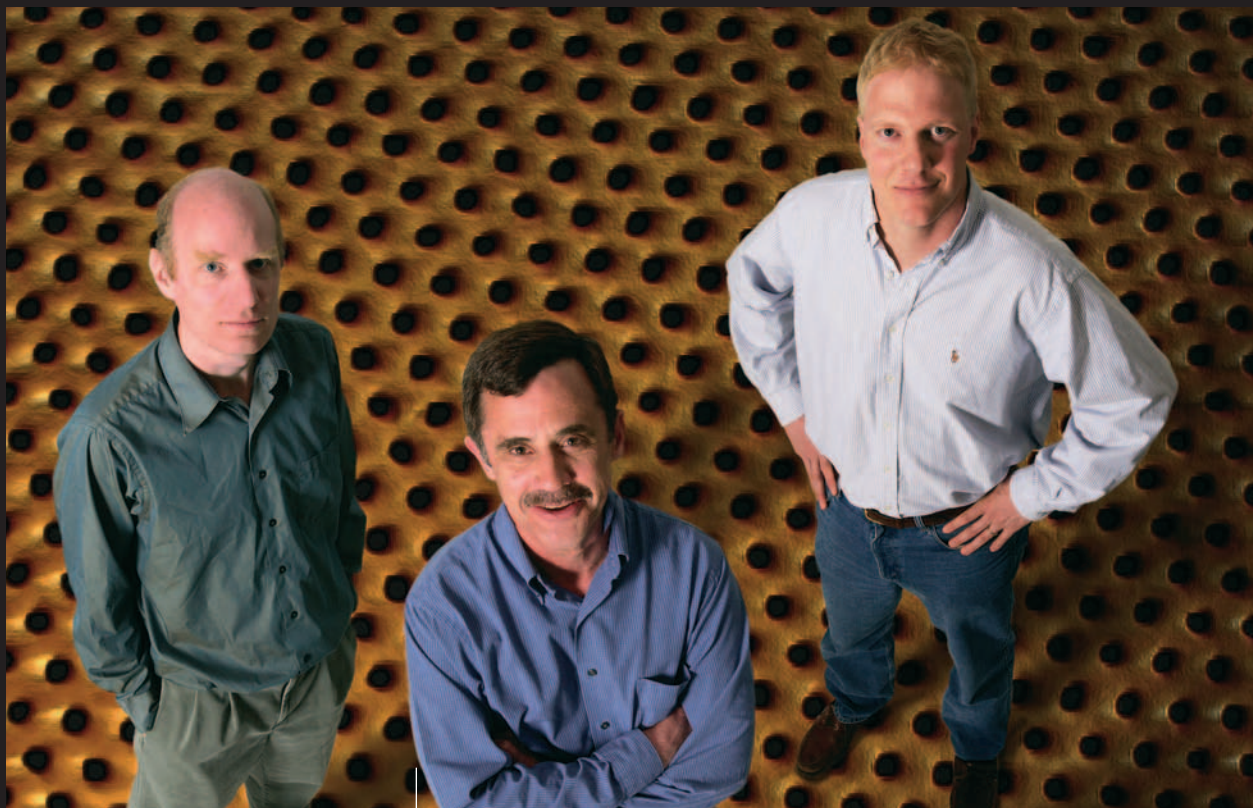




University of Massachusetts Amherst

REPORT ON RESEARCH 2005

Expanding the capacity for research and innovation



FACULTY RECOGNITION

In September 2005, UMass Amherst presented its first Awards for Outstanding Accomplishments in Research and Creative Activity. The recipients were faculty members chosen by their peers in recognition of achievements and initiatives bringing national and international renown to UMass Amherst. Biographies of the recipients follow.



Priscilla M. Clarkson

Professor of Exercise Science; Associate Dean for Research, School of Public Health and Health Sciences

Priscilla M. Clarkson's research focuses on exercise-induced muscle damage and repair in humans. In the field of sport nutrition she concentrates on micronutrient requirements and eating disorders in female athletes. She has published more than 185 scientific research articles, has given hundreds of national and international scientific presentations, and is the editor of the *International Journal of Sport and Nutrition*. Clarkson is a fellow in the American College of Sports Medicine and has held many positions within that organization. She was a member of the Massachusetts governor's panel to improve police training practices to prevent training-induced cases of muscle damage leading to kidney failure. She currently serves on the Research Review Board of the Gatorade Sports Science Institute, Nabisco's Nutritional Advisory Council, two NASA working groups, and the NCAA Competitive and Medical Safeguards Committee.



