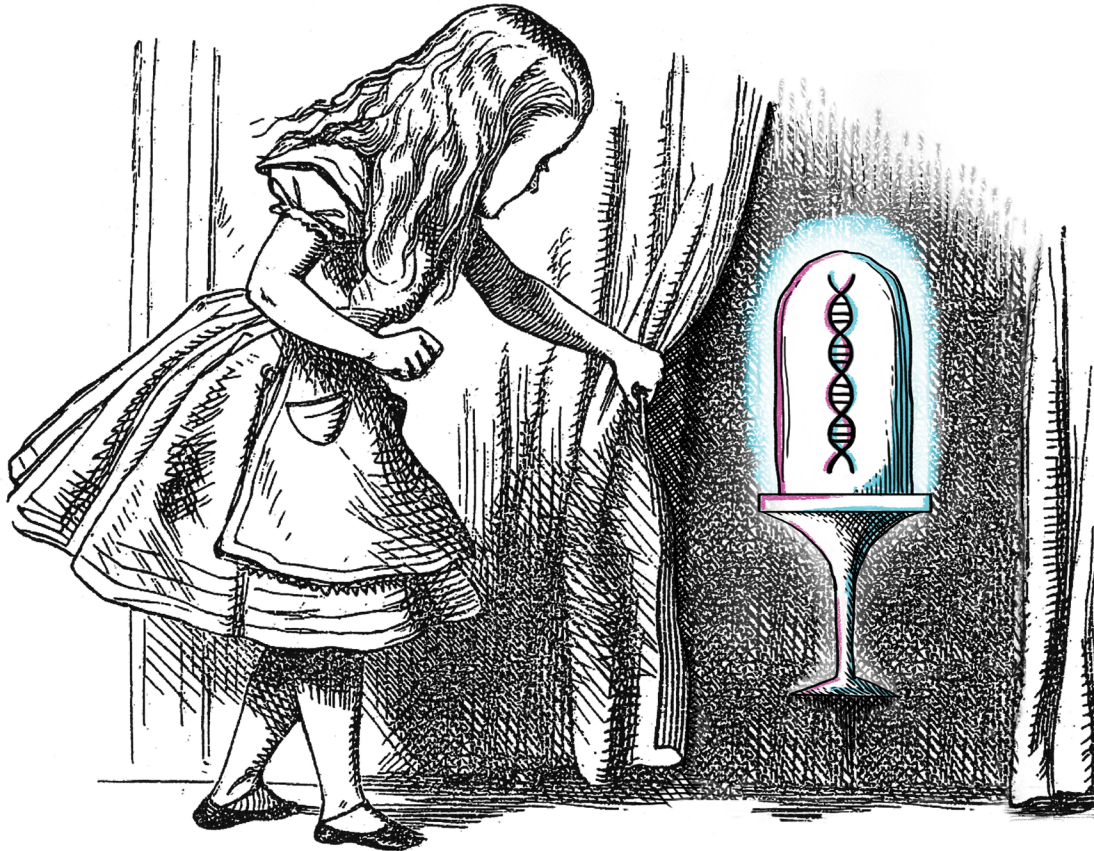


GAME CHANGERS

TECHNOLOGIES THAT ARE REWRITING THE FUTURE OF THE LIFE SCIENCES



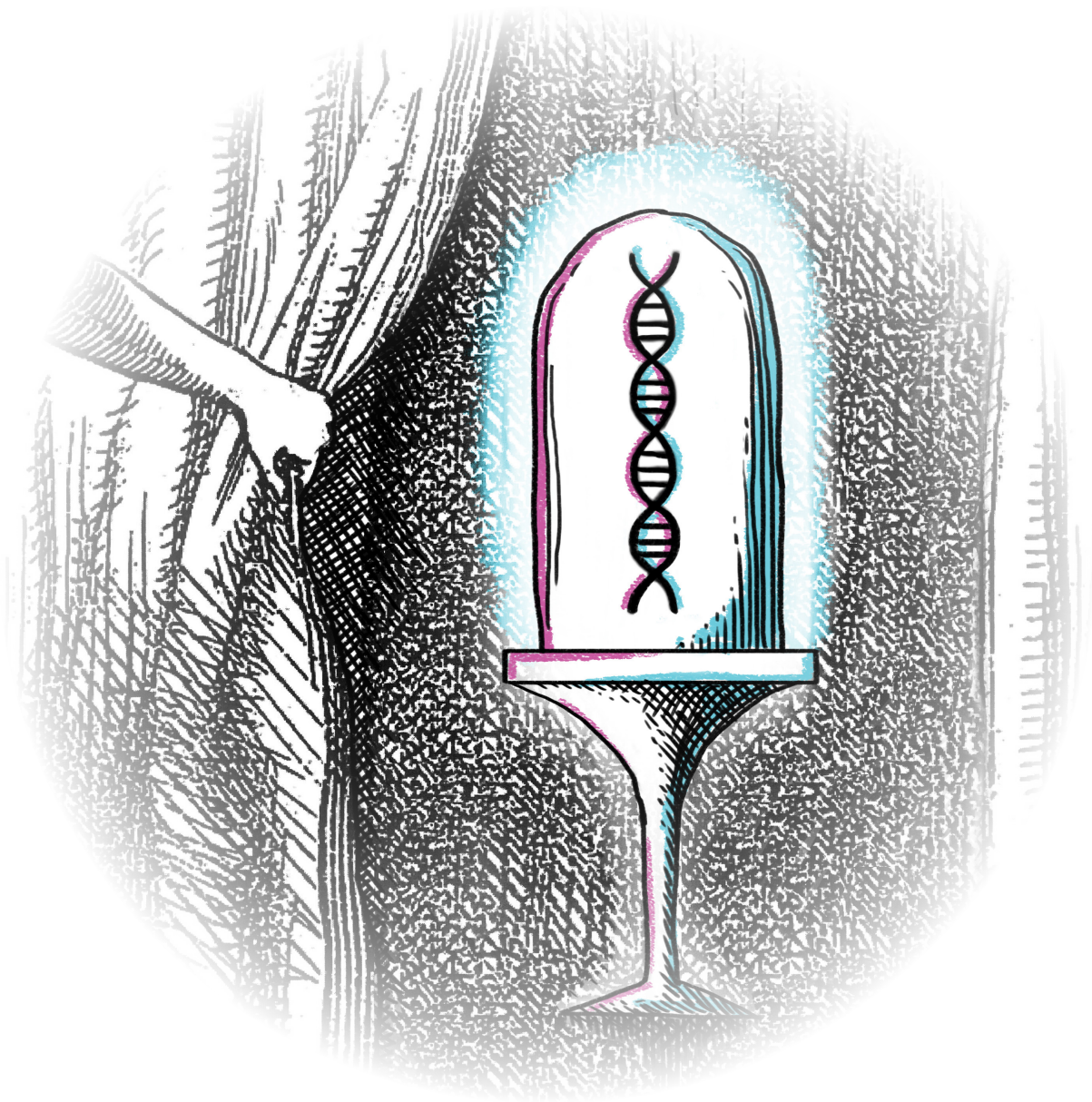
S A L T I E L
L I F E S C I E N C E S
S Y M P O S I U M

SEPTEMBER 15, 2017

SIXTEENTH ANNUAL LSI SYMPOSIUM

FORUM HALL, PALMER COMMONS
100 WASHTENAW AVE, ANN ARBOR

M LIFE SCIENCES INSTITUTE
UNIVERSITY OF MICHIGAN



ON THE COVER:

An adaptation of an illustration by Sir John Tenniel from
Alice's Adventures in Wonderland (1865).

SCHEDULE

8:30 A.M.

Welcome

Mark Schlissel, M.D., Ph.D.

President of the University of Michigan

8:40 A.M.

200 Years of Life Sciences at U-M

Roger D. Cone, Ph.D.

Mary Sue Coleman Director, Life Sciences Institute; Professor of Molecular and Integrative Physiology, Medical School; Professor of Molecular, Cellular, and Developmental Biology, College of Literature, Science, and the Arts; Vice Provost and Director, U-M Biosciences Initiative

& **David Ginsburg, M.D.**

Research Professor, Life Sciences Institute; James V. Neel Distinguished University Professor of Internal Medicine, Human Genetics and Pediatrics, Warner-Lambert/Parke-Davis Professor of Medicine, Medical School; Howard Hughes Medical Institute Investigator

9:10 A.M.

