Vanderbilt University Institute of Image Science and as chair of the faculty advisory board of the Vanderbilt University Advanced Computing Center for Research and Education. He is currently the principal scientist of ImageVU, Vanderbilt's clinical data reuse initiative in radiology.

Ahmed Alaa, PhD, University of California, Berkeley

Ahmed Alaa is an assistant professor of computational precision health, electrical engineering, computer science, and statistics at UC Berkeley and UCSF. He is also a member of the Berkeley AI Research Lab and the Bakar Computational Health Sciences Institute. His research interests cover the areas of machine learning and statistics, healthcare informatics, causal inference, and clinical proteomics. Previously, he was a postdoctoral scholar at the MIT Computer Science & Artificial Intelligence Laboratory, the Broad Institute of MIT and Harvard, and Cambridge University (UK). He received various awards including the Edward K. Rice Outstanding Doctoral Student award at UCLA, the Marcus Program Award in precision medicine, a Hellman Society fellowship, and an AFMR award from Microsoft Research.

Stephen Aylward, PhD, NVIDIA

Stephen Aylward is the Global Lead for Strategic Applied Research in Health Care and Life Sciences at NVIDIA. His research focuses on AI-driven, real-time DT of patients to advance medical device design, intervention planning, and outcome prediction. With over 25 years of leadership in medical imaging and AI, he has led NIH-, DARPA-, and DoD-funded projects and helped establish widely used open-source platforms including ITK, 3D Slicer, VolView, and MONAI. Dr. Aylward is a MICCAI Fellow, an adjunct professor of computer science at University of North Carolina (UNC) at Chapel Hill, and chair of the MONAI Advisory Board. He also serves on advisory boards at Vanderbilt, Johns Hopkins University, and Medtronic. He has authored more than 200 publications with over 17,000 citations. Before joining NVIDIA, Dr. Aylward was Senior Director of Strategic Initiatives at Kitware, where he also founded the company's North Carolina office. Earlier in his career, he was a tenured associate professor of radiology at UNC.

Jason Bates, PhD, University of Vermont

Jason Bates is a respiratory biomedical engineer and physiologist working predominately in the field of lung mechanics with a focus on the biophysical mechanisms of airways responsiveness and the pathophysiology of ventilator-induced lung injury. Dr. Bates spent the earlier part of his career until 1999 in the Meakins-Christie Laboratories of McGill University. He is currently a Professor of Medicine, Molecular Physiology & Biophysics, and Electrical & Biomedical Engineering at the University of Vermont. From 2010–2014 he also served as interim director of the University of Vermont School of Engineering. Dr. Bates has co-authored more than 360 peer-reviewed scientific papers as well as numerous other articles. In 2009 he authored a book published by Cambridge University Press titled *Lung Mechanics. An Inverse Modeling Approach*. He has just published another book with Dr. Bela Suki titled *Mathematical Modeling of the Healthy and Diseased Lung*, Springer 2025. Dr. Bates is a Fellow of the American Institute for Medical & Biological Engineering, a Fellow of the Biomedical Engineering Society, a Fellow of the American Thoracic Society, and a senior member of the Institute of Electrical & Electronic Engineers.

Jeff Bodner, Medtronic

Jeff Bodner is a Distinguished Scientist and Technical Fellow at Medtronic in Minneapolis, working within the newly formed DT team in the Medtronic AI Center of Excellence. Jeff is recognized for his expertise in using computational modeling for medical device design, including novel applications like in silico clinical trials. During his 27 years in the medical device design field, he has contributed to the development of numerous devices, such as neurostimulation devices, implantable drug delivery pumps, and cardiac rhythm management devices. Jeff is an active member of the ASME Verification and Validation and Uncertainty Quantification standards community, having served previously on the ASME V&V40 subcommittee and currently on the V&V10 subcommittee. Prior to Medtronic, he held positions at Boston Scientific, Guidant, and BAE Systems.

Jeff has a bachelor's and master's degree in mechanical engineering from Case Western Reserve University and a master's degree in biomedical engineering from the University of Minnesota Twin Cities. He is an inventor on approximately 30 U.S. patents related to medical device design.

Katy Börner, PhD, Indiana University Bloomington

Katy Börner is the Victor H. Yngve Distinguished Professor of Engineering and Information Science in the Departments of Intelligent Systems Engineering and Information and Library Science at the Luddy School of Informatics, Computing, and Engineering; core faculty of the Cognitive Science Program; and founding director of the Cyberinfrastructure for Network Science Center (http://cns.iu.edu)—all at Indiana University Bloomington. She is a curator of the Mapping Science exhibit (http://scimaps.org), and she leads the international Human Reference

Atlas effort (https://humanatlas.io). She holds an MS in electrical engineering from the University of Technology in Leipzig, and a PhD in computer science from the University of Kaiserslautern-Landau. Börner is a Fellow of the American Association for the Advancement of Science (AAAS), a Humboldt Research Fellow, an Association for Computing Machinery (ACM) Fellow, a Network Society Fellow, and a Stiftung Charité Awardee & Visiting Fellow.

