



UNIVERSITY OF  
MARYLAND



*Joint NSF and NIH Symposium on  
Accelerating Mathematical-Biological Linkages*

*February 12, 2003*

*Natcher Conference Center, National Institutes of Health*

**Dr. Mary E. Clutter** is Assistant Director of the National Science Foundation (NSF). She is responsible for the Biological Sciences Directorate that supports all major areas of fundamental research in biology. She received her Bachelor of Science degree in Biology from Allegheny College and her masters and doctoral degrees from the University of Pittsburgh. She has received honorary doctorates of science from Allegheny College and Mount Holyoke College and the Bicentennial Medallion of Distinction from the University of Pittsburgh. She has received numerous Senior Executive Service Awards including the Meritorious and Distinguished Executive Presidential rank awards from President Ronald Reagan, President George Bush and President William Clinton.

**Dr. Michael Gottesman, M.D.**, is Deputy Director of Intramural Research at the National Institutes of Health. His research on cancer has focused on multidrug resistance in human cells. Previously he served as acting director of the Office of Intramural Research and was acting director of the National Center for Human Genome Research from 1992 to 1993. He is chief of NCI's Laboratory of Cell Biology, a post he has held since 1990. His research has earned him many awards, including the Milken Family Foundation Award for Cancer Research, 1990; the C.E. Alken Prize, 1991; and the Rosenthal Foundation Award, 1992. He was elected a fellow of the American Association for the Advancement of Science in 1988.

**DR. JOEL E. COHEN** heads the Laboratory of Populations at Rockefeller and Columbia Universities in New York. He is a MacArthur Foundation Prize Fellow and a Guggenheim Fellow. He has received numerous awards, including the Tyler World Prize for Environmental Achievement, the Mercer Award of the Ecological Society of America, the Sheps Award of the Population Association of America, the Nordberg Prize of the Population Council, and the Soper Prize of the Pan American Health Organization. Dr. Cohen is a member of the Governing

boards of the National Academy of Sciences, the National Research Council, the Nature Conservancy, and the American Academy of Arts and Sciences.

**Dr. Margaret Palmer** is Professor of Biology and of Entomology at the University of Maryland, College Park. She received her Ph.D. in Oceanography in 1983 but in the last 15 years has turned her attention to freshwater systems. Her research focuses on how hydrodynamics and geomorphology influence stream invertebrate communities and their ability to recover from anthropogenic disturbances. In partnership with the conservation organization American Rivers and collaborator Dave Allan, Palmer is currently leading a major effort to complete a scientific synthesis of the state of river restoration in the nation (National River Restoration Science Synthesis project). Palmer's research group is also completing theoretical and empirical work on the interactive effects of land use change and climate change on urbanizing watersheds. She is on the Ecological Society of America's governing board and chairs the ESA "Committee on Visions for Environmental Biology in the 21<sup>st</sup> Century". She is also a member of the Scientific Advisory Boards for NSF's National Center for Ecological Analysis and Synthesis and for USGS's Grand Canyon Monitoring and Research Center. Her awards include a Lilly Fellowship, a Distinguished Scholar Teacher Award, an Aldo Leopold Leadership Fellow, and an AAAS fellow.

**DR. ALEX MOGILNER** is Head of the Laboratory of Cell and Computational Biology (LCCB) that houses both experimental and theoretical cell biologists at the University of California at Davis. The experimentalists use biochemical, biophysical, and microscopic techniques to study microtubule-based motility. The theoreticians use mathematical modeling to explain motility phenomena. In the Lab, they focus on Cell Biology: cytoskeletal dynamics, microtubule-based motility, mitosis and cell division.

**DR. ROBERT HOLT** is Professor of Ecology at the University of Florida. His research focuses on theoretical and conceptual issues at the population and community levels of ecological organization, and on the task of linking ecology with evolutionary biology. In addition to basic research, he is interested in bringing modern ecological theory to bear on significant applied problems, particularly in conservation biology. He has also carried out large-scale experiments on habitat fragmentation. His students include both theoreticians and empirical ecologists, and he collaborates with faculty at a wide range of institutions, both inside and outside the USA. He is currently developing a research program with a Florida dimension.