Introduction of the Mary Sue and Kenneth Coleman Life Sciences Lecturer

Alan R. Saltiel, Ph.D.

Professor and Director, Comprehensive Diabetes Center, University of California, San Diego School of Medicine; Director, Life Sciences Institute (2002–2015)

9:15 A.M.

Mary Sue and Kenneth Coleman Life Sciences Lecture: Nature's Gift: How the Discovery of Structural Principles in a Microbial Protein Helped Illuminate the Pathophysiology of Psychiatry

Karl Deisseroth, M.D., Ph.D.

D.H. Chen Professor of Bioengineering and of Psychiatry and Behavioral Sciences, Stanford University; Howard Hughes Medical Institute Investigator

10:10 A.M.

MORNING BREAK

10:30 A.M.

Single Molecules and Single Cells: Probing Chemistry and Biology at Their Fundamental Limit

David R. Walt, Ph.D.

Core Faculty Member, Wyss Institute at Harvard University; Professor of Pathology, Harvard Medical School; Howard Hughes Medical Institute Professor; Founder of Illumina, Inc. and Quantarix, Corp.

11:30 P.M.

Whole-Animal Imaging with High Spatiotemporal Resolution

Philipp Keller, Ph.D.

Group Leader, Howard Hughes Medical Institute's Janelia Research Campus

12:30 P.M.

LUNCH BREAK

1:45 P.M.

Probing the Molecular Organization of Cells and Organelles Using Cryo-Electron Microscopy

Daniela Nicastro, Ph.D.

Associate Professor of Cell Biology and Biophysics, Cryo-EM Facility Director, University of Texas Southwestern Medical Center

2:45 P.M.

AFTERNOON BREAK AND POSTER SESSION

Great Lakes Rooms

4:00 P.M.

Engineering Sub-nm, Organs & Ecosystem

George Church, Ph.D.

Core Faculty Member, Wyss Institute at Harvard University; Professor of Genetics, Harvard Medical School; Professor of Health Sciences and Technology, Harvard University and Massachusetts Institute of Technology

4:55 P.M.

Closing Remarks

Roger D. Cone

LIGHT REFRESHMENTS WILL BE AVAILABLE IN THE ATRIUM DURING BREAKS. ATTENDEES ARE ON THEIR OWN FOR LUNCH.

SPEAKER BIOGRAPHIES



George Church, Ph.D.

Core Faculty Member, Wyss Institute at Harvard University; Professor of Genetics, Harvard Medical School; Professor of Health Sciences and Technology, Harvard University and Massachusetts Institute of Technology

George Church leads the synthetic biology area at the Wyss Institute, where he oversees the directed evolution of molecules, polymers and whole genomes to create new tools with applications in regenerative medicine and bio-production of chemicals. Among his recent work is development of a technology for synthesizing whole genes, and engineering whole genomes, far faster and more accurately than current methods.

Church is widely recognized for his innovative contributions to genomic science and his many pioneering contributions to chemistry and biomedicine. In 1984, he developed the first direct genomic sequencing method, which resulted in the first genome sequence (the human pathogen, *H. pylori*). He helped initiate the Human Genome Project in 1984 and the Personal Genome Project in 2005. Church invented the broadly applied concepts of molecular multiplexing and tags, homologous recombination methods and array DNA synthesizers. His many innovations have been the basis for a number of companies, including Editas (Gene therapy), Gen9bio (Synthetic DNA) and Veritas Genetics (full human genome sequencing).

Church is also director of a U.S. Department of Energy Technology Center and a National Institutes of Health Center of Excellence in Genomic Science. He has received numerous awards, including the 2011 Bower Award and Prize for Achievement in Science from the Franklin Institute and election to the National Academy of Sciences and Engineering.



Karl Deisseroth, M.D., Ph.D.