Patrick M. Boyle, PhD, University of Washington

Patrick M. Boyle, PhD, PEng, Fellow of the Heart Rhythm Society, Fellow of the American Heart Association, is an associate professor of bioengineering at the University of Washington and an internationally recognized leader in cardiovascular computational modeling. His lab develops and deploys AI- and simulation-based technologies to solve clinically relevant problems in cardiac electrophysiology, including the use of explainable machine learning and cautiously evolving applications of DT to support precision care for arrhythmia patients. Supported by NIH, the American Heart Association, Additional Ventures, and other foundations, Dr. Boyle's translational research program bridges engineering innovation and clinical impact. His work has appeared in *Nature Biomedical Engineering*, *Science Advances*, *eLife*, *Heart Rhythm*, *JACC: Clinical Electrophysiology*, *Circulation: Arrhythmia and Electrophysiology*, and *EP Europace*.

Robert Califf, MD, Duke University School of Medicine

Robert M. Califf, MD, MACC, is a distinguished physician, researcher, and leader in clinical and regulatory science. He twice served as Commissioner of Food and Drugs for the Food and Drug Administration (FDA; 2016–2017, 2022–2025) and is currently an Instructor in Medicine at Duke University. Between his FDA appointments, he led medical policy and strategy at Verily and Google Health. A nationally recognized expert in cardiovascular medicine and clinical research, Dr. Califf was a long-time professor and vice chancellor at Duke, where he founded the Duke Clinical Research Institute. He is a member of the National Academy of Medicine and has published over 1,200 peer-reviewed articles.

Jeffrey Durmer, MD, PhD, Limbico Health

Jeffrey Durmer is a systems neuroscientist, neurologist, and sleep medicine physician with expertise across multiple applications of telehealth delivery in high-performance and healthcare populations. He earned his MD and PhD degrees in systems neuroscience from the University of Pennsylvania studying the neurophysiology of subcortical visual systems.

Dr. Durmer was the founding chief medical officer of Nox Health, a U.S.-based telemedicine sleep healthcare and technology firm. In that role, he created and applied platform-based population sleep health clinical programs across many different industries, including aerospace, transportation, manufacturing, elite and professional athletics, and health care. He led medical and behavioral sleep healthcare teams and clinical and health claims outcomes research teams and was the clinical innovation leader for sleep-healthcare programs designed for large, self-insured companies and international clinical research projects.

Prior to Nox Health, he co-founded FusionHealth, the first population sleep health platform company in the U.S., and FusionSleep, an Atlanta-based American Academy of Sleep Medicine-accredited multi-disciplinary sleep medicine program that continues to serve tens of thousands of children and adults with sleep and circadian disorders. He is the former director of the Emory University Sleep Laboratory and Pediatric Sleep Medicine Program, where he trained graduate students, medical students, residents, and fellows.

Dr. Durmer is a co-investigator for the NIH-funded Sleep SMART research trial, together with the University of Michigan and the NIH StrokeNet consortium. Dr. Durmer is a member of the NIH Sleep Disorders Research Advisory Board and provides scientific and clinical guidance for multiple sleep-related organizations involved in the healthcare technology, pharmaceutical, and clinical science/practice arenas.

He has published multiple medical textbook chapters, original research papers, and abstracts. Currently, he serves as the Chair of the Board of Directors for the Restless Leg Syndrome Foundation, is the appointed sleep medicine advisor to the Federal Aviation Administration, and is the past chair of the American Academy of Sleep Medicine Foundation Development Council as well as a reviewer for multiple medical journals and the Patient-Centered Outcomes Research Institute. He served as the Sleep Performance Director for the United States Olympic Weightlifting team, as well as multiple sports organizations including the National Football League's Atlanta Falcons.

James Allen Evans, PhD, The University of Chicago

James Evans is the Max Palevsky Professor of Sociology, director of the Knowledge Lab, and founding faculty co-director of the Chicago Center Computational Social Science at the University of Chicago. He's also worked with the Santa Fe Institute and Google. Evans' research uses large-scale data, machine learning, and generative models to understand how collectives of humans and machines think and what they (can) know. This involves inquiry into the emergence of ideas, shared patterns of reasoning, and processes of attention, communication, agreement, and certainty. Thinking and knowing collectives like science, the Web, and civilization as a whole involve complex networks of diverse human and machine intelligences collaborating and competing to achieve overlapping aims. Evans' work connects the interaction of these agents with the knowledge they produce and its value for themselves and the system. His work is supported by numerous federal agencies (National Science Foundation [NSF], NIH, and DoD), foundations. and philanthropies and has been published in *Nature*, *Science*, *Proceedings of the National Academy of Sciences of the United States of America* (*PNAS*), and top social and computer science outlets and has been covered by global news outlets from *the Economist*, *the Atlantic*, and *the New York Times* to *Le Monde*, *El Pais*, and *Die Zeit*.

