

CSAM NEWSLETTER

College of Science and Mathematics

A Spectrum of Possibilities

Irene Hits NJ School of Conservation

by William Thomas, NJ School of Conservation

On Saturday August 27, Hurricane Irene hit the New Jersey School of Conservation. What began as steady rain in the early Saturday afternoon, eventually dumped 7.5 inches of rain on a campus that had already experienced the wettest August in its history.

This 100-year rain event played havoc with the school. By Sunday morning, Lake Wapallane had flooded its banks. Access to Rainbow bridge – the footbridge that spans the lake – was flooded. All streams were over their banks. Three culverts on campus had been blown through the roadways. There was major erosion on all of the roads and paths servicing the hillside cabins.

The worst was yet to come. Wind and



rain had uprooted trees throughout the state forest. Trees blocked both the state roads leading to the campus. Severed power lines created a power outage that would last for 8 days. At 9:00am on August 28, I checked the east side of campus for damage. I met maintenance supervisor Earl Hotalen who cut his way into campus from the east via a forest road. After checking the large diesel generator that services the west side of the campus, he went to start the new portable generator

that would operate the water well. Problems began to pile up immediately. The power connection on the new generator was not compatible with the well. The backup for this backup generator would not start -- carburetor problems. Frustrated, Hotalen left to check the generators on the east side of campus. The wastewater treatment plant was operating.

By 10:00am the flooded lake waters were rocketing over the spillway and completely covering the walls and were running with such force that they had straightened the channel below the dam, destroying the retaining wall and undermining the bridge, spillway and road. Luckily Earl has spent twenty-seven years at the NJSOC. When he saw the volume of water coming over the spillway, he knew that the bridge had been compromised. He, I and my eight-year-old daughter Thea, jumped into a truck and blocked the road with barricades and the school backhoe. Later that morning when the rains stopped and the flow over the spillway subsided, the extent of the damage became clear. The roadway had been undermined. The bridge abutment destroyed. The spillway race had been exploded and pitted by craters. The sewer line that was encased in cement and ran through the bottom



of the spillway had been uprooted and broken. By Sunday, 7.5 inches of rain translated into 42,000 gallons of water entering the wastewater treatment plant.

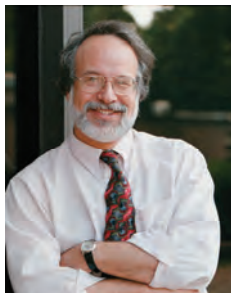
The containment walls at the spillway were cracked and destroyed. Three inches of macadam was all that connected the two sides of campus.

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From Dean Prezant -



With one of the wettest and hottest summers in recorded times behind us and with a Presidential election campaign beginning seemingly earlier than ever before, it seems a natural time to quickly consider the politics of science and CSAM's role in insuring that our future generations understand what science is and why science should be a primary mechanism to help rebuild and strengthen our economy and environment. We currently see the politicization of climate change and evolution and even immunizations! Recent surveys continue to demonstrate that a very large part of our society still believes that humans have had little if anything to do with climate change and a similarly large number who totally discount evolution as reality. There is, as you would expect, a dichotomy here that reflects those who lead a human-centric life that suggests we rule our planet with few or negligible consequences that reflect our actions. These individuals are also strong advocates for dismantling the EPA and removing or weakening many of the laws that now protect our environment. They see protective environmental rulings as impediments to our economy, ignoring the longer term health consequences. We see members of one of the newer political groups stating unequivocally that scientists promote climate solely to secure continued external government grant support. We see a split Supreme Court that has allowed industry to donate anonymously to politicians thus allowing for the possibility of strong bias in ongoing environmental legislation. And we see, amazingly enough, even after one court after another proclaims teaching creationism in our public classrooms illegal, ongoing battles to try to foster religion into our precollege science classrooms. Our concern in CSAM is to insure our students understand how to interpret the reality of these debates in the framework of science.

With this in mind, what are we doing, as an institution of higher learning and as a cadre of scientists to insure that our disciplines hold an appropriate place in the debate, a

place simultaneously at the political, public and industrial tables? At the state level, and in spite of the obvious need to retain our competitive edge in STEM disciplines, once again public higher education in New Jersey has received less support from the state than the year before. Once again the public has voiced strong concerns about increasing tuition rates without reflecting on the ongoing state cuts to higher education and our need and desire to curtail the exodus of New Jersey high school students to out-of-state colleges. And once again the state offers zero dollars towards infrastructure upkeep and construction for our public institutions of higher learning. That, however, has not stopped MSU from renovating and building new facilities for our students through alternative routes. Recently, because of a change in legislation (a change advocated and led in large part by our own University President, Dr. Susan Cole) we've seen new residence halls rise on our north campus...a first for the state in the form of a public-private partnership. And important to our entire campus, come January 2012 we will see the opening of the Red Hawk Math Learning Center (a "math emporium") on the top floor of a fully renovated Finley Hall. And our plans for the new Center for Environmental and Life Sciences continue to march forward, albeit slowed in final groundbreaking due to our resistant economy and an ongoing need to raise substantial funds without state support. Our new programs, facilities, grants, awards and student activities are all reflections of our efforts to continue to immunize our students and the community against the unfortunate trends and attacks we're seeing in the ongoing political campaigns and regrettable flow of misinformation too readily accepted by our citizenry. If the United States is to emerge from this economic chasm and if we are to retain (or some might argue regain) our leadership in the sciences, it is critical for the public to understand what science is, what is merely punditry, and how the sciences can help us rebuild. Be it through our curriculum, research, centers and institutes, or outreach programs, CSAM will continue to do its part to promote science and create alumni who can help bring science to its rightful and central role as an honest broker in revitalizing our nation. ♦

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What's Your Weekly Energy Expenditure?

by Diana Thomas, Mathematical Sciences

In a new study I have found that the decrease in workplace physical activity over the past fifty years is a significant contributor to the obesity epidemic. The findings indicate that the weight increases for men and women over the past 30 years cannot solely be attributed to increased caloric intake.

The study, "Trends Over 5 Decades in U.S. Occupation-Related Physical Activity and their Associations with Obesity," was published May 25 by the Public Library of Science (PLOS), in their peer-reviewed journal of science and medicine, PLoS ONE, and received media coverage by the New York Times, CNN, and Reuters: <http://well.blogs.nytimes.com/2011/05/25/less-active-at-work-americans-have-packed-on-pounds/>.

Researchers from the Pennington Biomedical Research Center, Montclair State University, and the Arnold School of Public Health at the University of South Carolina examined the trends in occupational physical activities over the past five decades to concurrent changes in body weight in men and women in the United States. In the 1960s, more than one half of jobs included moderate physical activity in contrast to today's less than 20 percent, according to the new study.

"Yesterday's jobs have been replaced by sitting or sedentary activity. In the last fifty years, we estimate that daily occupation-related energy expenditure has decreased by more than 100 calories per day, and this reduction accounts for a significant portion of the increase in mean U.S. body weights for women and men," said



lead author Pennington Biomedical scientist Timothy Church, MD, MPH, PhD.

"The causes of the obesity epidemic are a hotly debated issue, particularly in regard to the relative importance of diet and physical activity," continued Church. "Our data provides further support to the importance of including both diet and physical activity in discussions related to be both the causes and potential solutions of the on-going obesity epidemic."

In 2008, federal physical activity recommendations were released suggesting 150 minutes per week of moderate intensity or 75 minutes of vigorous intensity physical activity per week. However, only 1 in 20 Americans are meeting these guidelines. If men and women were meeting these recommendations, this would make up for the decreased activity levels in the labor work force.

In the study, the authors chose to focus on occupation activity as it represents the largest segment of waking hours for adults. Over the past 40 years, the workforce has also changed dramatically, with more women working today. Since 1970, the percentage of women in the workforce has risen from 43 percent in 1970 to 60 percent in 2007.

As jobs have become more sedentary over the past 50 years, this study supports increasing physical activity during leisure time as well as encouraging additional movement in the workplace as vitally important both per-

sonally and as a public health initiative.

The study's authors also include Timothy Church, MD, MPH, PhD; Catrine Tudor-Locke, PhD; Peter T. Katzmarzyk PhD; Conrad P. Earnest, PhD; Ruben Rodarte, MS; Corby K. Martin, PhD; and Claude Bouchard, PhD, from the Pennington Biomedical Research Center; and Steven N. Blair, PED, of the University of South Carolina. The study report can be accessed at <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0019657>.

Allow me to provide the following tips to remain more active throughout a typical CSAM faculty member's workday. Never sit longer than a 50 minute stretch. Stand during meetings and during office hours.

As faculty members, we spend a large portion of our day with a computer. Find a way to stand and work. For example stand a podium on your desk and place your computer on top. This will be awkward at first so allow some time to get used to it. For those with extra money a walking desktop treadmill is a wonderful option.

