

CSAM NEWSLETTER

COLLEGE OF SCIENCE AND MATHEMATICS

A Spectrum of Possibilities

CSAM Awarded \$218k Grant to Pioneer “Greening” of Higher Education IT in New Jersey

by Ann Frechette, Dean's Office

Montclair State University has been awarded a \$218,000 energy technology demonstration grant to rapidly advance the development of an energy management software designed to enable IT Data Centers to realize significant energy efficiency improvements. Led by a transdisciplinary team of scientists in the College of Science and Mathematics and the PSEG Institute for Sustainability Studies, the core of the software toolkit will be a Decision Support System (DSS) that enables business and organizational decision-making intended to reduce energy usage and associated operational costs of IT data centers in higher education and small/medium-sized businesses.

“Recent studies have noted that in the US alone, electric consumption at data centers is almost 2% of world production, and today’s average data center consumes as much energy as 25,000 households,” quoted Dr. Michael P. Weinstein, director of the PSEG Institute for Sustainability Studies. “If this trend continues, data center output is expected to quadruple by the year 2020,” he added.

The Montclair State DSS will be an interactive software-based system that will capture an array of energy-related information from the University’s IT Data Center. The DSS will then use an artificial intelligence framework to provide expected performance vs. cost outcomes for various short and

long-term energy management decisions including application scheduling, hardware maintenance, server utilization, room temperatures, data center equipment selection, and future usage of virtual data centers.

“We expect the system will allow our institution not only to achieve cost savings in energy usage for the data center but also to predict how future decisions will result in savings” said Dr. Stefan Robila, associate professor of Computer Science, and Principle Investigator for the DSS project. “We also expect to become a model for higher education institutions in New Jersey and in the neighboring states, with the potential of becoming a pioneering system for colleges and universities throughout United States,” added Dr. Michael Oudshoorn, chair of the Department of Computer Science.

The grant was awarded by PSE&G, in partnership with the New Jersey Sustainable State Institute, to support innovative energy efficiency technologies that hold the potential to come to market quickly. Nearly \$8 million in grant funding is being made available for New Jersey’s leading energy technology organizations, including universities and the small businesses community. The Energy Technology Demonstration Grant Program is part of a \$190 million initiative that was approved by the NJ Board of Public Utilities in 2010 to support the state’s

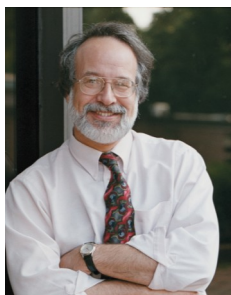
economic development goals and bring new energy efficiency tools to utility customers.

The Montclair State DSS project team includes principle investigators Stefan Robila and Michael P. Weinstein; Aparna Varde, an expert in data mining, database management and artificial intelligence; and Michael Pawlish, a doctoral student in the University’s Ph.D. program in Environmental Management. (See page 4 for more grant news) ♦

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From Dean Prezant - A Plea to End the False Debate.



This Newsletter shares news of recent and important CSAM research grants, CSAM students offering cutting edge science presentations at professional conferences and 5th graders visiting CSAM and extracting DNA from strawberries. There's much to celebrate as CSAM continues to discover, teach and learn science. But there's a national tempest that has been brewing much too long and cuts right to the heart of our national future as a leader in the sciences.

For too many decades we've had a false debate being promulgated in, of all places, our pre-college biology classrooms. This debate is yet one more piece of evidence that without a refocus on science and what science actually is, we will continue to lose our leadership role on this ever shrinking planet. Early in and through much of the last century evolutionary biologists, because of the many legal tests faced and won, began to feel a bit more secure in the knowledge that the courts had redundantly found that there are very real boundaries that define science and define what should not be proposed as science in a biology classroom. Based on a recent survey, this scientific fraud, unfortunately and surprisingly, in part seems to emanate from high school science teachers themselves!

In an article in the January 28th issue of *Science* magazine, one of two preeminent journals in the sciences, Penn State political scientists Michael Berkman and Eric Plutzer report that some 60% of high school biology teachers find ways to insure that students do not understand that evolution is the basic underpinning of biology and the major touchstone that allows a firmer and more cohesive understanding of life itself. In fact it appears that of the over 900 public high school science teachers surveyed in the National Survey of High School Biology Teachers, just over one quarter offer the lessons and overarching themes of evolution that the National Research Council recommends for high school biology. Some 540 teachers of those surveyed take an approach to teaching a basic tenet of science that is, at best, soft and noncommittal. Seemingly, in their discussions about evolution they share with students views that some perceive as viable options but options that are clearly not science. Some teachers share that students only need to learn about evolution because it will appear on standardized testing. It's possible that some teachers merely seek to avoid the "controversy". In fact, despite the many decades of court challenges that redundantly prohibit teaching creationism, 13% of science teachers sur-

veyed promote this or the equally non-testable (and non-scientific) intelligent design. It seems too many high school science teachers, despite the fact of evolution, a fact based on 150 years of "hard evidence" and testing using accepted scientific methodology, discuss evolution as a concept to be debated as an opinion. These teachers do our students a tremendous disservice. It is not a concept to be bandied back and forth as one would discuss the relative strengths of the Steelers and Jets. Fudging the reality of evolution by denial or offering false options is to undermine the universally accepted approach to science. It allows students to move on in their education with a structural understanding of "science" that will collapse under the weight of testing rigor. This most recent report, of dozens that came before, continues to demonstrate a basic misunderstanding in the general public with apparent support, purposeful or not, from many teachers to obfuscate science with some philosophical or religious thought. Aside from personal religious views that might shade what a teacher is willing to espouse in the classroom learning environment, teachers may worry about responses from supervisors, parent groups, or politicians. There seems, however, to be little debate among any of these groups that the United States must retain a lead in science if we are to remain relevant in a rapidly changing world. There is no threat to individual or group philosophies or religions to clearly enunciate what is and what is not science. What is at risk is the recognition of what science does and how it does it along with an equal understanding that we cannot hope to advance if we offer false impressions and approaches to our next generations. It is past time for our school systems to move beyond this false controversy and to move this debate to its rightful place as a historical footnote. ♦