Yulia Gel, PhD, Virginia Tech

Yulia Gel is a professor in the Department of Statistics at Virginia Tech. Her research interests focus on mathematical and statistical foundations of data science, topological and geometric methods in artificial intelligence and machine learning, risk analytics, and knowledge graph learning, with applications to assessing resilience of complex systems, biomedical DT, and early warning mechanisms. She holds a PhD in mathematics, followed by a postdoctoral position in statistics at the University of Washington. Prior to joining Virginia Tech, she was a tenured faculty member at the University of Waterloo, Canada, and University of Texas at Dallas. She also held visiting positions at Johns Hopkins University; University of California, Berkeley; and the Isaac Newton Institute for Mathematical Sciences, Cambridge University, UK. In her recent stint (2021–2025) as program director for NSF's Division of Mathematical Sciences and directorate for Technology, Innovation and Partnerships, she has served as a cognizant officer for various inter-agency interdisciplinary research programs at the interface of mathematical sciences and artificial intelligence, including the NSF–FDA–NIH Foundations for Digital Twins as Catalyzers of Biomedical Technological Innovation and the NSF–NIH Smart Health and Biomedical Research in the Era of Artificial Intelligence and Advanced Data Science. She has authored more than 150 publications in top statistical, data mining, and machine learning venues such as NeurIPS, International Conference on Machine Learning (ICML), International Conference on Learning Representations, Association for the Advancement of Artificial Intelligence, Knowledge Discovery in Databases, International Joint Conference on Artificial Intelligence, and PNAS and served as senior area chair for ICML and NeurIPS. She is a Fellow of the American Statistical Association (ASA), recipient of the NSF2023 Director's Award, and has multiple Best Paper Awards from the ASA Section on Statistics for Defense and National Security.

Nicholas E. Houstis, MD, PhD, Massachusetts General Hospital

Nicholas Houstis is a practicing cardiologist and scientist at Massachusetts General Hospital. Trained first as a computer scientist and then as a computational biologist, he now leads efforts to use informatics to diagnose cardiovascular disease from hemodynamic and electrocardiographic signals. Cardiologists currently analyze these analog waveforms almost completely unaided, but new algorithms are poised to change that, with the potential to unlock systematic quantitative diagnostic tools for all. Dr. Houstis' lab frames a subset of these applications as DT problems and is working towards solutions that are deemed trustworthy and that are practical enough to augment existing clinical workflows.

Dan Isaacs, Digital Twin Consortium

Dan Isaacs is General Manager Chief Technology Officer of Digital Twin Consortium® (DTC), where he is responsible for setting the technical direction for the Member Consortium, liaison partnerships, and business development support for new memberships. Dan is also the chief strategy officer for the Object Management Group® (OMG), where he develops and implements a comprehensive strategy to unify OMG consortia (Augmented Reality Enterprise Alliance, Consortium for Information & Software Quality, DTC, OMG Standards Development Organization, and Responsible Computing).

Previously, Dan was Director of Strategic Marketing and Business Development at Xilinx, where he was responsible for emerging technologies, including AI/machine learning, and defining and executing the ecosystem strategy for the industrial IoT. Prior to joining DTC, Dan was responsible for automotive business development focused on automated driving and advanced driver-assistance system.

Dan represented Xilinx to the Industrial Internet Consortium (IIC). He has more than 25 years of experience working in automotive, military aerospace, and consumer-based companies, including Ford, NEC, LSI Logic, and Hughes Aircraft.

An accomplished speaker, Dan has delivered keynotes and presentations and served as panelist and moderator for IIC World Forums, Industrial IOT Global conferences, Embedded World, Embedded Systems, and FPGA Conferences. He is a member of international advisory boards and holds degrees in Computer Engineering: EE from Cal State University, B.S. Geophysics from ASU.

Roozbeh Jafari, PhD, Texas A&M & MIT

Roozbeh Jafari is a principal staff member in the Biotechnology and Human Systems Division at MIT Lincoln Laboratory with a joint research appointment on MIT campus. He is also an adjunct professor in electrical and computer engineering in the School of Engineering Medicine at Texas A&M University. Dr. Jafari's goal is to establish impactful and highly collaborative programs to promote the health and wellness of interest to our national security and our communities. His aspiration is to serve as a catalyst between the Lincoln Laboratory, MIT campus, and other academic entities across the nation for such programs. He joined MIT from Texas A&M, where he was the Tim and Amy Leach Professor in Electrical and Computer Engineering in the School of Engineering Medicine.