Assess your activity using an objective method such as a pedometer or accelerometer. Objective measurements with these state of the art devices can be very illuminating. The research team and I use SenseWear armbands by BodyMedia which estimates energy expenditure through a triaxial accelerometer, body temperature, pulse rate, and perspiration levels. If you are interested in assessing your weekly energy expenditures using SenseWear armbands, contact me at thomasdia@mail.montclair.edu. ♦

Advisory Council—Member Profile

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

Dr. Michel Bitritto is an organic chemist and material scientist. She has held a range of research and management positions in the global chemical industry, state government and the entrepreneurial network. Currently as Director of the New Jersey Meadowlands Commission Business Accelerator, Dr. Bitritto assists entrepreneurial businesses developing alternative energy and clean technologies by providing business mentoring, training and networking opportunities critical to transforming science and technology into profitable businesses.



companies throughout the State. Prior to coming to her current position at the Meadowlands Business Accelerator, she was part of the management team of the New Jersey Institute of Technology Business Incubator, New Jersey's oldest and largest incubator housing over 90 entrepreneurial companies.

As Associate Director of Business Relations at the New Jersey Commission on Science and Technology in Trenton, Dr. Bitritto developed funding policies for the state's investments in its research universities and science and technology businesses. She authored a white paper for the State of New Jersey on nanotechnology opportunities and worked closely with Pennsylvania and Delaware to develop a regional nanotechnology cluster strategy.

Born and bred in New Jersey, Dr. Bitritto is a 27 year veteran of the New Jersey chemical industry. She held a range of corporate positions in R&D, marketing and manufacturing. Her work included development of high performance materials for electronics and automotive applications, membranes for water and gas purification, catalysts for chemical production. She was also responsible for marketing "new to the world" materials for use in personal care, environmental clean-up and medical device components. Dr. Bitritto started up and ran one of the nation's first large-scale engineering resins recycling business.

Dr. Bitritto is a past President of the New Jersey Business Incubator Network representing the state's 12 business incubators which provide critical support services and mentoring to over 500 early stage science and technology

Dr. Bitritto completed post doctoral research in Polymer Chemistry at the University of Maryland, holds a Ph.D. in Chemistry from the University of Connecticut, a Masters from the Polytechnic Institute of Brooklyn and an undergraduate degree in Chemistry and Math from Douglass College, Rutgers University. She completed the Executive Women in Leadership Program at Stanford University. She holds patents, is a published scientific author, and served in an elected municipal office. She is active in the community and serves on a number of boards. ♦

Kidsteam Research Report

by Jerry Falls, Computer Science

Last year, a new team was started on campus consisting of adults and children (ages 6-11). Their goal is not to score goals or shoot baskets, but instead to collaboratively work together as design partners to improve current technologies and design new ones. This intergenerational design team – affectionately called *Kidsteam*. Last year it consisted of five children, two industrial design undergraduate students, and myself.

Kidsteam meets twice a week during the school year in newly created interactive laboratory in Richardson Hall 109. We work on various projects including designing mobile technologies to support outdoor exploration, ways to gather and share data in order to promote collaborative scientific inquiry, designing the *SmartBoard* of the future, and more. In order to accomplish these tasks we employ

the design method of Cooperative Inquiry and work to refine it as necessary. This method of co-design includes techniques such as low-tech prototyping with arts and crafts supplies, and sticky note evaluations where team members can identify likes, dislikes, and/or design ideas.



While this collaborative, and interdisciplinary team provides many research opportunities, Jerry has collaborated

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CELS: An Update

One may ask why would the university take down a building (on the southeast corner of Richardson) only to leave an unusable vacant lot surrounded by a portable chain-link fence? Actually, this is a good sign for CSAM. It indicates that the university is at the latest stage in the development and eventual construction of a new CSAM building—the Center for Environmental and Life Sciences.

As has been reported in this section of earlier editions of this newsletter, CSAM faculty, the Dean's Office and the university's Design and Construction Department have been diligently working, yes even over the summer, to finalize the building's interior and exterior plans to the last details including color schemes and lab furnishings. It may

not seem that much progress has been done, but to have an existing building decommissioned and demolished is a great indication that progress is definitely being made on making the plan a reality.

Currently, architects and engineers at S/L/A/M are wrapping up the Construction Design phase of this project which includes but is not limited to the following: updated drawings/specifications based on CSAM's comments, revised/updated project schedule, and revised/updated cost estimate. Once these documents are completed, MSU will make final adjustments then prepare sets of drawings/specifications to go to NJ DCA for approval to bid and award the construction of the project. Keep your eyes on the now vacant lot! ♦

Obesity Expert: Spring '11 Sokol Lecturer

by Diana Thomas, Mathematical Sciences

Renowned obesity expert James A. Levine, MD, PhD presented the Spring Margaret and Herman Sokol Science Lecture held on March 29, 2011. The belief that including a bout of vigorous physical activity to achieve and maintain healthy weight is prevalent and appears in many national health and weight loss guidelines. However, Levine's talk, "Move it and Lose It...Weight Loss for the New Age," promoted increases in non-exercise activity. This includes regular daily activities such as walking, standing, or climbing stairs burn calories—what Levine calls, "non-exercise activity thermogenesis" or NEAT.

Over the past decade, Levine has compiled a large body of evidence that reveals the relationship between obesity and low NEAT. Levine's work has been corroborated by several experts who have found that increased low level of activity appears to prevent excessive weight gain.

An energetic and entertaining speaker, Levine modeled the behavior he was describing as he paced and moved around the stage, rarely stop-

ping to stand still in his specially designed Armani suit calorimeter that measures the energy expenditures of the wearer.

Levine promotes the use of objective measures of activity and has designed an expenditure monitoring device called the Gruve. In 2004, Levine created one of the first treadmill desks by putting a hospital tray across a conventional treadmill which has evolved into the Walkstation, a height adjustable walking desk made by Grand Rapids, Michigan-based Steelcase. "It's amenable to regular people—you don't need to have a gym membership, you don't need to be physically trim to use it," Levine said. "And you don't need to sacrifice productivity or access to the workplace in order to improve your health." "Burning calories is important in obesity and in our daily lives," said Levine. "There's a different way of living



Levine in calorimeter suit

available to us all. Those who join the movement win in terms of better health, being more productive, and being able to do more fun things."

Chief of Endocrinology at University Hospital Case Medical Center and Case Western Reserve University School of Medicine, Levine is a designated 'Expert' to the United Nations, NIH, and the National Science Foundation. He is the author of *Move a Little Lose a Lot* (Random House, 2009), and of many articles in newspapers and journals such as *Science*, *Nature*, and the *New England Journal of Medicine*. ♦

and **Fall 2011 Sokol Science Lecture**
November 3, 2011—8 p.m.
 Professor of Clinical Epidemiology, Mailman School of Public Health, Columbia University
Persistent physical and mental health effects in World Trade Center survivors
 With Dr. Steven D. Stellman,
 Director of Research, World Trade Center Health Registry, NYC Dept. of Health and Mental Hygiene and Professor of Clinical Epidemiology, Iman School of Public Health, Columbia University

Two Lethal Amphibian Diseases Tracked in NJ

By Kirsten Monsen-Collar and Lisa Hazard, Biology and Molecular Biology

Drs. Lisa Hazard and Kirsten Monsen-Collar, along with Environmental Management Ph.D. student Paola Dolcemascolo, have recently collaborated with the New Jersey Department of Environmental Protection to screen amphibians throughout the state for two serious amphibian pathogens: the fungus *Batrachochytrium dendrobatidis* (Bd) and Ranavirus. We were the first team to document the presence of Bd in the state of New Jersey in 2009, and we are now also the first team to document the presence of Ranavirus. Ranavirus species of the family Iridoviridae have caused local amphibian population crashes worldwide and may be contributing to overall population declines of some species. These viral pathogens can infect amphibians, fish, and reptiles and typically kill amphibians within a few days to a week of infection. Ranavirus has been documented throughout North America, including the relatively pristine Delaware Water Gap area in Pennsylvania, but up until now there has been no information about its status in New Jersey.

Our research team recently investigated a report of sick and dead green frog tadpoles (pictured right) in Ocean County, NJ; tadpoles displayed signs of Ranaviral disease including

lethargy, swelling, and red skin lesions. Additionally, Fowler's toad tadpoles in the same area were observed consuming the carcasses of dead green frog tadpoles; about a week later, the green frog tadpoles were all gone and we observed mass Fowler's toad tadpole mortality. To assess whether Ranavirus was the cause of this incident, we screened living and dead tadpoles for the presence of Ranavirus DNA using traditional PCR. We also tested tissue from living and dead individuals of several other species in the same area. Many of the symptomatic or dead tadpoles of both species tested positive to Ranavirus using PCR. We confirmed through DNA sequencing that these animals had a strain of Ranavirus typically found in larval amphibians. To our knowledge, this is the first confirmation of Ranavirus in New Jersey.