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Back issues are available at
<http://csam.montclair.edu/newsarchive.php>

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CELS: An Update

On 24 January 2011 a large red and white sign with an equally large X was posted on the front door on McEachern Hall, the first tangible sign designating imminent demolition. Soon thereafter, rising from that dust, will be the Center for Environmental Life Sciences (CELS), CSAM's upcoming state-of-the-art building that will foster interdisciplinary and transdisciplinary research and offer innovative teaching space all within a dynamic, "green" science facility.

Working with the extraordinary staff of *S/L/A/M* Collaborative, a Connecticut based architectural firm with deep experience in creating science venues, and MSU Engineering and Design division, an initial conceptual design was prepared incorporating the needs expressed by CSAM. Incorporating CSAM feedback, comments and suggestions, *SLAM* tailored the building's design and floor plan to match our current and predicted needs of the future with a focus in CELS on pharmaceutical and medicinal sciences and sustainability and environmental studies.

CELS is being designed for at least silver Leadership in Energy and Environmental Design (LEED) certification and will encompass 100,000 sq ft in a four-story structure that will overlook the Manhattan skyline to the east and form a newly delineated "Science Quad" to the west. Occupancy is targeted for January 2013.

In moving this project forward, the MSU Board of Trustees recognized our extensive planning and preparation and the desperate need we have for additional, modern



Sample fourth floor plan

science facilities and has approved a bond issue to fund most (but not all) of the construction, equipment and furnishings. We are in fund raising mode to insure that CELS helps fulfill the dreams of our students and faculty and will be a welcome venue that will make our alumni proud. To get a feel for CELS, take a look at the above figure to just get a glimpse of what will be a remarkable new way to conduct science and collaborate cross disciplines. We would truly value your support for these efforts that first and foremost will support our CSAM students and to continue to contribute to the critical need for scientists, mathematicians and educators in the United States. To contribute to this critical next step for CSAM, please contact our Development Office at boylej@mail.montclair.edu. ♦

5th Graders Extract DNA

“This is great!” “This is the best field trip ever!” These are some of the comments from the 5th grade students from Bradford Elementary School as they entered the genetics laboratory in Science Hall.

For the second consecutive year, Dr. Sandra D. Adams (pictured right) of the Biology and Molecular Biology Department hosted four classes of 5th grade students on four different days from Bradford Elementary, the University's adopted school. Dr. Adams presented a session on DNA that included a forensics activity. The students, then, extracted DNA from strawberries. Mr. Lou DeBello, the 5th grade teacher, who coordinated the trip to Montclair State, stated that he wanted all students to have the experience of conducting a science experiment in a real science laboratory. He added that this is the first time that some students were on a college campus. Dr. Adams conducts these ac-

tivities because she believes that this is the best way to motivate students and stimulate interest in science. According to Dr. Adams, “I have as much fun as the students. Their excitement makes all of the work worthwhile”. She hopes that these visits can develop in these students long lasting excitement about doing science. As they were leaving, several students commented to Dr. Adams and to other Bradford teachers that accompanied them that they are going to come to Montclair to study science and be scientists. ♦



Advisory Council—Member Profile

(Editor's note: The following is part of a series which features a member of the CSAM Advisory Council.)

Born in Batavia, N.Y., **Dr. Bradley T. Sheares** was raised in Chicago. He graduated summa cum laude



and Phi Beta Kappa with a bachelor's degree in chemistry from Fisk University and earned his doctorate in biochemistry from Purdue University.

He was a National Institutes of Health postdoctoral fellow and a Lucille P. Markey Scholar at the Center for Cancer Research at the Massachusetts Institute of Technology. Dr. Sheares' research interests included the bio-

chemistry of glycoprotein synthesis and gene regulation of cholesterol synthesis.

Dr. Sheares has broad experience in science, business and the pharmaceutical industry. He joined Merck and Co., Inc., as a Laboratory Research Fellow in 1987, and was named President of the U.S. Human Health Division in 2001. While at Merck, Dr. Sheares led the commercial launch in the U.S. of CRIVAN, an HIV protease inhibitor and a critical component of a multi drug cocktail that

revolutionized the treatment of HIV disease in the developed world. Dr. Sheares later joined Reliant Pharmaceuticals, Inc., as Chief Executive Officer. There, he assembled a seasoned executive management team, restructured the company's debt, and successfully executed the sale of Reliant to GlaxoSmithKline for \$1.67 billion in December of 2007.

Dr. Sheares serves on the board of directors of numerous multinational and U.S. based, public companies, including Honeywell, Progressive, Covance, and Henry Schein. Dr. Sheares is the recipient of numerous awards, including honorary Doctor of Science degrees from Fisk University and Purdue University. He has been featured in a number of articles and publications, including the Feb. 6, 2006 cover of Fortune Magazine, "Meet Corporate America's Next Generation of Leaders," and Fortune's "Most Powerful Black Executives" list.