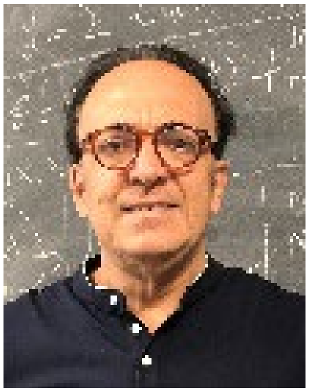
Jafari received his PhD in computer science from the University of California, Los Angeles, and completed a postdoctoral fellowship at the University of California, Berkeley. His research interests lie in the areas of wearable computer design, sensors, systems, and AI for digital health paradigms and, most recently, DT for precision health. He has raised more than $89 million for research with $25 million directed toward his lab. His research has been funded by NSF, NIH, DoD (Telemedicine and Advanced Technology Research Center), Defense Threat Reduction Agency , Defense Innovation Unit, Air Force Research Laboratory, Air Force Office of Scientific Research, Defense Advanced Research Projects Agency (DARPA), SRC Inc., and industry companies such as Texas

Instruments, Tektronix, Samsung, and Telecom Italia. He has published more than 200 papers in refereed journals and conferences. He has served as the general chair and technical program committee chair for several flagship conferences in the area of wearable computers. Jafari is the recipient of the National Science Foundation CAREER Award (2012), the IEEE Real-Time & Embedded Technology & Applications Symposium Best Paper Award (2011), the Andrew P. Sage Best Transactions Paper Award (2014), the ACM Transactions on Embedded Computing Systems Best Paper Award (2019), the William O. and Montine P. Head Memorial Research Award for Outstanding Engineering Contribution from the College of Engineering at Texas A&M University (2019), the Dean of Engineering Excellence Award at Texas of A&M University (2021), and the TEES Research Impact Award at Texas A&M University (2021). He has also been named the Texas A&M Presidential Fellow (2019).

Dr. Jafari serves on the editorial board for *Nature Digital Medicine*, the *IEEE Transactions on Biomedical Circuits and Systems*, the *IEEE Sensors Journal*, *IEEE Internet of Things Journal*, *IEEE Journal of Biomedical and Health Informatics*, *IEEE Open Journal of Engineering in Medicine and Biology*, and *ACM Transactions on Computing for Healthcare*. He is the past chair of the IEEE Wearable Biomedical Sensors and Systems Technical Committee as well as the IEEE Applied Signal Processing Technical Committee (elected). He serves on scientific panels for funding agencies frequently, has served as a standing member of the NIH Biomedical Computing and Health Informatics study section (2017–2021), and was the inaugural chair of the NIH Clinical Informatics and Digital Health study section (2020–2022). He is a fellow of AIMBE and IEEE.

Matthew Jolley, MD, Children's Hospital of Philadelphia

Matthew Jolley is an associate professor at the University of Pennsylvania and an attending pediatric cardiac anesthesiologist, pediatric cardiologist, and the Topolewski Endowed Chair in Pediatric Cardiology at the Children's Hospital of Philadelphia (CHOP). He did his undergraduate training at Stanford followed by medical training at the University of Washington. Following medical school, he completed training in pediatrics in the Boston Combined Residency Program, followed by anesthesia at Stanford, then returned to Boston Children's Hospital to complete his training in pediatric cardiology and pediatric cardiac anesthesia. He has been an attending at CHOP since 2015, where he is now a member of the Valve Imaging Team within the Pediatric Valve Center and the director of a growing research laboratory focused on the 3D image derived modeling of hearts and valves to inform interventional planning. He is also co-director of the Clinical 3D Cardiac Modeling Program at CHOP.



George Karniadakis, PhD, Brown University

George Karniadakis is a member of the National Academy of Engineering and the American Academy of Arts and Sciences. He received his SM and PhD from MIT (1984–1987) and did his postdoctorate at Stanford University. He is an AAAS Fellow (2018–present), Fellow of the Society for Industrial and Applied Mathematics (SIAM; 2010–present), Fellow of the American Physical Society (APS; 2004–present), Fellow of ASME (2003–present) and Associate Fellow of the American Institute of Aeronautics and Astronautics (2006–present). He received the SIAM/ACM Prize on Computational Science & Engineering (2021), the Alexander von Humboldt Award (2017), the SIAM Ralf E Kleinman Award (2015), the J. Tinsley Oden Medal (2013), and the CFD Award (2007) by the U.S. Association in Computational Mechanics. His h-index is 153 and he has been cited over 140,000 times.

Ashok Krishnamurthy, PhD, RENCI

Ashok Krishnamurthy is the director of RENCI and a research professor of computer science at UNC-Chapel Hill. He is also the co-director of the Informatics and Data Science Team at North Carolina Translational and Clinical Sciences Institute. Dr. Krishnamurthy has many years of experience with informatics and data science including data science cyberinfrastructure, medical image analysis, time-series data analysis, machine learning, and high-performance computing.