Monsen-Collar and R. Zappalorti

Our results have important implications for New Jersey amphibians and underscore the importance of testing for Ranavirus among multiple species and across an extended time period. We plan to continue to monitor this

site for Ranavirus outbreaks in future field seasons. Additionally, together with NJ DEP we have now collected

over 1,000 samples from amphibians throughout the state to screen for both Bd and Ranavirus to map out the distribution of these pathogens. Further sampling is being supported by a Conserve Wildlife Matching Funds grant from NJ Department of Environmental Protection.

Dr. Hazard, a physiological ecologist, is directing field sampling efforts, and Dr. Monsen-Collar and Ms. Dolcemascolo, molecular ecologists, are analyzing the samples. Results will be incorporated into two global databases of Bd and Ranavirus distribution that are maintained by Imperial College, London. ♦

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with a colleague who investigated the benefits of this process for children. Not surprisingly this team experience is beneficial not only for the adult researchers, but also for the children. In fact, findings from this research indicated that children involved in the technology design process in partnership with adults had positive social and cognitive experiences, which fell into the areas of relationships, enjoyment, confidence, communication, collaboration, skills, and content. In addition to these benefits and in order to show the children that their contribution is valued, they also receive a technology gift for their participation.

Please help in spreading the word about this exciting opportunity as we are currently recruiting children (ages 6-11) to participate. A more detailed description for those interested can be found at: <http://goo.gl/0dnlp>. Beyond seeking children to participate, the already interdisciplinary group welcomes members of other disciplines who are interested in participating in joint projects at any level. ♦

Ophiuchus

by Mary Lou West, Mathematical Sciences

Ophiuchus, the Serpent Carrier is an ancient myth from the Middle East, a constellation in the summer sky, and a sculpture on the MSU campus. But how many times have you bypassed it on your way to and from the library or College Hall and wondered what it might be, other than an abstract metal sculpture?



The sculpture, the story of a young man's victory over "the snake of all knowledge," consists of a concrete disk, an iron tripod, and aluminum artwork. It was designed in 1988 by Mac Adams an MSU professor of sculpture.

This victor changed his name to "Ophiuchus" (snake carrier in Greek) because he then carried the snake wrapped around his walking stick as he traveled from village to village learning the methods of medicine from the snake. The caduceus has become the emblem of physicians and veteri-

narians since that time. But it is also more than just a metal sculpture. At true noon on May 24 2011, as its shadow is centered on the disk, we were able to see a figure with his hand around a writhing snake's throat. At other times of the day or year when the shadow is not centered, it is not recognizable, except for July 17 when the sun is at the same declination



as on May 24. We chose May 24 because it was graduation day, when college seniors are celebrating their personal victories over the snake of all knowledge. The alignment calculations and surveying were done by Mary Lou West, and should hold for hundreds of years.

Ophiuchus is also the (small) thirteenth constellation of the Zodiac. ♦

GK-12 STEM Project

by Mary Lou West, Mika Munakata, and Ken Wolff, Mathematical Sciences

The MSU GK12 STEM Fellows in the Middle Program has just finished its fourth year, supporting eight graduate students in mathematics and sciences. In March twenty members of the project went to Ecuador as our international component. We visited universities, research stations, the ministry of education, and a

middle school. We also organized a virtual field trip (web video conferences) with our Kearny and Rutherford NJ schools while we were in Quito.

To investigate this year's theme of chemical interactions we wrote lessons and took field trips with all 250 middle school students to the Liberty Science Center and to the Sterling Hill Mining Museum. The final field trip brought everyone to MSU for a Math and Science Day in June, including seventh graders from Solomon Schechter School in New Milford. Presenters included Sandra Adams, Emrah Altunkaya, Lora Billings, Jonathan Cutler, Nina Goodey, Lisa Hazard, Aihua Li, Amy Miller (veterinarian), Carlos Molina, Kevin

Olsen, Greg Pope, Bob Prezant, David Trubatch, Dirk Vanderklein, and students Maryam Alapa, Caitlin Ament, Leslie Cheteyan, Jonathan Hayes, Stewart Hengeveld, Nadia Pasquale, Diana Sanchez, and Matthew Vieira, as well as the MSU Physics Club. Two educators from Ecuador, Victor Brito and Armando Yanez, also spoke during their week's visit to NJ.

Our poster Bridging the Gap: Connecting the Cutting-edge Lab with the Middle School Classroom was well received at the GK12 national meeting at NSF in Washington, DC. Check our website www.csam.montclair.edu/gk12 for many innovative interdisciplinary lessons for grades 6–8, and encourage your local teachers to use them. ♦



MSU faculty, students and public school teachers at the Equator

Once the extent of the damage was clear, the NJSOC staff put together a plan to get the school back on its feet. However, until the sewer line was repaired, there would be no flushing toilets. Until the portable generator was repaired, bottled water was the rule. Until power was restored, we would have to get propane to the emergency generator now running the wastewater treatment plant.

On Monday, Earl brought his own chainsaw to work and opened Flatbrook road -- the school's connection to Rte. 206. With the assistance of our wastewater plant operator and a contractor, we found the break and arranged for repairs. We had the sewer pipe repaired by Wednesday. Meanwhile, with the help of DEP, Parks &

Forests, we opened an alternate route to our Wastewater treatment plant. DEP Parks and Forests also cut downed trees on Sunrise Mountain road. NJSOC maintenance staff cleared of fallen trees from Skellinger, opening an alternate route to the wastewater plant. This road hasn't been used in twenty years! It was overgrown, pitted and slick with decaying vegetation. Nonetheless, it is now open and we used it to get propane and power to generators on east of campus. By Thursday, we had solved our emergency generator problems. What was once a

70 foot drive across a scenic bridge had become a 15-mile trek across the mountains. No waste had left our system. By Monday evening, September 5, power had been restored to campus and our generators were silent.

A week later, the school experienced more flooding after receiving another 8 inches of rain. Our telephone system was in shambles. President Cole,

Dean Prezant and V.P. Bressler have inspected the damage and are working to help the school through this mess. ♦



Fourth Annual Math and Science Day

On June 3rd, CSAM held its 4th Annual Math and Science Day. More than two hundred middle school students from Kearny, Rutherford, and New Milford spent the day at MSU participating in interactive math and science presentations.

Math and Science Day offered the students hands-on, age-appropriate learning opportunities designed to increase their interest in math and science. Organized by Dr. Mary Lou West (Mathematical Sciences) and led by CSAM faculty and graduate students, a wide array of student-friendly presentations and workshops were offered at the event, including:

- "Milk Tie-Dye" presented by Maryam Alapa
- "Discovery of DNA" presented by Caitlin Ament
- "Chutes and Ladders" presented by Leslie Cheteyan and Stewart

Hengeveld

- "Education in Ecuador" presented by Victor Brito Guaman and Armando Yanez
- "Tag, You're Sick!" presented by Jonathan Hayes
- "Liquid N₂, Very Cool" presented by Kevin Olsen
- "Attack of the Killer Plants" presented by Dirk Vanderklein
- "Ideal Gas Law Game" presented by Matthew Vieira
- "Light" presented by Emrah A. Tunkaya
- "Chemistry Magic" presented by



Nina Goodey

- "Gel Capsules" presented by Nadia Pasquale

Math and Science Day is a highlight of the National Science Foundation's Graduate Teaching Fellows in K-12 Education (GK-12) program, which promotes math and science research and education by placing CSAM graduate students in middle school classrooms to serve as resident scientists and mathematicians working together with the middle school teachers.

Supported by a \$2.95 million, five-year grant from the National Science Foundation, the Montclair State GK-12 program is directed by CSAM professors Ken Wolff, Mika Munakata, and Mary Lou West, and supported by a team of CSAM research faculty and graduate students. ♦

Elementary My Dear Watson!

by Stefan Robila, Computer Science



Could a computing system replace your physician soon? Between 1964 and 1966, Dr. Joseph Weizenbaum, then at MIT, designed and implemented ELIZA, a computer program aimed at processing users' typed sentences and simulate among others the answers of a psychotherapist. While rudimentary in many aspects, the application still leads some of its users to believe they are communicating with a human. Such experiments triggered the question: could a computing system "act like a human"? Initially investigated in 1960s and 70s, the concept of Question and Answering systems (QA), took significantly longer to mature. QA, i.e. the task of computer based answering of questions posed in natural language, was thought to be an easy task solvable in only a handful of years. After all, a computing system is able to store large amounts of information and retrieve it at ever increasing speeds. Yet, half a century later, the complexity of natural languages still poses significant challenges in reaching a definite solution.