Dr. Sheares is married to Adrienne Simmons and he has three daughters. The Sheares family actively supports and contributes to numerous not-for-profit organizations and institutions that support the education, development and well being of children and young adults. The Sheares Family Charitable Foundation was established in 2008 to support the Sheares family's philanthropic goals. ♦

CSAM Receives Over \$1.2 Million in Grants

The start of 2011 has been exceptional for CSAM faculty. Thus far, \$1,296,594 has been awarded to our faculty, including the "Greening" of Higher Education IT, featured on page 1, and the following:

Dr. **Stefanie Brachfeld** has been awarded \$451,342 from the NASA Mars Fundamental Research Program to study the origin and evolution of planetary magnetic fields and crustal magnetic anomalies on Mars. The grant titled "Static and shock pressure treatment of synthetic Mars basalts: Implications for understanding the evolution of crustal magnetic anomalies," will be conducted with colleagues from the University of Hawaii, University of Minnesota, and

Harvard University.

Dr. **Mark Chopping's** proposal to map changes in the grasslands and forests of the southwestern United States was recently selected for funding by NASA. The proposal is one of eighty-seven proposals that were selected out of a total of 325 submitted to the competition "The Science of Terra and Aqua". The \$182,386 project will use data from the NASA Earth Observing System Multiangle Imaging Spectroradiometer (MISR) and Moderate Resolution Imaging Spectroradiometer (MODIS). It will leverage an innovative modeling approach developed in previous Earth Observing System projects that exploits structural signals in the NASA

remote sensing data. The research is important because disturbances that are likely to be related to changing climatic conditions – owing to global warming – appear to be playing increasingly prominent roles in defining aboveground carbon stocks in the southwestern US, as elsewhere. These include unusually extensive and severe losses in forest cover from a modified fire regime; unusually extensive and severe insect outbreaks; and continued woody encroachment into former desert grasslands.

Drs. **Sandra D. Adams** and **Kirsten Monsen-Collar** have been awarded \$40,000 in support from the Howard

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PSEG Institute Holds Global Sustainability Forum

by Ann Frechette, Dean's Office

Leading sustainability scientists from around the world participated in the first major academic forum—sponsored by Montclair State's PSEG Institute of Sustainability Studies: International Symposium on Sustainability Studies: The Emerging Paradigm and the Urban Environment.

The International Symposium was

specifically designed to advance research, informed decision-making and development of science-based policy emerging at the very heart of the sustainability transition to reverse non-sustainable trends:

- Reconciling society's development goals with the planet's environmental limits,
- Understanding the fundamental character of interactions between nature and society,
- Advancing the social and technological knowledge related to sustainability, and using such knowledge for action, and
- Balancing social and environmental well-being, quality of life, and equity with wise management and conservation of natural resources.

Keynote speakers at the event, which was held in late October, 2010, included:



"Sustainability science brings together scholarship and practice, global and local perspectives from north and south, and disciplines across the natural and social sciences, engineering, and medicine — it can be usefully thought of as neither "basic" nor "applied" research but as a field defined by the problems it addresses rather than by the disciplines it employs;" Proceedings of the National Academy of Science/2003 (Clark, W.C., & Dickson, N.M.)

– Dr. Robert W. Kates, independent sustainability scholar and professor (Emeritus) at Brown University. Dr. Kates's research focuses on long-term trends in environment, development, and population, and he is particularly known for his work on natural hazards mitigation.

– John D. Sterman, the Jay W. Forrester Professor of Management at the

MIT Sloan School of Management and Director of MIT's System Dynamics Group. His research includes systems thinking and organizational learning, computer simulation of corporate strategy and public policy issues, and environmental sustainability.

– Dr. Simon A. Levin, is a Moffett Professor of Biology in the Department of Ecology and Evolution at Princeton University. He specializes in using mathematical modeling and empirical studies in the understanding of macroscopic patterns of ecosystems and biological diversities.

Speakers at the three-day symposium, which was attended by over 250 international scientists, policy makers and environmental executives, addressed the sustainability challenge in seven thematic areas:

- Managing the earth's life support systems: The Emergence of sustainability science and transdisciplinarity.
- Balancing ecology and economy: the value of natural capital and the quality of life.
- From science to policy: Ecosystem-based management and the coastal continuum.
- The coastal commons and the ecology of cities.

- Restoring and rehabilitating ecosystems: Return from the precipice.
- Achieving the sustainability transition: Social responsibility and social learning,
- Where do we go from here?



Sponsors of this inaugural symposium included the PSEG Foundation, the Public Affairs and Sustainability Practice Area of PSEG, the S/L/A/M Collaborative, the U.S. Environmental Protection Agency, Norris McLaughlin & Marcus and Christopher Stevenson, Esq., New Jersey's Department of Environmental Protection, Sodexo, New Jersey Natural Gas, and Paulus, Sokolowski & Sartor.

The PSEG Institute for Sustainability Studies – within the College of Science and Mathematics – was founded in 2010 to play a transformative role in transdisciplinary research and education to address the relevant sustainability issues of our time. Its central mission is to conduct research, education and outreach to balance conservation and preservation of Earth's life support systems with their production of sustainable goods and services for human welfare, now and in the future.