He has over 15 years or experience as both a researcher and an administrator in advancing cutting-edge research in interdisciplinary teams. Krishnamurthy collaborates with researchers in informatics, biomedical and health research, and social sciences to develop projects and programs that leverage the power of data science and scalable computing to solve challenging problems that advance the state of the art. He advises undergraduate and graduate students and mentors post-doctoral scholars and junior investigators. He is also involved in managing and enhancing research partnerships with faculty at UNC-Chapel Hill, Duke University, and North Carolina State University, along with building relationships between RENCI and Triangle area businesses.

Ashok's research over the years has been funded by NSF, NIH, DoD, DARPA, and the Department of Energy (DOE). Prior to joining RENCI and UNC in 2013, Krishnamurthy was for many years at the Ohio Supercomputer Center (OSC) and a faculty member at The Ohio State University. While at OSC, Krishnamurthy played a crucial role in establishing OSC's successful industrial outreach initiative called Blue Collar Computing. He also helped develop and deploy cyberinfrastructure that allows researchers to easily access and use computing and storage resources at OSC. Krishnamurthy holds PhD and master's degrees in electrical and computer engineering from the University of Florida and a bachelor's degree in electrical engineering from the Indian Institute of Technology.

Wilbur Lam, MD, PhD, Emory University and Georgia Institute of Technology

Wilbur Lam, MD, PhD, is a professor and W. Paul Bowers Research Chair in the Department of Pediatrics and the Wallace H. Coulter Department of Biomedical Engineering at Emory University and the Georgia Institute of Technology. Dr. Lam serves as associate dean of innovation for Emory University School of Medicine and as chief innovation officer for the Children's Healthcare of Atlanta Pediatric Technology Center. He is also the inaugural vice provost for entrepreneurship for Emory University.

Dr. Lam is a member of the Discovery and Developmental Therapeutics Research Program at the Winship Cancer Institute. He is a member of the National Academy of Medicine, a fellow of the American Institute for Medical and Biological Engineering, and an inductee of the American Society for Clinical Investigation.

Reinhard Laubenbacher, PhD, University of Florida

Reinhard Laubenbacher joined the University of Florida (UF) in 2020 as a professor in the Department of Medicine, Division of Pulmonary, Critical Care, and Sleep Medicine, where he established the Laboratory for Systems Medicine. Prior to joining UF, he served as director of the Center for Quantitative Medicine and Professor in the Department of Cell Biology at the University of Connecticut School of Medicine, with a joint appointment at the Jackson Laboratory for Genomic Medicine. He is a fellow of AAAS, the Society for Mathematical Biology, and the American Mathematical Society. He is president of the Society for Mathematical Biology, having previously served as editor-in-chief of the *Bulletin of Mathematical Biology*, its flagship journal. Dr. Laubenbacher is a mathematician by training, and his broad research interests lie in computational and mathematical systems biology with applications to human health. Most of his research is in collaboration with a broad spectrum of scientists and clinicians. An important focus of his work in recent years has been on the development and applications of medical DT technology.

Alison Marsden, PhD, Stanford University

Alison Marsden is the Douglass M. and Nola Leishman Professor of Cardiovascular Disease in the Departments of Pediatrics, Bioengineering, and, by courtesy, Mechanical Engineering at Stanford University. She is a member of the Institute for Mathematical and Computational Engineering. From 2007 to 2015 she was a faculty member in the Mechanical and Aerospace Engineering Department at the University of California San Diego. She graduated with a BSE degree in mechanical engineering from Princeton University in 1998 and a PhD in mechanical engineering from Stanford in 2005. She was a postdoctoral fellow at Stanford University in bioengineering from 2005 to 2007. She was the recipient of a Burroughs Wellcome Fund Career Award at the Scientific Interface in 2007 and an NSF CAREER Award in 2011. She was elected as fellow of AIMBE and SIAM in 2018, the APS Division of Fluid

Dynamics in 2020, the Biomedical Engineering Society in 2021, and ASME in 2025. She is the 2023 recipient of the Van C. Mow Medal from the ASME Bioengineering Division. She has published over 200 journal articles and holds leadership roles in several scientific societies. Her research focuses on the development of numerical methods for cardiovascular biomechanics and application of engineering methods to impact patient care in cardiovascular surgery and congenital heart disease.

