CHRISTOPHER S. CHEN, MD, PHD

Skirkanich Professor of Innovation
Department of Bioengineering
University of Pennsylvania, Philadelphia, PA

Dr. Chen is also a faculty member of the Cell Biology and Physiology Program as well as the Cell Growth and Cancer Program. He is director of the Tissue Microfabrication Laboratory and founding director of the Center for Engineering Cells and Regeneration.

Dr. Chen has been an instrumental figure in the development of engineered cellular microenvironments in order to engineer cell function. The goal of Dr. Chen's research is to identify the underlying mechanisms by which cells interact with materials and each other to build tissues, and to apply this knowledge in the biology of stem cells, tissue vascularization, and cancer.

In vivo, the local tissue structure defines the cellular environment, constraining how cells interact with surrounding extracellular matrix substrates, neighboring cells, soluble growth factors, and physical forces. These "microenvironmental" cues not only cooperate to regulate the behavior of individual cells, but their spatiotemporal organization also governs emergent properties of the multicellular community. Because neither traditional cell culture nor *in vivo* models provide adequate control over the adhesive and mechanical microenvironment in particular, understanding how these different cues contribute to the regulation of cellular function has been exceedingly difficult. To address this, Dr. Chen and his group have taken an innovative two-pronged approach to study these interactions: 1) adapting fabrication tools (mostly from the semiconductor industry) to build novel *in vitro* microenvironments, and 2) using these systems to understand the underlying mechanisms by which cells probe and respond to the physical, chemical, and structural cues in their surroundings.

Dr. Chen has received numerous honors, including the Presidential Early Career Award for Scientists and Engineers, the Angiogenesis Foundation Fellowship, the Office of Naval Research Young Investigator Award, the Mary Hulman George Award for Biomedical Research, and the Herbert W. Dickerman Award For Outstanding Contribution to Science. He serves as a member of the Faculty of 1000 Biology, the Board of Trustees for the Society for BioMEMS and Biomedical Nanotechnology, Editor for BioInterphases and Molecular and Cellular Biomechanics, and member of the Defense Sciences Study Group. Most recently he was named a Fellow of the American Institute for Medical and Biological Engineering.

Dr. Chen received his A.B. in Biochemistry from Harvard, M.S. in Mechanical Engineering from M.I.T., and Ph.D. in Medical Engineering and Medical Physics from the Harvard-M.I.T. Health Sciences and Technology Program. He earned his M.D. from the Harvard Medical School. He was Assistant Professor in Biomedical Engineering and in Oncology at Johns Hopkins University prior to being appointed Associate Professor at Penn.

DAVID EDDINGTON, PHD

Associate Professor
Department of Bioengineering
University of Illinois at Chicago, Chicago, IL

Dr. Eddington received his undergraduate training at the University of Illinois Urbana-Champaign where he earned his bachelor degree in materials science and engineering. He went to the University of Wisconsin-Madison to earn a PhD in biomedical engineering. Dr. Eddington then moved to the Massachusetts Institute of Technology for postdoctoral training in tissue engineering. In 2006, Dr. Eddington joined the faculty in the Department of Bioengineering at the University of Illinois at Chicago and is currently an Associate Professor and Director of Graduate Studies.

The Eddington lab focuses on developing novel solutions to current unmet experimental and clinical needs through applying simple microfabricated devices. These devices leverage beneficial phenomena (e.g. process integration, fast diffusion, or high surface to volume ratio) over multiple scales (nano, micro, and meso). Projects in the Eddington lab span from basic biology such as devices to study chemotrophic response in *S. cerevisiae* to translational research such as devices for quality control of transplanted tissues.

DOUGLAS A. LAUFFENBURGER, PHD

Ford Professor of Bioengineering
Head, Department of Biological Engineering
Massachusetts Institute of Technology, Cambridge, MA

Douglas A. Lauffenburger is Ford Professor of Bioengineering and Head of the Department of Biological Engineering at MIT, and also holds appointments in the Department of Biology and the Department of Chemical Engineering. He is a member of the Koch Institute for Integrative Cancer Research Center for Biomedical Engineering, the Center for Environmental Health Sciences, and the Center for Gynepathology Research, and is Director of the Computational & Systems Biology Initiative.

Dr. Lauffenburger's BS and PhD degrees are in chemical engineering from the University of Illinois and the University of Minnesota, in 1975 and 1979 respectively. His major research interests are in cell engineering: the fusion of engineering with molecular cell biology. Lauffenburger has coauthored a book entitled *Receptors: Models for Binding, Trafficking & Signaling*, published by Oxford University Press in 1993, and coedited another entitled *Systems Biomedicine*, published by Elsevier Press in 2010. More than 90 doctoral students and postdoctoral associates have completed their training under his supervision or co-supervision.