One of the newest efforts to produce a highly efficient QA is the IBM Deep QA Watson project. To demonstrate its abilities, IBM teamed with the quiz show Jeopardy! to set up a human-vs-machine competition. In February 2011, Watson played against two of the show's most famous contenders, Ken Jennings and Brad Rutter and won a two game sequence. Jeopardy! was used for its challenging system that combines requirements for vast repository of knowledge with ambiguity in the way the answers are phrased. The implications of successfully completing this challenge are quite big as the nature of human-computer interaction is changing in a drastic way. Applications currently investigated for near future deployment include designing a clinical decision support system for diagnosis and treatment of patients, and design of a legal research system.

In July 2011, the participants in the iImagine REU Program in Imaging and Computer Vision had the unique opportunity to visit IBM Research Center in Yorktown Heights, NY (hosted by Dr. Byron Martin, Assistant to IBM Vice-President for Research), to see Watson in action and interact with Dr. David Gondek one of the lead algorithm architects for the project. For the REU program, this is a continuing collaboration that allowed us to experience first-hand the evolution of one of the most exciting projects at IBM. Through repeated visits by REU student cohorts we saw how Watson progressed from a challenging idea in 2009 to a prototype yet to match the human opponents' performance in 2010 to a winner in 2011. As one of participants remarked, "It was a very eye opening experience" and prone to shape the student's perception of computing.



July 2011, iImagine REU Participants re-live the Watson Jeopardy Challenge.

The interaction with IBM is one of the four annual industrial visits the iImagine

REU program undertakes. Other visits allow the students to discover how imaging sensor systems are built and tested, how computer vision and image processing applications are developed and how large content repositories are managed. Since 2007, iImagine REU has hosted 40 students from over 20 institutions across United States. The program enters its sixth summer in 2012. Its funding is provided by two Research Experience for Undergraduates grants from the National Science Foundation. ♦

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The Pursuit of an Internship: Does It Really Matter?

by Gennae Hinson, CSAM Career Services

In today's competitive job market, the college graduate with an exceptional cover letter, stellar grade point average and glowing recommendations may not be enough if one critical component is missing from the résumé... experience. The internship experience is one of the most important criteria a student can include when trying to build a strong foundation for a successful career.

According to the National Association of Colleges and Employers (NACE) 2011 Internship and Cooperative Education (Co-op) Survey, internship hiring is expected to grow by 8 percent. Internship and Co-op programs are a great way for employers to identify highly motivated and qualified new hires, and gain short term talent to assist with projects to meet workplace goals. Internships allow students to engage in meaningful on-the-job learning experiences which prepare them for the workplace. Employers hiring recent college graduates want to see applicable work experience and qualifications to fulfill their needs. As a result, more employers are relying on internship programs as an effective recruiting tool. NACE (2011) pointed out that employers will hire approximately 60 percent of their new college hires from their internship and Co-op programs. This demonstrates value that employers place on hiring interns, but the employers are not the only ones who benefit from internships.

Experience gained through an internship can help students synthesize career occupations, leverage employment opportunities, develop employer contacts, and gain useful

experience that give them an edge in a competitive marketplace. Graduating students with paid or unpaid internships on their résumé have a much better chance at landing a full-time position after graduation.

This year, CSAM Career Services experienced a 25% increase in internship placement. Some of the top internship sites for 2010 included: Advanced Physical Therapy, Chemetall, Colgate-Palmolive, Medical Lab Diagnostics, Morristown Memorial Hospital-Dept. of Surgery, MTV Networks, Pearson, and St. Joseph's Regional Medical Center E.R. These demonstrate a small listing of internship site opportunities.

Completing at least one internship prior to graduation will not only help students ease their job search, but will allow them to hone skills that are marketable. Skills that students develop during the internship such as communication, analytical, problem-solving, and leadership will impress potential employers and are essential to the student finding the job they want after college. Therefore, students should be encouraged to begin their career planning early and an internship should be considered as a "must have" experience.

To find out more about internship and career building opportunities, students are strongly encouraged to visit CSAM Career Services. There are weekly walk-in hours, individual career appointments, workshops, employer-led events, and much more. ♦

CSAM Fall 2011 Calendar of Events

October 11:	Sustainability Seminar Series
October 18:	Sustainability Seminar Series
October 25:	Sustainability Seminar Series
November 1:	Sustainability Seminar Series
November 2:	Science Professionals Series
November 2:	Science Professionals Series
November 3:	Fall Sokol Science Lecture
November 8:	Sustainability Seminar Series
November 15:	Sustainability Seminar Series
November 18:	CSAM Entrepreneurship Workshop
November 29:	Sustainability Seminar Series
December 6:	Sustainability Seminar Series
December 13:	Sustainability Seminar Series

Adventure in Alaskan Tundra!

by Rocio Duchesne, PhD Student, Earth and Environmental Studies

This summer three intrepid aspiring scientists from CSAM went on a 20-day road expedition along the Dalton Highway, a gravel road that is the only ground transportation system to the Arctic Coast in Alaska. I led a team with two field assistants, Michael Cohrs and Scott Buchanan, both students at Montclair State University. Our primary goal was to collect radiometric and structural data on the surface in support of our NASA-sponsored research project on mapping shrubs in Arctic tundra (Principal Investigator: Professor Mark Chopping, Department of Earth and Environmental Studies).

Departing from Fairbanks in central Alaska on July 20, 2011, we drove almost 500 miles north to Deadhorse, an industrial camp that supports the Prudhoe Bay oilfield. Along the way, we were able to explore the different northern landscapes, passing from the boreal forest, to the Brooks Range, and across the North Slope, until we reached the Coastal Plain. As well as performing the survey work and viewing some breathtaking landscapes, we were also able to appreciate a wide variety of Alaskan wildlife – musk-oxen, caribou, moose, grizzly bears, Dall sheep, Arctic foxes, Alaskan marmots, mosquitoes, and a countless number of bird species – some at close range. At one point we encountered a young grizzly bear that came right up to our vehicle but thankfully it was more interested in berries than in us. It would have been very cool (literally!) to dip our toes in the Beaufort Sea but we were not able to access the coastline as it is privately owned (by oil companies). The survey work was hard on both mind and body. Dust from the road is carried several hundreds of feet into the tundra by the wind, forcing us to select sampling sites at least a mile away from the road in order to avoid any effects on vegetation. We walked an average of 3 to 4 miles each day, a great challenge and test of physical condition (this may not sound like much but if you have ever walked in the tundra you will know that it is a like walking on soccer balls: the grass forms tussocks and your foot may or may not land on solid ground!).

Our study sites encompassed a wide range of conditions, with vegetation associations of differing proportions of grasses, lichens, and shrubs. At each site we recorded the height and crown width of shrubs and acquired multispectral images of the surface at many different viewing angles. This will allow us to assess the accuracy of “atmospheric corrections” that are applied to NASA



Duchesne, Buchanan and Cohrs at the Arctic Coast

satellite remote sensing data, and will also help in assessing estimates of surface albedo (brightness), as well as with reflectance model calibration and validation.

We were happy to have had the chance to spend some time in the Alaskan Arctic and to have accomplished a successful campaign under difficult conditions and we were also very happy to make it back safely to the East Coast. The campaign was possible thanks to joint efforts with my advisor Mark Chopping, with additional logistical assistance from Ken Tape, our collaborator at the University of Alaska, Fairbanks. The campaign was partially funded by a grant to me from the Geological Society of America, with additional funds from Professor Chopping’s NASA Arctic Tundra grant. The data acquired in this expedition will support the efforts of mapping shrub expansion on the Arctic tundra using NASA satellite imagery by providing a robust collection of reference data. ♦

Interested in Study Abroad?

Dr. Michael Oudshoorn, Chair of Computer Science, will be visiting the UK in October supported by a small grant from Global Education. The visit will include discussions at the University of Sussex, University of Nottingham and the University of Stirling which will include an exploration of study abroad opportunities for Montclair State students. While in the UK students should be able to complete a number of courses which will count for credit here at Montclair State University. Faculty-led summer trips are also on the agenda for discussion. The goal is to provide students with a global perspective and a rich cultural experience without the barrier of a foreign language. Students who are interested are invited to contact the Computer Science department. ♦

Student News

Katrina Bandeli, a biochemistry major, participated in the 8th GSUMC Undergraduate Poster Competition, held in April at Essex County College. Her poster, "Sum Indices and Product Indices of Single Cyclohexane Chemical Compounds" received a second place prize. Her research is supervised by Dr. Aihua Li.

Danny Barry won first prize in the MSU 2011 Physics and Art Exhibition for his ultrafast photography.

Scott Buchanan presented "Radiotelemetry of the Eastern Hog-nose Snake (*Heterodon platirhinos*) at Cape Cod National Seashore" at the NJ Academy of Science Annual Meeting held at MSU.

