University Science Strategy Committee

Scott Strobel, PhD (Chair)

Scott Strobel joined the Yale faculty in 1995 in the Department of Molecular Biophysics & Biochemistry (MB&B) where he served as department chair from 2006-09 and currently holds the Henry Ford II Professorship. Since 2011 he has served as vice president for West Campus planning & program development, and in July 2014 he took on additional responsibility as the inaugural deputy provost for teaching & learning. In this capacity, he will oversee the development of a comprehensive Yale Center for Teaching and Learning that will promote teaching excellence, foster improved student learning, and provide a clear pathway for teaching resources and support to Yale faculty, postdocs, graduate students, and undergraduate students. In 2006 and again in 2010, he was named a Howard Hughes Medical Institute (HHMI) Professor to promote efforts in undergraduate science education. With this award he instituted a program to explore microbial and chemical diversity in the world's rainforests as a means to inspire undergraduate students in the sciences. He was awarded the Dylan Hixon Prize for Teaching Excellence in the Natural Sciences in 2004 and the Graduate Mentoring Award in the Sciences in 2007. He received his B.A. from Brigham Young University and his Ph.D. from the California Institute of Technology. His current research explores the chemical basis of RNA function and catalysis and hydrocarbon production by endophytic fungi.

Daniel Alfonso Colón-Ramos, PhD

Daniel Colón-Ramos was born and raised in Puerto Rico. He completed his B.A. at Harvard University, his PhD in the lab of Dr. Sally Kornbluth at Duke University and was a postdoctoral fellow in the lab of Dr. Kang Shen at Stanford University. The Colón-Ramos lab is interested in how synapses are precisely assembled to build the neuronal architecture that underlies behavior. To address this, they developed tools in the thermotaxis circuit of *C. elegans*. Their system enables unbiased genetic screens to identify novel pathways that instruct synaptogenesis *in vivo*, and single-cell manipulation of these pathways to understand how they influence behavior. As mechanisms underlying synapse structure and function are conserved, the research program seeks to enhance our understanding of synaptic cell biology in higher organisms, which may be important for disease.

Alison Galvani, PhD

Professor Alison Galvani is director of the Center for Infectious Disease Modeling and Analysis (CIDMA) as well as the Burnett and Stender Families Professor of Epidemiology at Yale School of Public Health, with a secondary appointment at the Department of Ecology and Evolutionary Biology. Integrating optimization theory, cost-effectiveness and medical decision-making into epidemiological models, Galvani was the first modeler to take into account how human behavior simultaneously affects and is affected by disease transmission. Her analyses have promoted reform of myriad public health strategies. For example, national influenza vaccination policies were informed by Galvani's findings that prioritizing children—who are disproportionately responsible for transmission—would greatly reduce infections, hospitalizations, costs, years of life lost and deaths, both overall and for the elderly. Her research has also spurred policy change by the UK National Health Services to include rotavirus vaccination in the immunization schedule for infants, by the Costa Rican Ministry of Health to support Zika and

dengue response, as well as by the Liberian Ministry of Health during the recent Ebola outbreak to optimize intervention approaches.

Steven M. Girvin, PhD

Dr. Girvin joined the Yale faculty in 2001, where he is Eugene Higgins Professor of Physics and Professor of Applied Physics. In 2007 he was named Deputy Provost for Science and Technology and in 2015 became Deputy Provost for Research. In that role he helps oversee research and strategic planning in the basic sciences and engineering across the university. He also helps oversee entrepreneurship, innovation and tech transfer at Yale.

Throughout his career, Professor Girvin's research has focused on theoretical studies of quantum many-particle systems. Since coming to Yale, his interests have extended to atomic physics, quantum optics and quantum computation. Professor Girvin's academic research is currently focused on 'circuit QED,' the quantum physics of microwave electrical circuits using superconducting Josephson junctions as artificial atoms. He works closely with the experimental team at Yale developing circuit QED into a practical architecture for construction of a quantum computer.