Ronald K. Hambleton

Distinguished University Professor of Educational Policy, Research, and Administration; Executive Director, Center for Educational Assessment

Ronald K. Hambleton, an internationally renowned psychometrician, was instrumental in the development of the School of Education's highly regarded Research and Evaluation Methods Program. He served as president and as a board member of the National Council on Measurement in Education and is the author or co-editor of eight books and the author or co-author of more than 600 research papers, reports, and reviews. Hambleton concentrates on four research areas: applications of item-response theory models, computer-based testing, criterion-referenced measurement methods and practices, and test adaptation methodology. He has presented more than 500 papers at regional, national, and international conferences and has given keynote addresses at many national and international meetings. Hambleton has had dozens of prestigious research clients and currently serves on several advisory boards.



Rachel Keen

Professor of Psychology

An acknowledged leader in the study of child development, Rachel Keen has spent her career at UMass Amherst, where her many accomplishments have greatly enhanced the visibility of the Department of Psychology. She has developed four lines of research, beginning with cardiac orienting and conditioning in human infants. In the early 1980s Keen began focusing on auditory localization and pitch perception in neonates and infants, developing an innovative strategy to study sound perception using a reaching-in-the-dark paradigm. During the past 15 years she has extended this paradigm to study memory, object permanence, and cognitive processing in infants and toddlers.

Keen is the author of nearly 100 articles and has been published in such prestigious journals as *Developmental Psychology*, *Child Development*, and the *Journal of the Acoustical Society of America*. She served

for six years as editor of the *Monographs of the Society for Research in Child Development*. Her work has been continuously funded by the National Institutes of Health since 1969, and she has mentored several scientists who have gone on to tenure-track positions at UMass Amherst and other leading research institutions.



James Kurose

Distinguished University Professor of Computer Science; Co-director, Networking Research Laboratory; Associate Director, NSF Engineering Research Center for Collaborative Adaptive Sensing of the Atmosphere

James Kurose is a world-renowned pioneer in computer networks, a subfield of computer science that has made possible the World Wide Web, wireless networks, and related technical marvels. His research interests include network protocols and architecture, network measurement, sensor networks, multimedia communication, and modeling and performance evaluation.

Kurose has been a visiting scientist at IBM Research, INRIA, Institut Eurécom, and the University of Paris. For the Institute of Electrical and Electronic Engineers (IEEE), he has served as editor-in-chief of the *Transactions on Communications* and as a founding editor-in-chief of the *IEEE/ACM Transactions on Networking*. One of the founders of the Commonwealth Information Technology Initiative, Kurose is also interested in system and pedagogical aspects of instructional technology. With Keith Ross he co-authored the textbook *Computer Networking: A Top-Down Approach Featuring the Internet*, now in its second edition.



Derek Lovley

Distinguished University Professor of Microbiology; Director, Genomes of Life Center

Derek Lovley is a pioneer in the application of genomic tools to bioremediation and energy generation. He has a long record of scientific discovery but in the past three years has reached an almost unprecedented level of productivity in applying systems biology to environmental restoration and transforming it from a largely empirical practice. At the Genomes of Life Center, which he directs, he has created two subfields of microbiology, the production of electricity from anaerobic sediments and the use of microbes to produce nanowires. Much of this work has received widespread media attention, and his laboratory's web site often receives more than 2.5 million visits a month. Lovley has had more than 200 publications, and between 2002 and 2004 appeared seven times in the highly prestigious journals *Science* and *Nature*.



John J. McCarthy

Professor of Linguistics

John J. McCarthy is an international leader in two major subfields of linguistics, phonology and morphology, and their interaction. His early work on the phonology and morphology of Semitic languages introduced a way to deal with non-concatenative morphology and made him a leader in the field. In the mid-1980s he was one of two key developers of the highly influential theory of prosodic morphology. In the early 1990s he played a major role in developing optimality theory and became one of its leading exponents and developers within linguistics.

By the mid-1990s most phonology papers submitted to meetings and journals reflected and acknowledged McCarthy's influence. He is celebrated for his impact on phonology proper, his training and mentoring of phonologists in optimality theory, and his contributions to its theoretical framework. He has also made important contributions in segmental phonology. His recent work addresses fundamental questions about the nature of phonological derivation, paradigmatic relations, and the concept of markedness.



Murugappan Muthukumar

Wilmer D. Barrett Professor of Polymer Science and Engineering

Many in the polymer community regard Murugappan Muthukumar as the most influential theorist of the past two decades. Exploiting the tools of analytical theory and computer simulation, he has made seminal contributions to the understanding of a wide variety of polymer systems. His complex calculations are marked by a penetrating physical insight that makes them understandable to a broad physics audience, and his key concepts can be extrapolated well beyond a specific polymer or problem. So great are the breadth and accessibility of Muthukumar's research that virtually all serious polymer investigators have at one time or another been strongly influenced by his work.