Biology students **Shanakey Cupidon**, **Kimberly Manderano**, **Yasmin Begum**, **Zeeshan Khan**, **Ajmal Abed** and **Yuna Maeda** along with math students **Anthony Criscitello** and **Javier Godoy** won a prize for their poster titled "The Mathematical Effects of Reduced Physical Activity" at the 2011 Montclair State University Student Research Symposium. The research team reported their results, conducting and analyzing clinical measurements on changes in body composition and energy expenditure for the Montclair State University hockey team as they transitioned from training to off training seasons. The study is funded by the Herman and Margret Sokol Institute for Pharmaceutical Life Sciences and is directed by PIs Dr. Diana Thomas and Dr. Dymna Gallagher (St. Luke's Roosevelt Hospital, Columbia University).

Paola Dolcemascolo (working with Drs. K. Monsen-Collar, and L.C. Hazard) presented "First report of Ranavirus in New Jersey amphibians"

at the Partners in Amphibian and Reptile Conservation, Northeast Chapter Annual Meeting. Millersville, MD.

Graduate student **Mark DeMilio** and undergraduate student **Franklin Paulino** of the Department of Chemistry and Biochemistry presented a poster entitled 'The Mechanism of Autoregulation by ICER' at the Biophysical Society 55th Annual Meeting.

Sarah Hall presented a poster on her work with Dr. Nina Goodey and fellow student **Karla Bagley** on predicting amino acids involved in inhibitor specificity in the dihydrofolate reductase family work at the ASBMB Annual Conference. She just completed a summer internship at Merck.

Dr. Lisa Hazard's students **Erika Koelmel** and **M. Gonzalez-Abreu** presented "Behavioral aversion of four Ranid frog species to road deicers: Does terrestriality influence sensitivity?" at the NJ Academy of Science Annual Meeting, MSU.

Kristen Kwasek, working with Dr. L. Hazard, presented "Behavioral responses of the eastern newt to road deicers" at Partners in Amphibian and Reptile Conservation Northeast Chapter Annual Meeting and received second place for Best Student Poster competition at the NJ Academy of Science Annual Meeting.

Alex McClain, undergraduate student in Biology and Molecular Biology was one of five selected to receive a

\$500 MACUB research grant, under the mentorship of Dr. Quinn Vega. His proposal titled "Mapping the Ubiquitination Sites in the Transcriptional Repressor Icer." He is to present the results of his research at the 44th Annual MACUB Conference to be held in October 2011.

Biology student, **Yuna Maeda**, spent August training and working as part of the Energy Balance Study by invitation from the study's PI, Steven Blair, an internationally recognized expert on physical activity. Yuna was trained on assessing energy expenditures using doubly labeled water and resting metabolic rate with a metabolic cart and will return to the University of South Carolina during her semester breaks this year to rejoin the Energy Balance study team.

Pictured below with Dr. Mary Lou West, are physics students **Tim Riesz**, **Deepa Shah**, **Adam Leszczynski**, **Liz Taylor**, **Joe Corrao**, and **Wayne Ernst**. All presented "Exciting Physics Demos" to eighth graders from Rutherford Union School as outreach for the MSU GK-12 Math & Science Day.



Several physics students presented their projects at the May meeting of the North Jersey Astronomical Group. Their topics were Measuring Meteorite Properties – **Ann Bannister**, Measurement of the Lifetime of Charged Muons in Cosmic Rays –

Continued on next page

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Tim Riesz, Quasar Color Variations in Outbursts – **Garrett Nieddu** and **Matt Rossi**, Anti-cyclonic Vortices in Keplerian Flows in Star-forming Disks – **Alex Cali**, Temperature Effects on Metals and Thermistors – Wayne Ernst, Thermocouples to Measure Sap Flow – **Korrine Dobosh**, and DNA Flow in Electrophoresis Gels – **Travis Keeler**. Ann Bannister, Tim Riesz, Garrett Nieddu and Matt Rossi also presented their posters at the NJ Academy of Sciences meeting held at MSU, and at the annual Student Research Symposium where Wayne Ernst and Mike Cohrs presented their poster on Vortex Induced Oscillations and Its Potential Energy Harvest”.

The PhD program in Environmental Management is only two years old, but its students are collecting an impressive number of awards. This year, **Paola Dolcemascolo** was awarded a \$6,000 Gateway Research Learning Center Fellowship from the National Park Service. **Rocio Duchesne** and **Faith Justus**, both working under the supervision of Mark Chopping, were awarded grants from the Geological Society of America (GSA). **Marcia Anderson** took second place at the Society of Environmental Toxicology and Chemistry regional meeting. **Naz Onel** won first place and a cash prize of \$500 at the graduate student poster

award at the annual Student Research Symposium. **Pravin Punamiya** was honored as the Outstanding Doctoral Student by the College of Science and Mathematics. **Pravin Punamiya**, and fellow third-year PhD student, **Padmini Das**, were inducted into Alpha Epsilon Lambda, the Graduate Students Honor Society. Punamiya and Das, along with third-year student **Luke Diglio** and first-year student **Naz Onel** were also inducted into the Phi Kappa Phi Honor Society for ranking in the upper 10% of their class. First-year student **Sushant Singh** authored a book examining arsenic contamination in soil, water, and food in the eastern Indian state of Bihar, focusing on one of the worst-affected cities, Maner, in the state's Patna district.

Working closely with NJ Division of Fish & Wildlife, doctoral student, 4 year Trout in the Classroom teacher and *Trout Unlimited* member **Luke Diglio** (pictured right-center, sampling for trout) has been studying the impacts of dam removal and migration patterns of native brook trout in the upper South Branch Raritan River (SBR) in Mount Olive



Township. This summer, as part of his doctoral studies, he was featured in *Trout Unlimited* as he marked the native brook trout with a special paint for tracking to determine the extent native brook trout populations intermingle and hence, interbreed in a section of the river devoid of non-native trout such as brown and rainbow trout.

From late March 2011 into June 2011



Ms. **Inês Rosa** was a visiting researcher in Bob Prezant's laboratory in Science Hall. Inês is a doctoral student from the

Center for Environmental and Marine Studies at the Universidade de Aveiro in Portugal where she is pursuing research on the invasive bivalve *Corbicula fluminea*. At MSU Inês was examining the influence of changes in temperature and sediment type on the dispersal properties of this highly mobile clam. Back home in Portugal she hopes that her studies will help slow the rapid invasion of *C. fluminea* outside of its native region and perhaps lead to an approach to inhibit this clam's penchant for invading cooling waters in power plants. ♦

CSAM Students Compete at Putnam

by Jonathan Cutler, Mathematical Sciences

Five students from the Department of Mathematical Sciences, Michael Melvin, Mark Urban, Garrett Nieddu, Erick Szentmiklosy and Susan Huamanchumo, took part in the 71st Annual William Lowell Putnam Mathematical Competition in December 2010. The competition is an annual contest for undergraduates in the USA and Canada that has taken place since 1938. The students attended weekly sessions in preparation for the six-hour exam and competed with others from 548 universities, including Harvard, MIT, Caltech, Cal-Berkeley, Stanford, and Princeton. The exam, consisting of 12 questions worth 10 points each, is notoriously difficult. Out of the 4296 contestants, Garrett Nieddu ranked 883 – an admirable achievement! Garrett is now a graduate student in the Department of Mathematical Sciences and will help run the preparation sessions for the Putnam this coming fall. Students interested in taking the exam this year, can stop by the office of Dr. Jonathan Cutler in RI-206 or email cutlerjo@mail.montclair.edu. ♦

Scholarship Winners

CSAM students, in record numbers, are receiving academic scholarships, thanks to the many generous donors. This year's awardees are:

Gina Barbagallo	Anonymous Presidential Discretionary Scholarship	Discretionary and Goldfarb Scholarship	
Hylarie Boscan Ortiz.....	Ryan Memorial Scholarship	Stephanie Lear	Charles Hadley Award
Louis Bungo.....	Goldfarb Scholarship	Shannon McCarthy	Maitland Simmons Science Scholarship
Emily Burd.....	Alumni Tribute, Anonymous Presidential Discretionary and Goldfarb Scholarship	Malgozata Milej	John C. Stone Scholarship
Katlyn Buschgans	Viola Whitney Pflieger Award	Lindsay Morris	McPeak and North Ward Center Scholarship
Mario Caldararo	Bonnie Lustigman Research Fellowship	Daniel Onove.....	Audrey V. Leef, Maitland Simmons Science and Sokol Freshman Chemistry Scholarship
Joseph Calello	Verizon Scholarship	Oscar Patterson.....	Hodson Physics Scholarship
Alex Cali.....	Ben Minor Physics Scholarship	Hannah Peltz.....	Kalahert Scholarship
Esthefanie Castillo	Frazee Baldasaree and Women & Minority Student Centennial Scholarship	Brayerlis Perez	Dr. Al Stein Memorial Fund
Jessica Centinaro.....	Kurt and Anny Landsberger Scholarship Fund for Environmental Studies	Andrew Perez Vinas	Sokol Freshman Chemistry and Ryan Memorial Scholarship
Brandon Coveney.....	Reid Scholarship	Zahava Picado	Frazee Baldasaree and Sokol Freshman Chemistry Scholarship
Marnie Crow	Bonnie Lustigman Research Fellowship	Samuel Pobanz	Bert Boucher Scholarship Fund
Joseph De Luca.....	S. Marie Kuhnlen Scholarship	Ivana Prokopva.....	George Placek Memorial Award
Jessica Evans.....	Charles Hadley Award and Jacob Goodman Scholarship	Fabiana A. Restrepo	Dr. Elton Robertson Technology Award
Yanina Figuereo.....	Anonymous Presidential Discretionary and Elizabeth Vandervliet Scholarship	Bree Riles	Frazee Baldasaree Scholarship
Nanci Fioravanti	Milstead Memorial Award	Melanie Rodriguez	Frazee Baldasaree Scholarship
William Gizzi.....	Sokol Freshman Chemistry Scholarship	Stephanie Rubianes	Sokol Freshman Chemistry Scholarship
Jonathan Hincapie	Verizon Scholarship	Jacqueline Ruiz.....	Audrey Leef and Sokol Freshman Chemistry Scholarship
Lukasz Jarosz.....	Gertrude Goble, Goldfarb, Sokol Freshman Chemistry and Women & Minority Student Centennial Scholarship	David Sharpe	Kurt and Anny Landsberger Scholarship Fund for Environmental Studies
Joshua Kilian-Meneghin ..	Anonymous Presidential	Danielle Shedlock.....	Sokol Freshman Chemistry Scholarship
		Franklin Tatis	Sokol Freshman Chemistry Scholarship
		Melissa Tobie	Sokol Freshman Chemistry Scholarship

MS in Computer Science Goes On-line and Gets a Face Lift.

The MS degree in Computer Science will be offered on-line commencing Spring 2012. The degree is also currently undergoing some minor changes which will eliminate required coursework and increase the number of culminating experiences. The culminating experiences will be the traditional thesis, or traditional project, or an in-depth seminar subject under the guidance of a faculty member. A final option will be a literature research topic under the direction of a faculty advisor. This final option is new and will allow students to develop expertise in a specific area via a comprehensive directed reading subject resulting in a detailed report describing the current state of the art in that area. The comprehensive exam is being removed as a culminating experience. These changes will make the degree more attractive to students and allow them to work with a faculty member to tailor a program of study that best suits their needs and interests. Offering the degree on-line will cater to the needs of working students who are self-motivated and interested in developing their career or their knowledge base. ♦

Convocation 2011



The College of Science and Mathematics held its annual Convocation ceremony on Sunday, May 14 at the University's Amphitheater.

Dr. Jeffrey D. Sachs, (pictured left) Director of The Earth Institute and Professor of Health Policy and management at

Columbia University, received an Honorary Doctor of Science Degree. Associate Dean Jinan Jaber served as master of Ceremonies and remarks were made by President Susan A. Cole and Dean Robert S. Prezant.

Outstanding Students Awards were given to graduating seniors from each of CSAM's academic majors. The selection is based on academic performance, involvement in research, service and leadership.

This year's recipients are:
Franklin Paulino, Biochemistry

Noelle Mullanaphy, Biology
Cindi Havel, Chemistry
Theodore Michael Winand, Computer Science
Samuel Paul Pobanz, Geography
Leah Kristen Thiel, Geoscience
Richard James Gornall, Information Technology
Rachael Lea Compton, Mathematics
Jennifer Catuzzi, Molecular Biology
Oscar Patterson, Physics

Parth Vyas was also named Outstanding Student Conducting Undergraduate Biology Research and Jennifer Catuzzi represented the graduates as Student Speaker. ♦



CSAM Annual Awards

CSAM held its annual awards ceremony on April 27, 2011. Graduate students, faculty and staff were recognized for their service, teaching and research. Congratulations to the following:

Outstanding Master's Students

Scott Buchanan, Biology
Agnieszka A. Zieba, Chemistry
John Kane, Computer Science
Sara Hamouda Desouki, Environmental Studies
Audrey A. Burns, Geoscience
Jackson Burton, Mathematics
Emily Shade, Teaching Middle Grades Math
Tricia Prince, Molecular Biology
Vladimir Mishcherkin, Statistics

Senior Research Award

Parth Vyas, Biology

Masters Research Award

Jackson Burton, Mathematics and Physics

Doctoral Research Award

Pravin Punamiya (Earth and Environmental Studies)

Margaret and Herman Sokol Awards

Faculty/Student Research Award

Yang Deng/Ashley DeGrandis, Earth and Environmental Studies

Nina Goodey/Karla Bagley, Chemistry and Biochemistry

Carlos Molina/Alex McClain and Sirisha Bupathi/Marni Crow, Biology and Molecular Biology
Elena Petroff/Jennifer Guercio, Biology and Molecular Biology

Margaret and Herman Sokol Faculty Fellow

Stefanie Brachfeld, Earth and Environmental Studies

Summer Graduate Student Research Fellowship

James Alexander, Mathematical Sciences
Dipika Patel, Biology and Molecular Biology

Graduate Fellowship in Science

Franklin Paulino, Chemistry and Biochemistry

CSAM Awards of Excellence

Faculty Service — Angel Gutierrez
Faculty Research — Stefanie Brachfeld
Administrative Assistant — Maria Pignatello
Professional Staff — George Grover
Outstanding Academic Advising—Matthew Gorrington
Service Award—Donna Lorenzo ♦

Faculty Activity

Dr. **George E. Antoniou**, (Computer Science) presented on the "Minimal Realization of 2D Roger-Ramanujan CFE Systems" at the IEEE (Xplore) International Symposium on Signals, Circuits and Systems in Iasi, Romania.

Dr. **Jonathan Cutler**, (Mathematical Sciences) gave an invited hour-long lecture entitled "Extremal problems related to graph homomorphisms" at the 28th Brazilian Colloquium in Mathematics at the Instituto Nacional de Matematica Pura e Aplicada (IMPA) in Rio de Janeiro, Brazil.

Dr. **Yang Deng**, (Earth and Environmental Studies) was invited to give a presentation entitled "Thermally Activated Persulfate for Treatment of Landfill Leachate" at Southern Illinois University Carbondale. He and his collaborator, Dr. Xiaolan Zeng from Chongqing University in China, (pictured below) visited his collaborators at Tongji University in Shanghai,



and Chongqing University as part of his project sponsored by MSU Global Education Center Grant, and gave an oral presentation entitled "Advanced Oxidation Processes (AOPs) for Treatment of Landfill Leachate" at the two universities. Dr. Deng also delivered an oral presentation entitled "Ambient Iron-Mediated Aeration (IMA) for Water Reclamation" at the biannual Association of Environmental Engineering and Science Professor Conference in Tampa, FL.

Dr. **Nina Goodey** (Chemistry and Biochemistry) presented a poster on

her M.A. student Maryam Alapa's discovery of two equilibrium *B. stea-rothermophilus* DHFR conformers that both bind the drug methotrexate at different rates at the Gordon Research Conference on Proteins in Holderness, NH.

Dr. **Lisa Hazard**, (Biology and Molecular Biology) and students K. Kwasek E. Koelmel, M. Gonzalez-Abreu and S. Gerges presented "Variation in salinity aversion of northeastern amphibian species may influence response to anthropogenic salinization at the Partners in Amphibian and Reptile Conservation Northeast Chapter Annual Meeting in Maryland. Dr. Hazard is serving as Student Support Committee member, Society for Integrative and Comparative Biology; Vice President, MSU chapter of Phi Kappa Phi; Judge, Best Student Paper competition, Comparative Biochemistry and Physiology section of the Society for Integrative and Comparative Biology.

Dr. **Kirsten Monsen-Collar** (Biology and Molecular Biology) presented "Amphibian diseases in New Jersey", conducted with Dr. L. Hazard and students P. Dolcemasclo and R. Dussa, at New Jersey Chapter of The Wildlife Society meeting, Waretown, NJ.

Dr. **Aihua Li**, (Mathematical Sciences) gave a colloquium presentation, "Construction of Explicit Solutions to the Matrix Equation $AXA=XA^2X$ ", at Beijing Jiaotong University. She delivered a key note speech in the Summer Interactive Teaching Workshop at the University of Science and Technology Beijing titled "Promoting Deep Learning through Interactive Teaching". She presented a talk in the 61st Graph Theory Day Conference held in New York City, titled

"Interlace Polynomials of Ladder Graphs". And, she presented an invited colloquium "On the Construction of Explicit Solutions to the Matrix Equation $AXA=XA^2X$ ", at the University of Louisiana at Lafayette. She also organized the 8th Garden State Undergraduate Mathematics Conference held in Essex County College and reviewed three articles for Mathematics Reviews and refereed one paper for the journal Communications in Algebra.