Esra Neufeld, PhD, IT'IS

Esra Neufeld, PhD, is Associate Director and Head of Computational Life Sciences at the IT'IS Foundation in Zurich and lecturer at the Swiss Federal Institute of Technology. His group models interactions between electromagnetic, thermal, and ultrasound exposure and physiological/biological processes in complex anatomical environments towards elucidating interaction mechanisms, establishing safety guidelines, optimizing medical device safety and effectivity, developing novel therapies, and facilitating personalized precision medicine. They established and expanded the virtual population of high-resolution functionalized anatomical models that is widely employed (e.g., for *in silico* trials, implant safety assessments, and dosimetry). Applications advanced at IT'IS range from wireless communication safety to neuroprosthetics and electroceuticals, brain and nerve interfaces, cancer therapy, aneurysm rupture prediction, novel forms of focal brain stimulation and surgery, and MRI implant safety assessment. As a founding member of the SPARC Data and Resource Center, IT'IS develops o^2S^2PARC, an open, cloud-hosted, and online accessible platform for FAIR, collaborative, reproducible, and sustainable computational modeling and data analysis with particular strengths in computational neurosciences.

Dr. Neufeld is chief science officer at Zurich MedTech AG, where he is responsible for the development of medical treatment planning software, the multi-physics simulation platform Sim4Life, and medical image processing tools as well as R&D in high-performance computing and AI. He co-founded TI Solutions AG to develop high-quality and flexible neuro-stimulation devices and treatment planning tools for research on temporal interference brain stimulation—a non-invasive deep brain stimulation technique with particular strengths in state-aware closed-loop stimulation.

Dr. Neufeld contributes to several standardization committees and serves as a consultant to companies and government agencies on dosimetry, exposure safety, uncertainty assessment, verification and validation, numerical techniques, *in silico* clinical trials, and computational life sciences.

Grace C.Y. Peng, PhD, NIBIB

Grace C.Y. Peng, PhD, is the director of Mathematical Modeling, Simulation and Analysis at NIBIB within NIH in the U.S. Department of Health and Human Services. In this capacity, she has programmatic oversight of extramural activities in these areas.

Dr. Peng received a BS degree in electrical engineering from the University of Illinois Urbana-Champaign and MS and PhD degrees in biomedical engineering from Northwestern University. She performed postdoctoral and faculty research in the Department of Neurology at Johns Hopkins University. In 2000 she became the Clare Boothe Luce Professor of Biomedical Engineering at the Catholic University of America. Her research focused on developing computational models of the vestibular system in control of the head and neck and analytical tools for studying the oculomotor system in patients with vestibular dysfunction. Since 2002, Dr. Peng has been a program director in NIBIB, overseeing various programs promoting the development of mathematical and statistical modeling and analysis methods; medical simulation tools; and next generation engineering systems for rehabilitation, robotics, neuroengineering, and surgical systems. In 2003, Dr. Peng led the creation of the Interagency Modeling and Analysis Group (IMAG), which now consists of program officers from multiple federal agencies of the U.S. government. Since 2004, IMAG has supported funding initiatives targeted to multiscale modeling of biomedical, biological, and behavioral systems. Since 2006, IMAG has facilitated the activities of the Multiscale Modeling Consortium of investigators. Dr. Peng also has served in leadership roles in the NIH SPARC (2014–2016), BRAIN Initiative (since 2014), Bridge2AI Program (since 2020) and ComPASS Program (since 2022). Dr. Peng is committed to promoting the development and use of intelligent tools and reusable data and models to accelerate biomedical research and translate scientific knowledge to the clinic and community. In 2020, she was inducted into the AIMBE College of Fellows.

Amanda Randles, PhD, Duke University

Amanda Randles is the Alfred Winborne Mordecai and Victoria Stover Mordecai Associate Professor of Biomedical Sciences and Biomedical Engineering at Duke University, where she also serves as director of the Duke Center for Computational and Digital Health Innovation. She holds courtesy appointments in mechanical engineering and materials science, computer science, and mathematics and is a member of the Duke Cancer Institute. Her research focuses on the development of patient-specific DT models that integrate high-performance computing, machine learning, and multiscale biophysical simulations to enable proactive diagnosis and treatment of diseases ranging from cardiovascular disease to cancer. She has published 120 peer-reviewed papers, including in *Science*, *Nature Biomedical Engineering*, and *Nature Digital Medicine* and holds 121 granted U.S. patents with approximately 75 additional applications pending. Her contributions have been recognized with the ACM Prize in Computing, the NIH Pioneer Award, the NSF CAREER Award, the ACM Grace Hopper Award, the Jack Dongarra Early Career Award, and the inaugural Sony and Nature Women in Technology Award. She was named to the HPCwire People to Watch list in 2025, is a Fellow of the National Academy of Inventors, and has been honored as a World Economic Forum Young Scientist and one of MIT Technology Review's Top 35 Innovators Under 35. Randles received her PhD in applied physics from

Harvard University as a DOE Computational Science Graduate Fellow and NSF Fellow, an MS in computer science from Harvard, and a BA in computer science and physics from Duke University. Prior to graduate school, she worked as a software engineer at IBM on the Blue Gene supercomputing team.