A synopsis of the Symposium, including copies of the speaker presentations, is available at: <http://csam.montclair.edu/sustainabilitystudies/conferences>. ♦

NJSOC to Become Sustainability Showcase Site

by Ann Frechette, Dean's Office

The New Jersey School of Conservation (NJSOC) – the University's environmental education and field research campus – was recently awarded a \$2.65 million grant by the New Jersey Board of Public Utilities (NJBPU) as part of a competitive grant program for innovative energy efficiency and renewable energy projects at state facilities. The grant will allow the installation of a 300,000-watt solar farm that will meet all of the School's electricity needs as well as generate excess power for use by local utilities.

The solar farm, which is expected to be operational in late 2011, will be comprised of fourteen-hundred 200-watt modules on a ½ acre tract site within the NJSOC. The solar arrays will feed into a bank of 24 Solectric inverters that will convert the DC electricity into AC electricity and feed into the facility's main circuit breaker panels.

"We anticipate that the installation of the "solar farm" will serve as a sustainability showcase and generate high interest in solar energy among the thousands of students and teachers

that visit the NJSOC each year," said Dr. William H. Thomas, director of the NJSOC. "Further, it will promote the training of undergraduate and graduate students, expand the number of on-site courses offered by MSU and create research opportunities in keeping with regional priorities for open space, clean energy generation and biodiversity in the most densely populated state in the nation," Thomas added.

The grant was awarded by the NJBPU which is funded with federal stimulus money allocated to New Jersey's State Energy Program (SEP) under the American Recovery and Reinvestment Act (ARRA).

In addition to energy cost savings, the U.S. EPA estimates the facility's clean electricity solar system will reduce atmospheric emissions of 3,938 tons of CO₂, 22,859 tons of NO_x, and 14,730 pounds of SO₂ over a 30-year period.

"The NJSOC's solar farm presents Montclair State with a unique opportunity to apply state of the art technology to renewable energy practices,

attract and educate new and existing students for potential career opportunities in this sector and contribute to a sustainable New Jersey," said Dr. Michael P. Weinstein, director of the University's PSEG Institute for Sustainability Studies.

The New Jersey School of Conservation (NJSOC) is the environmental field campus of Montclair State's College of Science and Mathematics. Established in 1949, the NJSOC is the oldest university operated environmental field center in the United States. Today, the NJSOC provides an array of environmental education programs and serves over 7,000 students and teachers each year. It is located sixty miles from MSU's main campus on a 240-acre tract in the Stokes State Forest of Sussex County NJ. The NJSOC is at the center of 30,000 acres of state forest and federal lands, surrounded The Delaware Water Gap National Recreation Area, Stokes State Forest, High Point State Park and a mosaic of properties held by the Nature Conservancy and the Conservation Trust. ♦

NJSOC Associate Director Named

Dr. Randall FitzGerald, Associate Professor of Environmental Studies, Coordinator of Education and Research, and Environmental Science Specialist at Montclair State University's School of Conservation (NJSOC) has been promoted to Associate Director of the NJSOC. He is an authority on microtine behavioral ecology and has authored numerous articles relating to animal behavior, behavioral ecology, and human sociobiology. His current research interests center around mate selection strategies and on the influence of imagery on responsible environmental behavior in humans. As Associate Director, Dr. FitzGerald will continue to oversee the educational and research efforts at the field station and will assist the director, Dr. William Thomas, in the day to day operations. Dr. FitzGerald earned his B.S. in Environmental Science from the State University of New York, College at Purchase, his Ph.D. in Biology at SUNY Binghamton, and spent 2 years as a NSF post-doctoral research fellow at the University of Pittsburgh. ♦

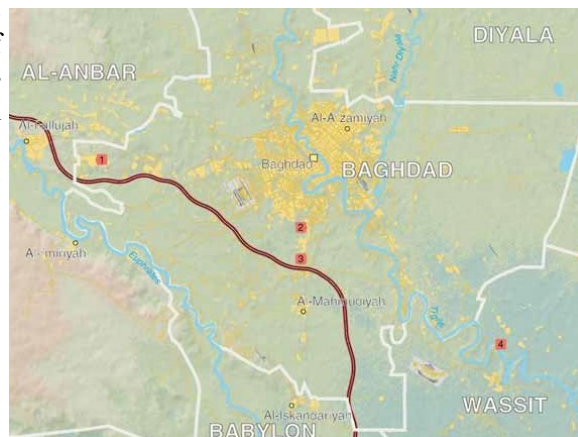


Baghdad: Surrounded by Hazardous Materials

by Mahmood M. Barbooti, Earth and Environmental Studies

For more than three decades, Iraq has entered three wars that resulted in entire ignorance of the establishment of properly designed facilities for hazardous waste management. All the resources of the country were directed towards maintaining the momentum for the war operations. Iraq now has several thousand contaminated sites resulting from a combination of general industrial activities, military activities and post-conflict damage and looting. The damage sustained to the industrial sites from looting cannot be underestimated. Several examples, known to UNEP, illustrate the scale and severity of the issue and the resulting damage to the environment and human health.

This article reflects the impact of the war operations on the environment where humans were exposed to hazardous chemicals. Baghdad, in particular, was exposed to severe chemical pollution and the contamination extended to agricultural fields and seeped into ground water. UNEP started a wide program for the Environmental Site Assessment, ESA, of the most contaminated sites in Iraq. Five sites were chosen and five working teams from the Ministry of Environment were formed for this mission. I was the leader of one of these teams. Our charge was to assess the Qadissiya site (15 miles to the south of Baghdad). The site was a military chemical plant which was heavily attacked by US aircrafts which caused the spread of hazardous chemicals such as chromium (VI) and cyanide on the land. The site is surrounded by agricultural and residential places. Potential pathways to exposure from toxic chemicals on such sites include direct contact (site workers and trespassers), blown dust and in the drinking water. Samples taken from the site indicated chromium contamination of soil in the range shown in the table to the left.