**Dr. CHARLES DELWICHE** is Associate Professor of Cell Biology and Molecular Genetics at the University of Maryland. His research focuses on early events in the evolution of plants and algae, particularly the endosymbiotic origin of plastids (chloroplasts), and the origin of land plants (i.e., embryophytes) from green algae. Molecular systematics is a field that applies to tools of molecular

biology to the study of how organisms are related to each other. Thus one of the major activities is the determination of DNA sequences from diverse organisms, and the computer analysis of these sequences to reconstruct their history of mutation. Mathematical problems of interest include identification of accurate models of DNA sequence evolution, techniques for combination of partially overlapping graphs (i.e., phylogenetic trees), and development of models to predict protein targeting. He also uses more classical methods to study the structure and physiology of key organisms, and combine the information from these studies to gain insights into the early history of evolution of photosynthetic life on earth.

**DR. DE WITT SUMNERS** is Robert O. Lawton Distinguished Professor of Mathematics and a member of the Institute of Molecular Biophysics Department of Mathematics, Florida State University. He is interested in the applications of topology to molecular biology and polymer configuration, both in theory development and computational simulation. The long-range goal of one of his projects in molecular biology is to develop a complete set of experimentally observable topological parameters with which to describe and compute enzyme mechanisms and the structure of the active enzyme-DNA synaptic intermediate. He is co-director of the Program in Mathematics and Molecular Biology ([www.math.fsu.edu/~pmmb](http://www.math.fsu.edu/~pmmb)), a national research and training consortium funded by a Burroughs Wellcome Fund Interfaces grant. In addition, as a member of an interdisciplinary ([http://www.pet.med.va.gov:8080/hbp\\_p20.html](http://www.pet.med.va.gov:8080/hbp_p20.html)) Human Brain Project research team, he is interested in the mathematical analysis and visualization of human brain functional data. He intends to use these new encoding algorithms, plus other geometrical and topological ideas, to aid the group effort in the study of human brain anatomical and functional data.

**DR. MICHAEL NEUBERT** Since earning his Ph.D. in Applied Mathematics at the University of Washington, Dr. Neubert has been employed in the Biology Department at the University of Washington. There, he collaborates with biological oceanographers who are interested in using mathematical approaches to address a diverse set of ecological problems ranging from the biogeography of deep-sea benthic communities to the dynamics of coastal phytoplankton populations to marine mammal epidemiology. He is also interested in theoretical questions involving the interplay between complex life histories and dispersal.

**DR. MONICA K. HURDAL** is an Assistant Professor in Mathematics at Florida State University. Her research involves investigating, modeling, and visualizing data related to the way the human brain functions. She has been a visiting researcher at Johns Hopkins University and collaborates with the neurology and radiology departments at the University of Minnesota and the mathematics department at the University of Tennessee. She was a 2001-2002 Mobile-Exxon Project NExT Fellow. She has published in neuroscience,

psychology, and mathematical journals and has received funding from the NIH Human Brain Project, NSF, and FSU.

**DR. SHARON LUBKIN** is a mathematical biologist at North Carolina State University. She uses mathematical models and methods as tools to answer biological questions. The main area of her research is tissue dynamics, modeling the physical forces which create and modify structures in multicellular organisms. She has applied this biomechanical perspective to applications in developmental biology and biomedical engineering including tooth development, vasculogenesis, tumor encapsulation, and branching morphogenesis in the lung and other organs. She collaborates extensively with laboratory biologists. Dr. Lubkin has also worked on biological questions in epidemiology, microbial population biology and pattern formation, and the social question of quantifying urban sprawl.

**DR. ZAN LUTHEY-SCHULTEN** received a B.S. in Chemistry from the University of Southern California in 1969, a M.S. in Chemistry from Harvard University in 1972, and a Ph.D. in Applied Mathematics from Harvard University in 1975. From 1975 to 1980 she was a Research Fellow at the Max-Planck Institute for Biophysical Chemistry in Goettingen, and from 1980 to 1985 a Research Fellow in the Department of Theoretical Physics at the Technical University of Munich. She is presently an Associate Professor of Chemistry and Biophysics as well as an affiliate of the Beckman Institute at the University of Illinois at Urbana-Champaign.

**Dr. LEAH GERBER** is Assistant Professor of Conservation Biology at Arizona State University. She uses mathematical models to connect biological uncertainty to decision-making in conservation biology. Most recently she has focused on the connection between science and policy in endangered species recovery and marine reserve design. Dr. Gerber collaborates with natural and social scientists in developing a decision framework to monitor and manage marine reserves in the Gulf of California. Dr. Gerber serves on the White Abalone and Mount Graham Red Squirrel Recovery Teams and has worked extensively with the National Marine Fisheries Service to develop criteria for classifying marine mammals under the Endangered Species Act.