Azizi A. Seixas, PhD, University of Miami

Azizi Seixas, Ph. is the interim inaugural chair of the Department of Informatics and Health Data Science, founding director of The Media and Innovation Lab (The MIL), associate director of the Center for Translational Sleep and Circadian Sciences, and Director of Population Health Informatics within the Institute for Data Science and Computing at the University of Miami Miller School of Medicine. Dr. Seixas is a nationally recognized scientist and technology leader. He was named Cell Press' Top 100 Most Inspiring Black Scientists in America, 2022 Amazon's Education Champion Award, 2023 M.I.A. Miami's Most Influential and Powerful Black Business Leader, 2024 M.I.A. South Florida's Black Educator of the Year, 2024 Academy of Science, Engineering and Medicine of Florida Rising Star Award, the winner of the Inaugural 2024 Tipping Point Award from Malcolm Gladwell and T-Mobile, 2025 South Florida Hispanic Chamber of Commerce's Health Tech Vanguard Award, and 2025 U.S. Presidential Early Career Award for Scientists and Engineers, the highest honor given to scientist at this stage of their career by the U.S. government.

Dr. Seixas has made significant contributions in education, research, clinical care, venture, and service. He pioneered several educational programs in AI, big data, digital technology, STEM education, and underrepresented groups and mentored over 50 junior scientists. Dr. Seixas has an extensive publication record with over 200 peer-reviewed and published papers and abstracts in the following areas: 1) exploring cardiovascular and brain health disparities among diverse communities with a focus on urban and rural settings, racial/ethnic groups, and sex differences; 2) investigating the impact of sleep, physical activity, diet, and stress on cardiovascular and brain health; 3) developing personalized behavior modification strategies using machine learning and AI to enhance healthcare through DTs; 4) developing novel decentralized clinical trial methodologies to increase research inclusivity, as highlighted in a recent *Science* manuscript; and 5) advancing early dementia screening and diagnosis through digital biomarkers and augmented reality. Dr. Seixas is the principal investigator for three large grants (two NIH and industry grants), holds key leadership roles in five NIH grants, and serves on several AI and technology advisories and boards, including the American Heart Association, American Academy of Sleep Medicine, Phillips, Microsoft, and the government of Jamaica. Dr. Seixas developed and pioneered several innovations: 1) The MIL Box, a remote health monitoring technology program and kit; 2) a 10-minute digital and augmented reality–based cognitive assessment (e.g., Altoida) to detect cognitive impairment and dementia; 3) the HARMONI Alliance and Real World Data platform, a global alliance dedicated to promoting healthy aging for all through innovation and technology; 4) digital health equity framework; and 5)a novel turn-key software to increase technology capacity for under-resourced communities in Florida via the NIH AIM AHEAD project.

Partho Sengupta, MD, Robert Wood Johnson Medical School, Rutgers University

Partho Sengupta, MD, MBBS, Fellow of the American College of Cardiology, is a tenured professor of medicine, chief of the Division of Cardiology at Rutgers Robert Wood Johnson Medical School, and chief of the Cardiovascular Service Line at Robert Wood Johnson University Hospital. He completed his residency and cardiology fellowship at the Mayo Clinic (Rochester and Arizona) in 2007 and 2010.

An internationally recognized leader in cardiac imaging, digital health, and artificial intelligence, Dr. Sengupta has authored more than 330 peer-reviewed publications (h-index: 72). His research focuses on advanced ultrasound imaging, AI-enabled diagnostics, robotics, and wearable technologies. He has directed multidisciplinary teams to pioneer mobile health and point-of-care ultrasound programs, including landmark ASE Foundation projects, such as ASE-REWARDS, ASE-VISION-in-Tele-Echo, and ASEF-VALUES, that advanced community outreach, digital platforms, and global learning in echocardiography.

Dr. Sengupta has also made milestone contributions to imaging informatics. He reported one of the earliest applications of machine learning in echocardiography (2013) and more recently led the development of the PRIME checklist, now adopted by the ACC and *JACC: Cardiovascular Imaging* as the standard framework for evaluating AI in cardiovascular imaging.

His achievements have been widely recognized. He was named among the Top 1% Healthcare Research All-Stars for 2025 by Avant-garde Health, received the 2024 AACIO Award for Outstanding Achievements in Cardiology, the 2023 NJBiz Healthcare Hero Award, and the 2023 ACC Gifted Educator Award. In 2025, he was appointed co-chair of the NIH Study Section for K Awards, reflecting his national leadership in physician–scientist training. He will also serve as abstract chair for the ASE Annual Scientific Sessions (2026–2027) and overall scientific session chair (2027–2028).

Through innovation centers at West Virginia University and Rutgers, supported by NSF, NHLBI, and industry grants, Dr. Sengupta has fostered breakthrough discoveries, patents, and industry collaborations. He has mentored more than 30 national and international research trainees, many of whom have achieved recognition as Young Investigator Award finalists.