The map of the central region of Iraq showing Baghdad surrounded by four of the most polluted sites: 1: Khan Dahri (Lead) 2: Ouairig (Damaged army equipments), 3: Qadissiya (Hazardous Chemicals) and 4: Suwaira (Agricultural pesticides).

Metal	Water, mg/L		Soil, mg/kg	
	Minimum found,	Maximum found,	Minimum found,	Maximum found,
Chromium	15	2368	7	362
Copper	1	6	1	12050
Nickel	1	200	6	605
Lead			2	33860
Antimony			5	12920
Total Cyanide			1	48
Selenium	1	3		
Silver	2	13		
Zinc	32	44	5	1295

an area of about 60 hectares. Tetraethyl lead is known for its toxicity due to the high lead content. It is abandoned internationally, but still used in Iraq. The environmental effects of the hazardous waste are enhanced because of the existence of residential and agricultural activities surrounding these contaminated locations. Samples were collected by my team and sent for analysis to three accredited laboratories for analysis in the United Kingdom in 2005. Out of 42 soil samples analyzed, 39 samples were contaminated with lead that exceeded the maximum acceptable levels of 1 mg/kg. The lowest concentration of lead detected was 2 mg/kg compared to the maximum detected concentration of 16990 mg/kg.

For the natural environment, the indicators of importance are biodiversity and sensitivity to degradation. In general, the industrial areas in Iraq are situated in heavily developed regions of low biodiversity and sensitivity. For the population, the pattern of land use in Iraq indicates that the human health issues for contaminated land and hazardous waste are similar to those observed worldwide. [Assessment of Environmental “Hot Spots” in Iraq, UNEP, 2006]. ♦



Hazardous chemicals on the land of Qadissiya Site.

ScienceApps: Academic/Industry Educational Collaboration

The College of Science and Mathematics announces the launch of *ScienceApps*: a non-credit bearing applied science and mathematics educational program designed to meet the specific job training needs of early career professionals.

Developed in collaboration with industry partners, *ScienceApps* is designed to fill a critical need for “job-ready” science and mathematics graduates by delivering applied skills and know-how tailored specifically for the workplace. *ScienceApps*' first offering is a Consumer Product Science short course designed for the Fragrance and Consumer Household/Personal Care industries. Developed in collaboration with one of the world's foremost Fragrance and Flavor companies, this unique formulation science course is specifically designed for entry level or early career professionals, recent Bachelor of Science graduates seeking employment in this field, and business professionals who want an understanding of how products are formulated. At the end of this 2½ day short course, participants will be well-grounded in all key aspects of product formulation including:

- How products are formulated (personal care, fabric care, air care and household products)
- Selection and use of ingredients
- Product evaluation and stability and
- Regulatory, environmental and legal aspects of product formulation



The Consumer Product Science short course faculty includes:

- Dr. Kumar Vedantam, Vice President of Technology and Applications, Givaudan Fragrances Corporation
- Dr. Saliya deSilva, Professor of Chemistry and Biochemistry, Montclair State University
- Dr. Elena Petroff, Assistant Professor of Biology and Molecular Biology, Montclair State University

The short course will be held March 16-18, 2011 on the Montclair State University Campus. For more information on *ScienceApps* and the Consumer Product Science short course, go to: <http://scienceappscps.eventbrite.com/>. ♦

Scholarships Available

CSAM is pleased to announce the availability of research scholarship opportunities for undergraduate and graduate students for the 2010-2011 academic year.

• *The Margaret and Herman Sokol Faculty/Student Research Grant Program* is an endowed program designed to acknowledge the role faculty play in advancing student academic development. The program awards grants for projects which impact on the depth and breadth of science and mathematics education at Montclair State in research initiatives that involve students working cooperatively with faculty. Application available at http://csam.montclair.edu/pdfs/Sokol_Faculty_Student_Research_Grant_2011.pdf.

• *The Margaret and Herman Sokol Graduate Summer Research Fellowship* will provide a \$5,000 stipend to a talented M.S. or M.A. student to conduct thesis research at

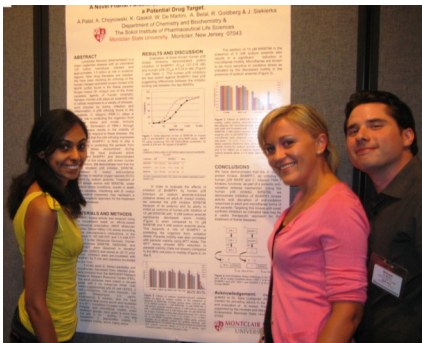
MSU during the summer of 2011. Any CSAM science graduate student who has completed one year of graduate study, is working on a research thesis, and will return to MSU for the fall 2009 semester is eligible to apply. The stipend is meant to assist the student during the summer and help her or him to make significant progress on a thesis research project and eliminate the need for working outside of the university. Application available at <http://csam.montclair.edu/>. Deadline: March 18, 2011.