During the past year Muthukumar developed the Computation Science Center at the College of Natural Sciences and Mathematics. He is the associate editor for *Physical Review Letters* and chair-elect of the American Physical Society's High Physical Division.



Anna Nagurney

John F. Smith Memorial Professor of Finance and Operations Management; Director, Virtual Center for Supernetworks; Director, Supernetworks Laboratory for Computation and Visualization

Anna Nagurney's status as one of the shining stars of the Isenberg School of Management continues to be confirmed by a seemingly unbroken stream of awards and other recognitions. Last year she was awarded a prestigious fellowship at the Radcliffe Institute for Advanced Study at Harvard; in order to accept it, she had to turn down her second Fulbright Award in five years. In 2004 Nagurney was selected as a fellow at the Rockefeller Foundation's Bellagio Center. In 2003 she was awarded a \$400,000 NSF grant for her pioneering work in knowledge supernetworks.

Nagurney's work in that field continues at the Virtual Center for Supernetworks, which serves academia, industry, and government as a resource on the study of economic, environmental, financial, knowledge and social supernetworks and their applications in such areas as transportation, logistics, critical infrastructure, telecommunications, power and energy, and electronic commerce.



Max Page

Associate Professor of Art; Adjunct Associate Professor of History

His spirited presentations and thought-provoking scholarship on urban, architectural, and public history have won Max Page wide admiration. Page is the author of *The Creative Destruction of Manhattan, 1900-1940* (1999), which won the Spiro Kostof Award of the Society of Architectural Historians for the best book on architecture and urbanism. He writes for a variety of publications about New York City, urban development, and the popular uses of history. He co-edited *Building the Nation: Americans Write Their Architecture, Their Cities, and Their Environment* (2003). In the past three years he has published three articles in major journals, three chapters in important books, and 14 pieces in, among others, *Architecture*, *Metropolis*, *The Philadelphia Inquirer*, *The Hartford Courant*, and *The Christian Science Monitor*.

Page's contributions as a public historian include curatorial activities, consultantships, and conference presentations everywhere from California to Venice, Italy.

**Thomas P. Russell**

*Distinguished University Professor of Polymer Science and Engineering;
Director, Materials Research Science and Engineering Center*

Thomas P. Russell is widely regarded as one of the most influential polymer physicists of our time. At the Materials Research Science and Engineering Center, which he has directed since 1997, Russell unites the efforts of 34 UMass Amherst faculty members from the departments of Biochemistry, Chemical Engineering, Chemistry, Plant Biology, Physics, and Polymer Science and Engineering who conduct research collaborations and outreach programs with more than a dozen other institutions. The Center has been fostered by 29 years of support from the National Science Foundation.

Russell's research interests include using polymers and block copolymers for the fabrication of nano-structured materials and exploring electronic, magnetic, biological, and sensory applications of their use. He has received several major grants and is associate editor of *Macromolecules*, the leading journal of polymer science and engineering.

**Kalidas Shetty**

Professor of Food Science

In 2004, U.S. Secretary of State Colin Powell announced the selection of Kalidas Shetty as one of five National Academy of Sciences Jefferson Science Fellows to serve one-year terms providing policy makers in the U.S. Department of State with cutting-edge scientific and technical expertise on opportunities associated with long-range emerging international scientific developments. The Jefferson Science Fellows, supported by grants from the John D. and Catharine T. MacArthur Foundation and the Carnegie Corporation, will help define a significant new relationship between the scientific community and the U.S. Department of State.

Shetty's teaching focuses on food biology, food biotechnology, functional foods, and world food habits. His research centers on biotechnology and the metabolic biology of functional foods and more specifically on innovative advances in ingredient biosynthesis, food safety, nutrition, functional foods, and the environmental adaptation of biological systems.

**James Tate**

Distinguished University Professor of English

James Tate was inducted into the American Academy of Arts and Letters in 2004, thereby attaining this country's highest formal recognition of artistic merit. He had already, in 1992, won a Pulitzer Prize. Since 1979 he has published nine collections of poetry, the most recent of which, *Return to the City of White Donkeys*, was issued in 2004. He has also published a book of essays and a collection of short stories and served as editor of *Best American Poetry of 1997*. Tate's poetry has appeared in a wide range of literary journals, including *The New Yorker*, *The Yale Review*, *Harvard Review*, *The Virginia Quarterly*, and many others. Translations and editions of his books have been published in England, Norway, Slovenia, Germany, and Russia. He has read at innumerable venues in the U.S. and Europe and has recently appeared before the American Academy of Poets, the Poetry Society of America, Sarah Lawrence University, and the Grolier Bookshop as well as at many poetry festivals.