In recognition of his research and contributions to the field, Dr. Girvin has been elected Fellow of the American Physical Society, the American Association for the Advancement of Science, and the American Academy of Arts and Sciences, Member of the Royal Swedish Academy of Sciences, and the US National Academy of Sciences. In 2007 he was awarded the Oliver E. Buckley Prize of the American Physical Society.

Arthur L Horwich, MD

Horwich received undergraduate and M.D. degrees from Brown University, trained in Pediatrics at Yale, was then a postdoctoral fellow first at Salk Institute in the Tumor Virology Laboratory, and then in Genetics at Yale, then joined the Yale faculty. His work was initially involved with protein import into mitochondria and resulted in discovery of a "folding machine" inside mitochondria, Hsp60. He has used genetic, biochemical, and biophysical tools to study the mechanism of action of these ring shaped so-called chaperonin machines that provide essential assistance to protein folding in many cellular compartments. More recently he has focused on neurodegenerative disease as caused by protein misfolding, seeking to understand how misfolded SOD1 enzyme in the cytosol of motor neurons leads to one form of ALS. His lab is modeling mutant SOD1-linked ALS in mice transgenic for a mutant SOD1-YFP, the YFP moiety offering a fluorescent reporter of the mutant protein and "tag" for biochemical studies.

Jay D Humphrey, PhD

J.D. Humphrey received the Ph.D. degree in Engineering Science and Mechanics from The Georgia Institute of Technology and completed a post-doctoral fellowship in Medicine - Cardiovascular at the Johns Hopkins University. He is currently John C. Malone Professor and Chair of Biomedical Engineering at Yale. He has authored a graduate textbook (*Cardiovascular Solid Mechanics*), co-authored an undergraduate textbook (*An Introduction to Biomechanics*), co-authored a handbook (*Style and Ethics of Communication in Science and Engineering*), co-edited a research text (*Cardiovascular Soft Tissue Mechanics*), published chapters in 25+ other books or encyclopedias, and published 250+ archival journal papers. He served for 10 years as founding co-editor-in-chief for the international journal *Biomechanics and Modeling in Mechanobiology* and serves as

immediate past Chair of the US National Committee on Biomechanics. He is a Fellow of the American Institute of Medical and Biological Engineering and a Fellow of the American Society of Mechanical Engineers

Akiko Iwasaki, PhD

Akiko Iwasaki received her Ph.D. from the University of Toronto (Canada) in 1998, and her postdoctoral training from the National Institutes of Health (USA) (1998-2000). She joined Yale University as a faculty in 2000, and currently is an Investigator of the HHMI and a Waldemar Von Zedtwitz Professor of Immunobiology, and of Molecular Cellular and Developmental Biology. Akiko Iwasaki's research focuses on the mechanisms of immune defense against viruses at the mucosal surfaces. Her laboratory is interested in how innate recognition of viral infections lead to the generation of adaptive immunity, and how adaptive immunity mediates protection against subsequent viral challenge for vaccine development.

Mark Lemmon, PhD

Mark Lemmon, PhD, FRS was appointed the Co-Director of the Cancer Biology Institute and the David A. Sackler Professor of Pharmacology in 2015. Dr. Lemmon returns to Yale, where he completed his PhD in 1993, from the University of Pennsylvania's Perelman School of Medicine. At UPenn, he was the George W. Raiziss Professor of Biochemistry and Biophysics as well as Chair of the department and an Investigator at the Abramson Family Cancer Research Institute. Dr. Lemmon's research focuses on the signaling mechanisms of receptor tyrosine kinases (RTKs) and their associated pathways, aberrations in which cause cancers and other diseases.