Ida Sim, PhD, MD, University of California San Francisco

Ida Sim, MD, PhD, is professor of medicine (UCSF) and computational precision health (UCSF and UC Berkeley) and co-director of the UCSF UC Berkeley Joint Program in Computational Precision Health. She obtained her BSc in biology, her MD, and her PhD in medical informatics from Stanford. A practicing primary care physician, Dr. Sim completed her internal medicine internship and residency at the Massachusetts General Hospital and a fellowship in general medicine at the Palo Alto VA Medical Center.

Dr. Sim's research is on cyberinfrastructure and policies for large-scale health data sharing and AI for managing multiple chronic conditions in primary care. She is co-founder of Open mHealth, which defines the IEEE 1752 global open standard for patient-generated health data interoperability, and co-leads JupyterHealth, a new project bringing the Jupyter ecosystem to healthcare. She is also co-founder of Vivli, the world's largest platform for clinical trial data sharing. In prior work, Dr. Sim was the founding project coordinator of the World Health Organization's International Clinical Trials Registry Platform and led the establishment of the first global policy on clinical trial registration.

Dr. Sim is a member of the National Academy of Medicine and the American Society for Clinical Investigation, a Fellow of the American College of Medical Informatics, and a recipient of the U.S. Presidential Early Career Award for Scientists and Engineers.

Charles Taylor, PhD, University of Texas at Austin

Charles "Charley" Taylor, PhD, leads the Center for Computational Medicine jointly founded by Dell Medical School and the Oden Institute for Computational Engineering and Sciences. He is jointly appointed as the W. A. "Tex" Moncrief, Jr. Endowment in Simulation-Based Engineering and Sciences–Endowed Chair No. 7–Computational Medicine at the Oden Institute and as a professor in the Department of Internal Medicine at Dell Medical School.

Under Taylor's leadership, the center advances research in artificial intelligence, machine learning, and DT technology, supporting capabilities that are a key component of the world-class integrated academic medical center the University of Texas at Austin is building.

As part of his work, Taylor focuses on translating computational medicine research findings into real-world clinical approaches, working with industry partners to widely disseminate these solutions and maximize their impact. The center complements ongoing work in the Center for Computational Oncology and the Willerson Center for Cardiovascular Modeling and Simulation, further advancing collaborations between the Oden Institute and Dell Medical School.

Dr. Taylor is a founder and member of the Board of Directors of HeartFlow Inc. He was chief technology officer at HeartFlow from 2010 to 2021 and then chief scientific officer from 2021 to 2023. Dr. Taylor is also the chairman of Ebenbuild, GmBh. Prior to HeartFlow, he was an associate professor in the Departments of Bioengineering and Surgery at Stanford University with courtesy faculty appointments in the Departments of Mechanical Engineering, Radiology, and Pediatrics. He was also previously an adjunct professor of computational engineering and sciences at the University of Texas at Austin and a part-time professor of biomedical engineering at the Eindhoven University of Technology. He is internationally recognized for his pioneering work over the last 30 years in combining computer simulation methods with medical imaging data for patient-specific modeling of blood flow to aid in the diagnosis and treatment of cardiovascular disease. Charles has published over 425 peer-reviewed journal and conference papers and has more than 300 issued patents worldwide.

He received his BS degree in mechanical engineering, MS degree in mechanical engineering, and MS degree in mathematics from Rensselaer Polytechnic Institute and a PhD in mechanical engineering from Stanford University. Charles was elected to the American Institute for Medical and Biological Engineering in 2007 and the U.S. National Academy of Engineering in 2024.

Erika Tyburski, Sanguina

Erika Tyburski is the CEO and one of the founders of Sanguina, Inc. She has 13 years of experience, bridging translation between invention and deployment of in vitro diagnostic and smartphone application technologies for disease management, including research and development, clinical testing, FDA clearances, manufacturing, and commercialization, having raised over $12 million in funding since Sanguina's start. The company is revenue-generating with customers and strategics and poised to shift the paradigm for disease management and wellness. In addition to her work with Sanguina, Erika collaborates with ACME POCT as a regulatory lead for NIH-funded point-of-care and home in vitro diagnostics.

Olivia Walch, PhD, Arcascope

Olivia Walch is the CEO of Arcascope, a startup focused on rescuing failed drugs by unlocking the power of circadian timing. Her work leverages phones and wearables to monitor and optimize circadian rhythms in real-world settings, with the aim of reviving treatments that failed in trials not because they didn't work but because they were delivered at the wrong time. Her research has been featured in CNN, *The New York Times*, and *The Atlantic*. She is also the co-editor of the textbook *Political Geometry* from Birkhäuser and author of the pop science book *Sleep Groove*.

National Heart, Lung, and Blood Institute