• *The Margaret and Herman Sokol Graduate Fellowship in Science* offers a \$10,000 award to a graduating senior who will pursue full-time graduate study leading to a doctoral (Ph.D.) degree at an accredited institution of higher learning. Current students majoring in Biology, Molecular Biology, Geoscience, Physics, Chemistry and Biochemistry are eligible to apply. Application available at <http://csam.montclair.edu/>. Deadline: March 18, 2011. ♦

Student News

Environmental Management student, **Aslan Aslan**, was accepted into the European Space Agency short training course at the European Earth Observing center in Frascati, Italy during January 2011. Aslan was trained in polarimetric/interferometric radar remote sensing which corresponds to his PhD research topic (mapping trends in biomass in Indonesian tropical forest) under the mentorship of Dr. Mark Chopping.

Chemistry students **A. Patel**, **A. Chojnowski**, **K. Gaskill**, **W. De Martini** and **A. Belal** presented "A novel filarial parasite (*B. malayi*) stress-activated protein kinase as a potential drug target," co-authored with Drs. **R. Goldberg** and **J. Siekierka** at the 2010 Woods Hole Conference on Molecular Parasitology.



In January 2011, two of Dr. Aihua Li's graduate students in mathematics presented at the Joint AMS/MAA National Mathematics Meeting, held in New Orleans. **Emel Demirel** presented her paper "Study of polynomial solu-

tions to certain diophantine equations" in the AMS Session on Number Theory. This research is a part of her master thesis and is sponsored by a CSAM Sokol Faculty/Student Research grant.

Her travel expenses were partially covered by the Graduate School and CSAM. **Stewart Hengeweld** gave a presentation titled "Integrating graduate research into the middle school classroom", in the AMS Session on Mathematics Education. Stewart is a GK-12 Fellow supported by an NSF grant through MSU. This research is a joint work with Dr. Li and middle school teacher, Mr. M. Miguel. The GK-12 program and CSAM supported his travel to the conference.

Doctoral student **Paola Dolcemascolo** (Earth and Environmental Studies) received a \$5,000 NJWRRRI student research grant, becoming the second MSU student in two consecutive years to get this grant. ♦



Continued from page 4

Science Education Alliance to offer an innovative program, the Phage Genomics Research Initiative, that will involve first year students in authentic research. With this award, MSU joins a small network of institutions selected through a national competition in which first year students isolate colonies of bacteriophage from locally collected soil samples, purify and characterize the phage, and extract the DNA. The students will then use bioinformatics tools to analyze and annotate the DNA from their phage.

The College's **Passaic River Institute (PRI)** was recently awarded a "Research Experience for Undergraduates" grant by the National Science Foundation totaling \$390,000 over 3 years. For eight weeks each summer, ten undergraduate students

will spend their summer at the College's New Jersey School of Conservation (NJSOC) in the wilds of the mountains of northwest New Jersey amid cool hemlock forests in a "geo-environmental scientific research immersion experience" focused on several beautiful small lakes in the area. Students will work on and rotate among the following research areas, performing field measurements and comparing them with modeling calculations: 1) surface hydrology; 2) sub-surface hydrology; 3) diurnal water-quality relationships; 4) erosion and sedimentation relationships and 5) sediment-water phosphorus dynamics. Seven faculty from the departments of Earth and Environmental Studies and Biology and Molecular Biology are participating in the project led by PRI Director, Dr. Kirk R. Barrett. REU students will also travel periodically

to Montclair State's main campus to analyze samples using advanced instruments. Scientific endeavors will be supported by team-building, recreational and educational/professional development activities, including presentations by the students at professional conferences. The grant pays participating students a stipend along with their living and travel expenses. More information is available at www.csam.montclair.edu/pri.

As co-PIs, Drs. **Yang Deng**, **Dibyendu Sarkar** and **Sudipta Rakshit** received a NJWRRRI grant funded for \$14,966 titled "Scrap Tire and Water Treatment Residuals as Novel "Green" Sorbents for Removal of Common Metals from Polluted Urban Storm Water Runoff." ♦

NEW! Middle School Science Teaching Certification Program

CSAM is pleased to announce that a new certification program in Middle School Science Teaching has been approved by the MSU Board of Trustees. The program is designed for teachers, with New Jersey certification in disciplines other than science and closely related fields, who are teaching science in the middle grades or preparing for such an assignment. Four new courses have been developed in Biology, Chemistry, Earth Science and Physical Science that address New Jersey State standards for teaching science in the Middle Grades. Teachers who successfully complete the sequence of four courses will have the background and education they need to be effective science teachers in the middle grades and will be able to communicate the science and model effective teaching pedagogy. ♦

Faculty Activity

Dr. **Mahmood Barbooti** (Earth and Environmental Studies) delivered lectures on Environmental Chemistry at the Institute of International Education as part of the Scholar Rescue Fund lecture program.

Dr. **Yang Deng** (Earth and Environmental Studies) presented a poster entitled "A new pathway to applying Zero-Valent Iron (ZVI) for environmental remediation: Bare or bimetallic Zero-Valent Iron nanoparticle/dioxygen system (ZVI/O₂)" at the 2010 SERDP & ESTCP's Partners in Environmental Technology Technical Symposium and Workshop, and a poster entitled "Simultaneous oxidation of refractory organics and ammonia in Landfill Leachate by thermally activated persulfate" at the 2010 International Chemical Congress of Pacific Basin Societies.

Dr. **Lisa Hazard** (Biology and Molecular Biology) presented "Interspecific variation in behavioral aversion of sympatric temperate zone amphibians to road deicers" at the Society for Integrative and Comparative Biology Annual Meeting, Salt Lake City. She has also been appointed to its Student Support Committee as Vice President, MSU chapter of Phi Kappa Phi Judge for Best Student Paper competition. Dr. Hazard is a reviewer for *Herpetologica*.