Dr. **Carlos Molina**, (Biology and Molecular Biology) visited the labor-



atory of Dr. Wei Ge, a world expert in fish reproduction located in Hong Kong to forge a collaboration to study the role of the cloned gene, ICER in fish ovulation. While there, Molina presented a seminar and worked in Ge's lab.

Dr. **Dibs Sarkar**, (Earth and Environmental Studies) has been invited to give a talk in the symposium "Recent Advances in Studies of Dissolved Arsenic and Other Metals in Global Hydrologic Systems" in the 123rd Annual Meeting of the Geological Society of America to be held in Minneapolis in October 2011.

Dr. **Johannes Schelvis**, (Chemistry and Biochemistry) gave an invited short talk entitled 'Evidence for Concerted Electron Proton Transfer between FADH- and Trp• in *Escherichia coli* Photolyase'

Continued on next page

at the 17th International Symposium on Flavins and Flavoproteins in Berkeley, CA.

Dr. **Eric Stern**, (Battell) gave oral and written testimony to the NYC Council - Committee on Waterfronts in the subject area of Dredged Material Management and the Development of Sustainable Policy.

Dr. **Diana Thomas**, (Mathematical Sciences) gave a keynote presentation at the Ninth International Symposium on In Vivo Body Composition Studies in Hangzhou China on a Dynamic model predicting gestational weight gain. Additionally, she was awarded funding by the NSF sponsored National Institute of Mathematical and Biological Synthesis to hold a workshop on Mathematical modeling of human body weight regulation in Knoxville, TN. It was attended by international researchers in nutrition, medical science, physiology, behavior

psychology, and mathematics.

Dr. **Ashwin Vaidya**, (Mathematical Sciences) organized another terrific Physics and Art Exhibition featuring "On the Neutron Trail: Seeing Fulcrums and Frames" by Olivia Fermi. Dr. Vaidya along with Dr. **Mika Munakata** (Mathematical Sciences) presented "Creativity in Science and Math" as part of MSU's second annual showcase on university learning and teaching.

Dr. **Mary Lou West**, (Mathematical Sciences) presented scripted demos on the quality of an oscillator and on a Faraday cage (using kitchen equipment) at AAPT's Dave's Dazzling Demos at Rutgers. She and undergraduate **Tim Riesz** participated in the QuarkNet meeting, also held at Rutgers, where they tested out the NJ cosmic ray array. She also attended a symposium on new methods of teaching physics with learning strategies

which mirror scientific practice by Gorazd Planinsic (Ljubljana, Slovenia). She was a session moderator at the NJ Academy of Sciences meeting at MSU. Her outreach to schools included a presentation at the first annual Career Day for Eighth Graders at Lincoln School in Kearny. The students were interested in astronomy, constellations, and the Ophiuchus sculpture on MSU's campus. She also gave talks on Quasars at Leonia Middle School, and on Cosmic rays at Schuyler School in Kearny.

Postdoctoral Researcher **Yingkai Xu**, (Chemistry and Biochemistry) presented a poster entitled "Assignment of the Vibrational Normal Modes of the Isotope-Labeled Riboflavin Neutral Radical in Riboflavin Binding Protein by Resonance Raman Spectroscopy and Computational Chemistry" at the 6th International Conference on Advances in Vibrational Spectroscopy in Rohnert Park, CA. ♦

New additions to CSAM

CSAM is pleased to welcome the following new faculty and staff members:

Clement Aga Alo, Ph.D. – Assistant Professor, Earth and Environmental Studies
 Catherine A. Holl-Cross – Director Red Hawk Math Learning Center, Mathematical Sciences
 Erin Elizabeth Krupa, Ph.D. – Assistant Professor, Mathematical Sciences
 Pankaj Lal, Ph.D. – Assistant Professor, Earth and Environmental Studies
 David Rotella, Ph.D. – Margaret and Herman Sokol Chair of Chemistry and Professor, Chemistry and Biochemistry
 Michael D. Scehovic – Computer Systems Administrator, Computer Science
 Jennifer J. Schiffer – Department Administrator, Computer Science
 Vladislav Snitsarev, Ph.D. – Assistant Professor, Biology and Molecular Biology
 Laying Wu, Ph.D. – Electron Microscopy Specialist/Lab Director

And, Congratulations...

... to the following faculty for their promotion to Associate Professor:
 Lisa Hazard (Biology and Molecular Biology)
 Katherine Herbert (Computer Science)
 David Trubatch (Mathematical Sciences)

and to full Professor:

Mark Chopping (Earth and Environmental Studies) and
 Aihua Li (Mathematical Sciences).

And to:

Johannes Schelvis (Chemistry and Biochemistry)
 David Konas (Chemistry and Biochemistry)
 Jing Peng (Computer Science)
 David Trubatch (Mathematical Sciences)
 Dibyendu Sarkar (Earth and Environmental Studies)
 Meiyin Wu (Biology and Molecular Biology)

on their tenure.

Kudos

Dr. Sandra Adams (Biology and Molecular Biology) and **Ronald M. Durso**, K-12 Science and Technology Education Supervisor of Fair Lawn Public Schools, are one of 10 recipients of the 2011 American Society for Biochemistry and Molecular Biology (ASBMB) Science Technology Engineering and Mathematics (STEM) Seed Grant for their project "*Integrating Molecular Biology Research Techniques into the High School Science Classroom*". Each award is worth \$2,000 and is to be used to support the development of a K-12 STEM outreach program and/or partnership. Dr. Adams and Mr. Durso have established a partnership with the goal of introducing students at Fair Lawn High School to current molecular biology techniques while building on their knowledge of cell and molecular biology. Students will use these techniques to conduct authentic research involving analysis of unknown DNA.

The MARC Program, **Dr. Reginald Halaby** (Biology and Molecular Biology) was funded by the NIH for Year 5 of the grant in the amount of \$394,512.

Dr. Angel Gutierrez (Computer Science) was selected as Faculty Advisor of the year by the Center for Academic Advising and Adult Learning (CAAAL). He was recognized for his excellent service and outstanding work in the area of academic advising at Montclair State University's 3rd Annual Academic Awards reception. He will compete at the national level through the National Academic Advising Association's (NACADA) annual awards program.

Dr. Scott Kight (Biology and Molecular Biology) is the recipient of the 2011-12 University Distinguished



Teacher Award. As part of this award, Dr. Kight received support to develop and teach a new course on evolutionary biology for non-science majors.

Co-PIs **Kirsten Monsen** and **Lisa Hazard** (Biology and Molecular Biology) received a \$3500 New Jersey Conserve Wildlife Matching Funds Grant for work on Prevalence of the *Batrachochytrium* and Ranavirus pathogens among New Jersey amphibian populations from the NJ Department of Environmental Protection, Division of Fish and Wildlife.

Dr. Dibs Sarkar (Earth and Environmental Studies) has been awarded a Geological Society of America Fellowship. This is bestowed as "...an honor...on the best of our profession once per year at the GSA [Geological Society of America] Spring Council meeting... in recognition of distinguished contributions to the geosciences." **Dr. Sarkar** received a Housing and Urban Development – Lead Technical Studies three year



\$499,694 grant for "A Novel Phytoremediation Method using Vetiver Grass to Cleanup Lead-Based Paint Contaminated Soils: Phase II – Field Study. He was also elected a Fellow of the Geological Society of America, the premier professional

society for geologists in the world and Vice-President of the Hudson-Delaware Chapter of the Society of Environmental Toxicology and Chemistry for 2011-12, and was made the Technical Editor of the International Journal of Environmental Science and Technology, one of the leading environmental science journals in the world, Associate Editor of Soil Chemistry the Soil Science Society of America Journal, a top 10 journal in soils, Adjunct Professor in the Environmental, Earth, and Ocean Sciences Department at the University of Massachusetts at Boston and Adjunct Professor in the Biological Sciences Department at Michigan Technological University.

Dr. Diana Thomas (Mathematical Sciences) has been awarded \$302,860 from the National Institutes of Health to develop computational methods that determine dietary intake during weight loss. The grant titled "A computational model to determine energy intake during weight loss," will be conducted with colleagues from the University of Wisconsin-Madison, Pennington Biomedical Research Center, Mayo Clinic, and Maastricht University (Netherlands). **Dr. Thomas** is also co-investigator of a \$3,375,150 five year award from the National Institutes of Health to develop and deliver lifestyle interventions for overweight and obese pregnant women to achieve the Institute of Medicine recommended target weight gains during gestation. The grant titled "Expecting Success: Personalized Management of Weight During Pregnancy," will be conducted with PIs Redman and Martin from Pennington Biomedical Research Center and co-investigators Jeffrey Breaux and Karen Elkind-Hirsch from the Woman's Hospital in Louisiana. It is one of five awarded nationwide! ♦

Molina Receives Patent

Congratulations to Dr. **Carlos A. Molina** (Biology and Molecular Biology) on the recent patent approval (USPTO-EPAS ID: PAT1676870, filed on September 2, 2011) for Methods for Modulating Ovulation. According to Dr. Molina, "this invention relates to agents and methods for modulating ovulation in both humans and non-human animals. "It is based, at least in part, on unexpected discoveries that ovulation, a complex biological process controlled by the cyclical action of hormones, can be modulated by a 20 group of inducible cAMP early repressor (ICER) polypeptides.