D.H. Chen Professor of Bioengineering and of Psychiatry and Behavioral Sciences, Stanford University; Howard Hughes Medical Institute Investigator

Karl Deisseroth is a practicing psychiatrist working to elucidate the detailed form and function of the brain's neural circuitry. He developed ways to study how groups of neurons influence each other and is using those techniques to explore how brain circuitry works and how it goes awry in disorders such as depression, anxiety and Parkinson's disease. Deisseroth's lab at Stanford University pioneered "optogenetics," an approach to stimulate or inhibit neurons with flashes of light.

In the first mammalian behavioral experiment in 2007, his group used optogenetics to wake sleeping mice, using patterns of pulsed light to control a genetically targeted specific kind of neuron in the hypothalamus. In 2009, they reported a series of versatile advances applicable to virtually any type of cell in the brain.

He received his bachelor's degree from Harvard in 1992, his doctorate from Stanford in 1998 and his M.D. from Stanford in 2000. He completed his postdoctoral training, medical internship and adult psychiatry residency at Stanford, and he was board-certified by the American Board of Psychiatry and Neurology in 2006. He tries to find spare time for flyfishing.

SPEAKER BIOGRAPHIES



Philipp Keller, Ph.D.

Group Leader, Howard Hughes Medical Institute's Janelia Research Campus

After studying physics and computer science at the University of Karlsruhe and University Heidelberg in Germany, Keller pursued his Ph.D. in biology at the European Molecular Biology Laboratory.

While still an undergraduate student, he introduced light-sheet microscopy to cell biology by developing methods for high-resolution imaging of the cellular cytoskeleton, developed a computational model of yeast spore formation and investigated the evolutionary mechanisms that shaped the yeast genome architecture. For this research, he received the Otto-Haxel-Prize and the Award of Excellence of the University of Heidelberg. As a graduate student, Keller developed scanned light-sheet microscopy and a computational framework for automated cell tracking to systematically reconstruct the cell movements and divisions underlying early zebrafish development. His "Digital Zebrafish Embryo" was named as one of the Top Ten Breakthroughs of the Year 2008 by *Science*.

After receiving his doctorate (summa cum laude) in 2009, he became a group leader at the Howard Hughes Medical Institute's Janelia Research Campus in 2010. At Janelia, he leads a highly interdisciplinary lab in which optical physicists, computer scientists and biologists collaborate to advance light microscopy and study the development and function of the early nervous system using light-sheet microscopy and computer vision.



Daniela Nicastro, Ph.D.

Associate Professor of Cell Biology and Biophysics, Cryo-EM Facility Director, University of Texas Southwestern Medical Center

Daniela Nicastro received her Ph.D. in biology from the Ludwig-Maximilians University in Munich, Germany in 2000. Following three years in the lab of Wolfgang Baumeister at the Max-Planck Institute for Biochemistry in Munich (1998–2001), she took a postdoctoral fellow position in the National Center for Research Resources for 3-D Electron Microscopy of Cells at the University of Colorado in Boulder. From 2006 to 2015 she was an assistant and then tenured associate professor of biology and director of the Correlative Light and Electron Microscopy facility at Brandeis University, near Boston.

Since July 2015, Nicastro has been an associate professor at the University of Texas Southwestern Medical Center in Dallas with appointments in the Departments of Cell Biology and Biophysics. She has almost 25 years of experience in electron microscopy of cellular structures and is a leading expert in cellular cryo-electron tomography. The research interest of the Nicastro lab is focused on studying the three-dimensional structure and function of cytoskeletal assemblies, molecular motors, organelles and cells using a combination of cutting-edge methods to elucidate the structure-function relationships of macromolecular complexes in their native environment.

SPEAKER BIOGRAPHIES

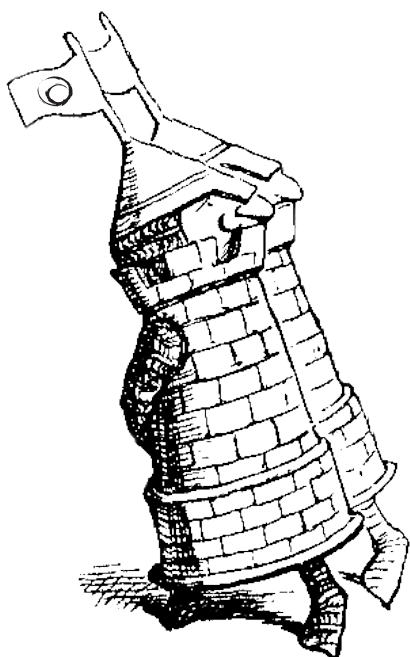


David R. Walt, Ph.D.