Dr. **Reginald Halaby** (Biology and Molecular Biology) received an

ABRCMS Judges' Travel Subsidy for the 2010 Annual Biomedical Research Conference for Minority Students held in Charlotte, NC.

In January 2011, **Dr. Aihua Li** (Mathematical Sciences) participated in the Joint AMS/MAA National Mathematics Meeting and gave a presentation "Cryptography, a great topic for undergraduate mathematics courses" in the MAA Session on Cryptology for Undergraduates. In December, she was invited to give two colloquium talks at Miami University, Ohio: "Contributions of ancient Chinese mathematics", in the Department of Mathematics, and "Chinese abacus and its role in mathematics education", in the Department of Educational Psychology. And, in November, Dr. Li participated in the MAA-NJ/PA joint meeting and was elected to be the vice chair for student fairs of MAA-NJ section. She also refereed a paper for Communications in Algebra and reviewed two articles for Mathematics Review.

Dr. **Michael P. Weinstein** (PSEG Institute for Sustainability Studies)

gave an invited keynote speech at the Annual Meeting of the Alliance for Global Sustainability in January in Gothenburg, Sweden.

The British Broadcasting Corporation has awarded a commendation for wildlife photography to Dr. **Jacalyn Willis** (PRISM), Gregory Willis, and Ben Dodge in the Animal Behavior category of the worldwide competition of more than 700 researchers who use camera-traps. The photo shows a mother puma escorting her two young kittens on a foray in the rainforest preserve of Gallon Jug, Belize. The photo and background on the project, part of the Rainforest Connection of the College of Science and Mathematics of Montclair State University, will be highlighted in the BBC print *Wildlife* magazine and on the BBC website. The photo is part of a conservation project that involves both long-term monitoring of mammal populations in both Belize and Panama, and a conservation education program provided by videoconference technology live and interactively from the Willis' research sites in both countries. ♦

Congratulations to our CSAM faculty who were awarded tenure:

Dr. **David Konas**, Chemistry and Biochemistry
 Dr. **Jing Peng**, Computer Science
 Dr. **Dibyendu Sarkar**, Earth and Environmental Studies
 Dr. **Johannes Schelvis**, Chemistry and Biochemistry
 Dr. **David Trubatch**, Mathematical Sciences
 Dr. **Meiyin Wu**, Biology and Molecular Biology

Publications

- Alsudani, H.M., R.I. Al-Bayati, **M.M. Barbooti**, A. H. Kadhum and F. Shamsudin (2010). "Determination of common cations and ammonium by ion chromatography in water samples of Baghdad City: Part.2." *International Research Journal of Biotechnology*, 1:3, pp. 28-36.
- Barbooti, M.M.**, M.A. Zablouk and U.A. Al-Zubaidi (2010). "Recovery of chromium from waste tanning liquors by magnesium oxide." *International Journal of Industrial Chemistry*, 1, pp. 29-38.
- Blouin M.S., I.C. Phillipsen and **K.J. Monsen** (2010). "Population structure and conservation of the Oregon spotted frog, *Rana pretiosa*." *Conservation Genetics*. 11:6, pp. 2179-2194.
- Callanan J.R., **G.A. Pope, M.L. Goring** and **H. Feng** (2010). "Effects of high intensity forest fire on clay mineralogy." *Physical Geology*, 31, pp. 407-422.
- Deng, Y.**, H. M. Solo-Gabriele, M. Laas, L. Leonard, D. L. Childers, and M. Ross (2010). "Impacts of Hurricanes Katrina and Wilma on water flow within the Everglades." *Journal of Hydrology*, 392, pp. 164-173.
- Feng H.**, H. Jiang, W. Gao, **M.P. Weinstein**, Q. Zhang, W. Zhang, L. Yu, D. Yuan and J. Tao (2010). "Metal contamination assessment for sediments in western Bohai Bay and adjacent urban estuaries, China." *Journal of Environmental Management*, doi: 10.1016/j.jenvman.2010.11.020.
- Feng H.**, W. Zhang and L. Yu (2010). " $\delta^{13}\text{C}$, $\delta^{15}\text{N}$ and $\text{C}_{\text{org}}/\text{N}_{\text{total}}$ as tracer for sources of carbon and nitrogen to Yangtze River Intertidal Zone. In Schmidt, P.E (ed). *River Deltas Types Structures & Ecology*. Hauppauge, NY: Nova Science Publishers, pp. 147-160.
- Kollikkathara, N., **H. Feng**, and **D. Yu** (2010). "A system dynamic modeling approach for evaluating municipal solid waste management issues." *Waste Management*, 30, pp. 2194-2203.
- Li A.** and E. Mosteig (2010). "On the construction of explicit solutions to the matrix equation $\text{X}^2\text{AX} = \text{AXA}$." *Electronic Journal of Linear Algebra*, 21, pp. 159-170.
- Monsen-Collar, K.J.** and P. Dolcemascolo. (2010). "Using molecular techniques to answer ecological questions." *Nature Education Knowledge*, 1:11, p.1.
- Monsen-Collar, K., L. Hazard** and R. Dussa (2010). "Comparison of PCR and RT-PCR in the first report of *Batrachochytrium dendrobatidis* in New Jersey amphibians." *Herpetological Review*, 41:4, pp. 460-462.
- Nwachukwu, M.A., **H. Feng**, and J. Alinnor (2010). "Integrated studies for automobile wastes management in developing countries in the concept of environmentally friendly mechanic village." *Environmental Monitoring and Assessment*, DOI 10.1007/s10661-010-1714-y.
- Nwachukwu, M.A., **H. Feng** and **D. Ophori** (2010). "Groundwater flow model and particle track analysis for selecting water quality monitoring well sites, and soil sampling profiles." *Journal of Spatial Hydrology*, 10, pp. 1-14.
- Passchier, S.** and E. Erukanure (2010). "Paleoenvironments and weathering regime of the Neoproterozoic Squantum "Tillite", Boston Basin: No evidence of a snowball Earth." *Sedimentology*, 57, pp. 1526-1544.
- Patel, A., A.N. Chojnowski, K. Gaskill, W. De Martini, R.L. Goldberg** and **J.J. Siekierka** (2010). "The role of a *Brugia malayi* p38 MAP kinase ortholog (Bm-MPK1) in parasite anti-oxidative stress responses." *Molecular and Biochemical Parasitology* doi:10.1016/j.molbiopara.2010.12.008.
- Reynard-Callanan, J., **G.A. Pope, M.L. Goring** and **H. Feng** (2010). "Effects of high-intensity forest fires on soil clay mineralogy." *Physical Geography*, 31:5, pp. 407-422.
- Shaw, L., W.M. Spears, **L. Billings**, and P.M. Maxim (2010). "Effective vaccination policies." *Information Sciences*, 180:19, pp. 3728-3744.
- Thomas, D.**, D. Schoeller, L. Redman, C. Martin, J. Levine and S.A. Heymsfield (2010). "A computational model to determine energy intake during weight loss." *American Journal of Clinical Nutrition*, 92:6, pp. 1326-31.
- Heymsfield S.B., **D. Thomas**, A.M. Nguyen, J.Z. Peng, C. Martin, W. Shen, B. Strauss, A. Bosy-Westphal, and M.J. Muller (2010). "Voluntary weight loss: Systematic review of early phase body composition changes." *Obesity Review*, doi: 10.1111/j.1467-789X.2010.00767.x.
- Xu, J., N. Gao, Y. Tang, **Y. Deng**, and M. Sui (2010). "Perchlorate removal using granular activated carbon supported iron." *Journal of Environmental Sciences*, 22:11, pp. 1807-1813. ♦