In one aspect, this invention features a method of increasing ovulation in a vertebrate animal having an ovary. In a second aspect, the invention features a kit for treating infertility. In a third aspect, the invention features a method of decreasing ovulation in a vertebrate animal having an ovary.

The research was funded in part by a grant from the National Institute of Child Health and Human Development/ National Institute of Health. ♦

CSAMer's Inducted into the NJ Inventors Hall of Fame

Dr. Lynn F. Schneemeyer (Associate Dean for CSAM) has been selected to be inducted into the NJ Inventors Hall of Fame with Pioneer Status for her "Lifetime patent and technology achievement related to: Discovery and development of novel crystalline materials for optical communications applications".

Dr. John J. Siekierka (Director, Sokol Institute for Pharmaceutical Life Sciences) has been selected to be inducted into the NJ Inventors Hall of Fame for his "Lifetime patent and technology achievement related to: Research and development for anti-inflammatory drug and delivery devices".

These inventors join MSU Alumnus Herman Sokol in this honor. ♦

Publications

Antoniu, G.E. and **P.A. Katsalis** (2011). "On the 1D and 2D Rogers-Ramanujan continued fractions." *Journal of Circuits, Systems, and Computers*, 20:4, pp. 573-585.

Arango, E., A. Li (2011). "The behavior of DS-divisors of positive integers." *International Journal of Pure and Applied Mathematics*, 70:6, pp. 785-795.

Dieng, S. D. and **J.P.M. Schelvis** (2010). "Analysis of measured and calculated Raman Spectra of indole, 3-methylindole, and tryptophan on the basis of observed and predicted isotope

shifts." *Journal of Physical Chemistry A*, 114, pp. 10897-10905.

Goodey, N.M., K.G. Herbert, S.M. Hall and **C.K. Bagley** (2011). "Prediction of residues involved in inhibitor specificity in the dihydrofolate reductase family." *Biochimica et Biophysica Acta (BBA) - Proteins and Proteomics*, doi: 10.1016/j.bbapap.2011.08.001/

Hill, E., L. Pollock and **K. Vijay-Shanker** (2011). "Investigating how to effectively combine static concern location techniques." *Proceedings of the 3rd ICSE Workshop on Search-driven*

Development: Users, Infrastructure, Tools and Evaluation (SUITE'11), <http://msuweb.montclair.edu/~hillem/papers/ASE11.pdf>

Konas, D.W., C. Feldman, B. Anand, J. Piemonte, C. Garay, E. Silverthorne and **S.M. Wunderlich** (2011). "Laboratory analysis of vitamin C in vegetables served in eldercare facilities and evaluation of related public nutrient database information." *Topics in Clinical Nutrition*, 26:1, pp. 68-77.

Prioleau, D. (2010). "Do mature street trees pose a greater hazard risk across socioeconomic lines?" *Mid-*

dle States Geographer, v. 43, pp. 16-25.

Zieba, A., C. Richardson, C. Lucero, S. D. Dieng, Y. M. Gindt and **J. P. M. Schelvis** (2011). "Evidence for concerted electron proton transfer in charge recombination between FADH⁻ and ³⁰⁶Trp in DNA photolyase." *Journal of the American Chemical Society*. 133, pp. 7824-7836.

Cutler, J. and **A.J. Radcliffe** (2011). "An entropy proof of the Kahn-Lovasz theorem." *Electronic Journal of Combinatorics*. 18:1, p. 10.

Continued on next page

- Brown Kramer, J., **J. Cutler**, and A.J. Radcliffe (2011). "Negative dependence and Srinivasan's sampling process." *Combinatorics, Probability and Computing*, 20, pp. 347-361.
- Cutler, J.** and A.J. Radcliffe (2011). "Extremal graphs for homomorphisms." *Journal of Graph Theory*, 67, pp. 261-284.
- M.E. Messina Jr. and **R. Halaby**. (2011). "Does trip-tolide induce lysosomal-mediated apoptosis in human breast cancer cells?" *Medical Hypotheses*, 77, pp. 91-93.
- Saminathan, S., **D. Sarkar**, S. Andra and R. Datta (2011). "Lead fractionation and bioaccessibility in contaminated soils with variable chemical properties." *Chemical Speciation and Bioavailability*, 22:4, pp. 215-225.
- Andra, S., **D. Sarkar**, S. Saminathan and R. Datta (2011). "Predicting potentially plant-available lead in contaminated residential sites." *Environmental Monitoring and Assessment*, 175, pp. 661-676.
- Datta, R., **M. Quispe** and **D. Sarkar, D.** (2011). "A greenhouse study on the phytoremediation potential of vetiver grass, *Chrysopogon zizanioides* L., in arsenic-contaminated soils." *Bulletin of Environmental Contamination and Toxicology*, 86:1, pp. 124-128.
- Andra, S., R. Datta, R. Reddy, S. Saminathan and **D. Sarkar** (2011). "Antioxidant enzymes response in vetiver grass: A greenhouse study for chelant-assisted phytoremediation of lead-contaminated residential soils." *CLEAN – Soil, Air, Water*, 39, pp. 428-436.
- Quazi, S., R. Datta and **D. Sarkar** (2011). "Effects of soil types and forms of arsenical pesticides on rice growth and development." *International Journal of Environmental Science and Technology*, 8, pp. 445-460.
- Rakshit, S., D. Sarkar, P. Punamiya** and R. Datta (2011). "Antimony sorption at gibbsite-water interface." *Chemosphere*, 84, pp. 480-483.
- Andra, S., **D. Sarkar**, S. Saminathan and R. Datta (2011). "Exchangeable lead from prediction models relates to vetiver lead in different soil types." *Environmental Monitoring and Assessment*, Online, DOI:10.1007/s10661-011-1941-x).
- Taylor, R.W., ed. (2011). *Taking Sides: Clashing Views of Sustainability*. NY, NY: McGraw Hill Publishing, 519 pages.
- Church, T.S., **D.M. Thomas**, C. Tudor-Locke, P.T. Katzmarzyk, C.P. Earnest, R.Q. Rodarte, C.K. Martin, S.N. Blair and C. Bouchard (2011). "Trends over 5 decades in U.S. occupation-related physical activity and their associations with obesity." *PLoS ONE*, 6, pp. 1-7.
- Thomas, D.M.**, C.K. Martin, S.B. Heymsfield, L.M. Redman, D.A. Schoeller and J.A. Levine (2011) "A simple model predicting individual weight change in humans." *Journal of Biological Dynamics*, 1, pp. 1-21.
- Truitt, P.** et al. (2011). "Electrical spin injection from an organic-based ferromagnet in a hybrid organic-inorganic heterostructure." *Physics Review Letters*, 106, p. 156602.
- Heymsfield, S.B., M. Heo, **D. Thomas** and A. Pietrobelli (2011). "Scaling of body composition to height: Relevance to height normalized indices." *American Journal of Clinical Nutrition*, 93: 4, pp. 736-40.
- Xu, J., N. Gao, **Y. Deng**, M. Sui and Y. Tang (2011). "Perchlorate removal by granular activated carbon coated with cetyltrimethyl ammonium chloride." *Desalination*, 275:1-3, pp. 87-92.
- Zheng, L., N. Gao, **Y. Deng**, E. Du, M. Sui and S. Liu (2011). "The Effect of backwashing in the structure of microbial community on biological activated carbon (BAC) in a water treatment plant." *Fresenius Environmental Bulletin*, 20:7a, pp. 1741-1748.
- Ou, H., Gao, N., **Y. Deng**, J. Qiao, K. Zhang, T. Li and L. Dong (2011). "Mechanistic studies of microcystic aeruginosa inactivation and degradation by UV-C irradiation and chlorination with polysynchronous analyses." *Desalination*, 272, pp. 107-119.
- Xu, J., N. Gao, **Y. Deng**, M. Sui, and Y. Tang (2011). "Perchlorate removal by granular activated carbon coated with cetyltrimethyl ammonium bromide." *Journal of Colloid and Interface Science*, 357, pp. 474-479.
- Zhang, K., N. Gao, **Y. Deng**, M. Shui and Y. Tang (2011). "Granular activated carbon (GAC) adsorption of two algal odorants, dimethyl trisulfide and β -cyclocitral," *Desalination*, 266:1-3, pp. 231-237. ♦

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