Core Faculty Member, Wyss Institute at Harvard University; Professor of Pathology, Harvard Medical School; Howard Hughes Medical Institute Professor; Founder of Illumina, Inc. and Quanterix, Corp.

David R. Walt recently joined the Wyss Institute for Biologically Inspired Engineering at Harvard University after spending more than 30 years at Tufts University — where he published 300 peer-reviewed papers, obtained 75 patents, held seven professorships, won numerous national and international awards, and launched a multibillion-dollar biotech business. He also holds an appointment in the Department of Pathology at Brigham and Women's Hospital and serves as a Howard Hughes Medical Institute Professor.

Walt is the Scientific Founder of Illumina, Inc. and Quanterix, Corp. and has co-founded several other life sciences startups. He has received numerous honors for his fundamental and applied work in the field of optical microwell arrays and single molecules. He is a member of the National Academy of Engineering and the National Academy of Medicine, a fellow of the American Academy of Arts and Sciences, a fellow of the American Institute for Medical and Biological Engineering, and a fellow of the National Academy of Inventors. He received a B.S. in chemistry from the University of Michigan and a Ph.D. in chemical biology from the State University of New York at Stony Brook, and he did postdoctoral studies at the Massachusetts Institute of Technology. Walt is also a member of the LSI's Leadership Council and Scientific Advisory Board.



**DON'T LET A FUTURE SCIENTIST
DISAPPEAR DOWN THE RABBIT HOLE!**



The Life Sciences Institute is committed to educating the scientific leaders of tomorrow.

Help support students in our labs today by making a gift to educational and professional development programs at the institute.

LEARN MORE AT:

www.lsi.umich.edu/supporting-lsi

M
LSI

ABOUT THE LIFE SCIENCES INSTITUTE

The Life Sciences Institute is a hub for collaborative bioscience discovery at the University of Michigan. Our faculty, who hold joint appointments in schools and colleges across the campus, work to advance the understanding of fundamental biology in important areas of human health and disease. In addition to faculty labs, the LSI houses a world-class cryo-electron microscopy facility, a high-throughput screening center with extensive chemical libraries, a unique library of natural products and a comprehensive protein production and X-ray crystallography facility. The LSI is also the administrative home for the U-M Program in Chemical Biology, the U-M Center for the Discovery of New Medicines and the Michigan Life Sciences Fellows.

ABOUT THE ANNUAL SYMPOSIUM

In 2002, while construction of the institute was still underway, the LSI held its first symposium. The event continues to represent the LSI's most important values: excellence in science, investment in high-impact research and especially the synergy that happens when top scientists from a range of fields meet and share their work around a common theme.

In 2016, the annual LSI symposium was named the Saltiel Life Sciences Symposium thanks to an endowment made possible by the generous support of the LSI's faculty, Leadership Council, Scientific Advisory Board and friends. The name recognizes the leadership and scientific contributions made by former LSI Director Alan R. Saltiel during his 13-year tenure.

PAST SYMPOSIA

2016	Chemical Biology: Rise of the Cellular Machine	2009	Evolutionary Biology
2015	Defense Mechanisms in Life: From Bacteria to the Human Body	2008	Focus on Chemical Biology
2014	Victors for Discovery: Biomedicine at Michigan	2007	Frontiers in Stem Cell Biology
2013	Exploring Epigenetics and RNA	2006	Molecular Insights into Metabolic Disease
2012	Development and Diseases of the Nervous System	2005	Cancer Insights: Molecules to Medicine
2011	Autophagy	2004	Exploring the Complexity of Life
2010	Macromolecular Complexes in Cell Biology	2003	Genetic Insights into Biology and Disease
		2002	Structural Biology of Cell Signaling

LSI.UMICH.EDU

[FACEBOOK.COM/UMLIFESCIENCES](https://www.facebook.com/UMLIFESCIENCES)