Calendar of Events

March 16-18: Consumer Product Science Short Course

March 23: 2nd Annual Physics and Art exhibition
Keynote Speaker: Olivia Fermi “The neutron trail”
2:00 p.m. — University Hall Courtyard Lounge

March 29: Sokol Science Lecture Series
Move it and lose it...weight loss for the New Age
8:00 p.m. — Kasser Theater

April 5: Sokol Institute Research Symposium

April 9: New Jersey Academy of Science meeting
8:30 a.m. - University Conference Center

April 16: 5th Annual Student Research Symposium
9:00 a.m. — University Conference Center

May 14: CSAM Convocation
10:00 a.m. — Amphitheater

May 18: Graduate Convocation
7:00 p.m. — Yogi Berra Stadium

May 20: MSU Commencement
9:00 a.m. — Izod Center

May 20: Green Practices Workshop for Small Businesses

June 17: Green Practices Workshop for Small Businesses

Sustainability Seminars

4:00 p.m. Sokol Seminar Room (SH 102)

- March 8:** Eric Stern, ERM Group, Inc.
March 22: Lawrence Malizzi, Matrix New World
March 29: Margaret O’Gorman, Conserve Wild Life Foundation of New Jersey
April 5: David Golden, NJ Division of Fish & Wildlife
April 12: Robert Spiegel, Edison Wetlands Assoc.
April 26: Graduating PhD student presentations



Margaret and Herman Sokol Science Lecture

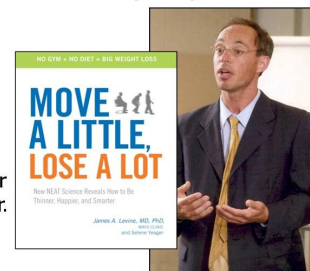
March 29, 2011
8:00 p.m. at Kasser Theater

Move It and Lose It... Weight loss for the New Age

*Stay fit and lose weight through routine daily activities
without an exercise routine or the gym*

Obesity expert **James Levine, MD, PhD**

Chief of Endocrinology at University Hospital Case Medical Center and Case Western Reserve University School of Medicine. He is a respected researcher, inventor of treadmill desks, and author.



Tickets, available in advance at the Kasser Theater, are **FREE** to the Montclair State University Community and \$10 for others.

CSAM Career Workshops

Sokol Seminar Room (SH 102)

- March 2, 5:00 p.m.** Internships and Co-ops
March 24, 3:00 p.m. Tips for admission to optometry, physician assistant and audiology schools
March 29, 3:00 p.m. Begin Your Career Search
April 4, 4:00 p.m. Common Resume and Interview Mistakes
April 13, 5:00 p.m. From Classroom to Industry for Science Majors
April 19, 3:00 p.m. Internships and Co-ops

Biology and Molecular Biology Seminars

4:00 p.m. Sokol Seminar Room (SH 102)

- February 24:** Dr. John Siefert, MSU, “A chemical biological approach to studying anti-stress responses in parasitic nematodes.”
March 3: Dr. Carlos Molina, MSU, “ICER-CREM, any one?”
March 31: Dr. Richard Roy, McGill University, “LKB1/AMPK signaling in cell polarity, growth and metabolism.”
April 14: Dr. Jennifer Krumins, MSU, “The role of microbial communities in soil trophic interactions.”