Professor Lauffenburger has served as a consultant or scientific advisory board member for Astra-Zeneca, Beyond Genomics, CellPro, Eli Lilly, Entelos, Genstruct, Insert Therapeutics, Johnson & Johnson, Merrimack Pharmaceuticals, Pfizer, Precision Therapeutics, SyStemix, the Burroughs-Wellcome Fund, and the Whitaker Foundation. He is a member of the National Academy of Engineering and of the American Academy of Arts & Sciences, and has served as President of the Biomedical Engineering Society, Chair of the College of Fellows of AIMBE and on the Advisory Council for the National Institute for General Medical Sciences at NIH.

JOSHUA N. LEONARD, PHD

Assistant Professor of Chemical and Biological Engineering
McCormick School of Engineering and Applied Science
Northwestern University, Evanston, IL

Dr. Leonard is also a member of the Robert H. Lurie Comprehensive Cancer Center and Chemistry of Life Processes Institute at Northwestern University. Dr. Leonard received a B.S. in chemical engineering from Stanford University in 2000, and a Ph.D. in chemical engineering from the University of California, Berkeley in 2006, where he employed computational and experimental approaches to develop novel gene therapies for treating HIV infections. From 2006-2008, Dr. Leonard trained in immunology as a postdoctoral fellow at the Experimental Immunology Branch of the National Cancer Institute, where he elucidated a central aspect of the antiviral immune response and developed novel targeted vaccine adjuvants. In 2008, Dr. Leonard joined the faculty of Northwestern University. He also co-directs a graduate cluster in Biotechnology, Systems, and Synthetic Biology and mentors Northwestern's international Genetically Engineered Machines (iGEM) team. Dr. Leonard's research group engineers novel biological systems that perform customized, sophisticated functions for applications in biotechnology and medicine. Using the tools of synthetic biology, biomolecular engineering, systems biology, and gene therapy, they develop technologies for investigating and coordinating complex multicellular functions. A central area of interest is developing programmable cell-based "devices" that make it possible to probe and modulate immune responses in a patient- and disease-specific fashion, to create new treatments with applications ranging from cancer and chronic infections to autoimmune disease and regenerative medicine.

DOROTHY SIPKINS, MD, PHD

Assistant Professor, Department of Medicine
The University of Chicago, Chicago, IL

Dr. Sipkins received her M.D. and Ph.D. degrees from Stanford University. She completed her internship and residency training in Internal Medicine at Massachusetts General Hospital and subspecialty training in Adult Hematology/Oncology in the Dana Farber Cancer Institute/Massachusetts General Hospital Partners Cancer Care Program. After her clinical fellowship, Dr. Sipkins pursued postdoctoral research at Massachusetts General Hospital before establishing her independent research laboratory at the University of Chicago, where she is an Assistant Professor. Her current research focuses on defining the molecular characteristics of tissue microenvironments, or "niches," that foster the survival and regeneration of both normal and cancerous hematopoietic stem cells. Her laboratory also examines the impact of malignant growth on the function of the normal hematopoietic stem cell niche. In combination with classical molecular and cell biology approaches, her lab utilizes state-of-the-art multiphoton and confocal optical imaging techniques to explore these questions *in vivo*, in real-time. Dr. Sipkins' work has been recognized with an NIH Director's New Innovator Award.

MELODY A. SWARTZ, PHD

Professor of Bioengineering
Swiss Federal Institute of Technology, Lausanne (EPFL), CH

Dr. Swartz has joint appointments in the Institute of Cancer Research and the Institute of Chemical Sciences and Engineering. She received her PhD in Chemical Engineering from M.I.T. and her B.S. from Johns Hopkins University. Following a postdoc at Harvard, she joined the faculty of Biomedical Engineering at Northwestern University in 1999, and moved to the EPFL in 2003. Her research focuses broadly on physiological transport phenomena as it relates to the lymphatic system, with specific interest in the functional biology of the lymphatic system and its roles in cancer and immunity. Her team applies integrative approaches combining bioengineering, physiology, and cell biology in seeking to develop new therapeutic strategies to manipulate lymphatic function and its role in immunity and tolerance. She has published extensively in these areas for the last 15 years and has mentored many PhD and postdoc students, several of whom have continued lymphatic research in their own labs. She has received many awards including the Leenaards Prize for Scientific Research, the Robert Wenner Award of the Swiss Cancer League, a Beckman Young Investigator Award, the NSF Career Award, the Rita Schaffer Award of the BMES, and many others.