Scott Miller, PhD

Complex molecule synthesis is one of the key disciplines of modern chemical research. The development of new methods for the synthesis and derivatization of such structures is a multi-dimensional activity involving reaction design, development, and application. Research in our group focuses on each of these aspects of chemical synthesis. Utilizing the architecture and design principles presented by biologically relevant structures and processes, we seek to discover new reactions and to apply new principles to the selective synthesis of complex molecules. As part of this program, we bring to bear the full arsenal of modern synthetic chemistry. Employing rational design, combinatorial screening and a constantly evolving collective intuition, we are working to discover new chemical transformations that enable the rapid synthesis of stereochemically complex structures. In addition, we are investigating the development of new catalysts for the selective functionalization of these molecules. A particular interest is in the catalytic modification of natural products. These studies are enabling access to an expansive set of biologically inspired natural product analogs.

Tim Pavlis

is Assistant Vice President for Strategic Analysis and Institutional Research at Yale University. He is responsible for providing high level advice and analytical support to inform the University's most important decisions. He oversees the Office of Institutional Research and the Swensen Fellows in Strategic Analysis. These offices utilize data and analysis to enable strategic and fact-based decision-making at Yale. Tim reports jointly to the Provost and to the Senior Vice President for Operations. Tim joined Yale in 2015. He spent most of his career in strategy consulting, most recently as a Principal in Bain & Company's San Francisco office. He also has leadership experience in the technology industry, having served as VP of Business Operations and Finance at a cloud software startup. Tim earned his A.B. in Physics from Princeton.

Patty Pedersen

Patty Pedersen, Ph.D. is the Associate Vice President for Development and the University Director for Corporate & Foundation Relations and for Individual Fundraising for Science & Engineering at Yale University. She works closely with Yale leadership and faculty to advance Yale's mission by strengthening the University's relationship with its donors and by making the link between the immediate and long-term priorities of the University. From 2001 to 2005, Patty led Yale's Office of Corporate Relations, which was later merged into Corporate and Foundation Relations, with Patty appointed as Director. She led Corporate and Foundation Relations to its best performance in Yale's recent capital campaign, which closed in 2011. During this campaign, Corporate and Foundation Relations secured more than $600 million as part of a record-breaking $3.88 billion fundraising effort. A trained scientist in addition to her career in development, Patty worked as a postdoctoral fellow and as an associate research scientist in neurobiology at Yale School of Medicine before accepting a position as a development officer for Yale's Peabody Museum of Natural History. She presently serves on the board of directors for The Association for Women in Science (AWIS). Patty received a B.A. from Smith College (Northampton, Massachusetts) and a Ph.D. in psychology from Johns Hopkins University (Baltimore, Maryland).

Anna Pyle, PhD

Anna Marie Pyle is the William Edward Gilbert Professor of Molecular, Cellular and Developmental Biology and Professor of Chemistry at Yale University. She has been a Howard Hughes Medical Institute Investigator since 1997. Dr. Pyle obtained her undergraduate degree in Chemistry from Princeton University and received her Ph.D. in Chemistry from Columbia University in 1990, where she worked with Professor Jacqueline K. Barton. Dr. Pyle was a postdoctoral fellow in the laboratory of Thomas Cech at the University of Colorado. Dr. Pyle formed her own research group in 1992 in the Department of Biochemistry and Molecular Biophysics at Columbia University Medical Center. In 2002, she moved to Yale University, where she leads a research group that specializes in determining the structure and function of large RNA molecules and protein enzymes that operate on RNA. Dr. Pyle teaches the undergraduate Molecular Biology course at Yale, she is Chair of the Building Committee for the Yale Science Building and she serves on the University Budget Committee. Dr. Pyle was Chair of the MSFA Study Section at the NIH, and previously served as a permanent member on the MSFE, and MGB Study Sections. At Brookhaven National labs, she serves on the Science and Technology Steering Committee and on Beamline Advisory Teams at the NSLSII light source. Dr. Pyle is the Co-Editor of *Methods in Enzymology* and serves on the Editorial Board of the *Journal of Molecular Biology*. Dr. Pyle is the author of over 160 publications and has mentored more than 40 graduate students and postdocs.

Peter Schiffer, PhD

Peter Schiffer is Vice Provost for Research and a Professor of Applied Physics and Physics. As Vice Provost for Research, he works to support and enhance the research enterprise across all schools and departments in the university.

Before joining Yale in 2017, he was the Vice Chancellor for Research and a Professor of Physics at the University of Illinois at Urbana-Champaign, and previously he served in a number of administrative, faculty, and research roles at Pennsylvania State University. Prior to that, he was on the faculty at the University of Notre Dame, and performed postdoctoral work at AT&T Bell Laboratories. His personal research focuses on artificial spin ice, geometrically frustrated magnets and other magnetic materials. He has co-authored more than 200 papers, and is the recipient of a Career Award from the National Science Foundation, a Presidential Early Career Award for Scientists and Engineers from the Army Research Office, an Alfred P. Sloan Research Fellowship recipient, and he received the Faculty Scholar Medal in the Physical Sciences and the Joel and Ruth Spira Award for Teaching Excellence from Penn State. He is also a Fellow of the American Physical Society. He has served as the chair of the Topical Group on Magnetism and its Applications and also as the chair of the Division of Materials Physics in the American Physical Society. He received his B.S. from Yale University in 1988 and his Ph.D. from Stanford University in 1993.

David Skelly, PhD

David K. Skelly is Director of the Peabody Museum of Natural History and the Frank R. Oastler Professor of Ecology at the School of Forestry & Environmental Studies at Yale University. Prior to assuming the Museum Directorship he served for five years as Associate Dean for Research in Forestry. He also holds an adjunct appointment in the Department of Ecology and Evolutionary Biology. Dave is a field biologist whose research focuses primarily on the ecology and development of amphibians. He has authored more than 80 papers, and his work on the effects of water pollution on the development of frogs in suburban environments has received wide attention in the national media. Dave has held a Guggenheim Fellowship and is a Fellow of the American Association for the Advancement of Science. He has been awarded the Forestry School's annual prize for teaching excellence on four occasions. Dave received his B.A. from Middlebury College and Ph.D. in biology from the University of Michigan, and held postdoctoral fellowships at the University of Wollongong, Australia and the University of Washington before joining Yale's faculty in 1996.

Daniel A. Spielman, PhD

Daniel Spielman receive his B.A. in Mathematics and Computer Science from Yale in 1992, and his Ph.D in Applied Mathematics from M.I.T. in 1995. He spent a year as a NSF Mathematical Sciences Postdoc in the Computer Science Department at U.C. Berkeley, and then taught in the Applied Mathematics Department at M.I.T. until 2005. Since 2006, he has been a Professor at Yale University. He is presently the Henry Ford II Professor of Computer Science, Mathematics, and Applied Mathematics.

He has received many awards, including the 1995 ACM Doctoral Dissertation Award, the 2002 IEEE Information Theory Paper Award, the 2008 and 2015 Godel Prize, the 2009 Fulkerson Prize, the 2010 Nevanlinna Prize, the 2014 Polya Prize, an inaugural Simons Investigator Award, and a MacArthur Fellowship. He is a Fellow of the Association for Computing Machinery and a member of the Connecticut

Academy of Science and Engineering. His main research interests include the design and analysis of algorithms, network science, machine learning, digital communications and scientific computing.

Paul Turner, PhD

Paul Turner is the Elihu Professor of Ecology and Evolutionary Biology and Acting Dean of Science. His research is interested in examining how viruses evolutionarily adapt to overcome new challenges, such as emergence on novel host species, transmission via new arthropod vectors, survival at elevated temperatures, or changes in host immunity. His work also examines how viruses can be used in phage therapy as an alternative to traditional antibiotics, and in oncolytic therapy against cancers. He employs a wide variety of study systems, including bacteria-bacteriophage studies, and tissue culture experiments using molecular virology models such as vesicular stomatitis virus and Sindbis virus, and disease pathogens such as dengue virus. Turner received his BS from the University of Rochester in 1988 and his PhD from Michigan State university in 1995.