

CSAM NEWSLETTER

COLLEGE OF SCIENCE AND MATHEMATICS

A Spectrum of Possibilities

MSU Leads Northern NJ Cluster for Newly Funded NSF LSAMP Grant

by Quinn Vega, Biology and Molecular Biology

The College of Science and Mathematics will take a leadership role in the Louis Stokes Alliances for Minority Participation (LSAMP) grant, a program funded by the National Science Foundation to increase the quality and quantity of students who successfully complete a degree in the STEM disciplines (Science, Technology, Engineering and Mathematics) and who demonstrate both an aptitude and interest in pursuing further graduate training. The grant, involving MSU and 8 other colleges and universities in New Jersey, will provide \$5 million over 5 years to support student learning and career preparation.

At MSU, the program will provide funds for up to 25 AMP scholars and 7 AMP mentors in the departments of Biology and Molecular Biology, Chemistry and Biochemistry, Computer Science, Earth and Environmental Science, and Mathematic Sciences. AMP scholars will be chosen from select freshman, sophomore and transfer students majoring in STEM disciplines who have demonstrated a commitment to succeed. Mentors will be junior and senior students who have excelled in the core undergraduate courses and are interested in working with incoming students. The program will focus on three key areas: academic preparation, research experience and career guidance.

Academically, scholars and mentors

will meet to discuss key concepts related to the core curriculum. With the help of Dr. James Zimmerman, associate director of the Research Academy for University Learning, students will study scientific problems related to the core course material and learn how to find answers to those problems. Scholars will also learn how to work together to better understand the course material.

In addition to studying their course material, scholars will also have an opportunity to work in faculty laboratories and gain valuable research experience. Through this research, scholars will get to interact with faculty outside of the classroom and gain a better understanding of the skills required for their chosen fields.

Throughout the program, students will also learn more about the career options available to them. Through site visits and seminars, scholars will be able to speak with experts who have succeeded in their chosen profession and find out what is required to achieve that success.

To support the goals of the entire LSAMP program, MSU will also serve as the Hub for the Northern cluster, which includes William Paterson University, Farleigh Dickinson University and Bloomfield College. As the leader for the Northern Cluster, MSU will organize meetings with the other institutions as well as coor-

dinate any academic programs and site visits that involve the cluster schools. Information about the program can be found at <http://csam.montclair.edu/lamps/> ♦

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From Dean Prezant -



Montclair State University has built its reputation on an outstanding faculty. Over the years our faculty has witnessed a transition in our academic home from being a teachers college to today's university where we are committed to creating a tier one learning environment with a firm balance of teaching and research. This balance is evident from this most recent and quite remarkable summer. As you'll see in this edition of our Newsletter, CSAMers have been tremendously successful obtaining external grant support to pursue research and develop important new programs to foster learning by our students. On top of these, a new research initiative involving faculty and students at our School of Conservation is in full swing, and accolades and awards continue to pour in for our students who are pursuing cutting edge research and presenting their work at national conferences. All of this is a continued reflection of our MSU history. We continue to stand on the shoulders of hundreds of outstanding faculty, staff and students who have kept and continue to keep our College filled with possibilities. A new cohort of faculty members has arrived with expertise in computer-human interface, mathematics education, biostatistics, fluid dynamics, and wetlands ecology. They are primed and ready to share their disciplines with our students.

CSAM has grown and in fact outgrown our current facilities in Mallory, Richardson and Science Halls. To try to keep pace with growing enrollment and concomitant growth of our faculty ranks, we've created new learning and research space by converting some classrooms, store-rooms, and even part of a loading dock into new laboratories. Now, even those limited spaces are gone. The good news is our MSU Board of Trustees has approved a top notch architectural firm to start working with our College in the design, development and construction of a new facility, the Center for Environmental and Life Sciences (CELS). This building will in large part house our programs in environmental and pharmaceutical sciences. In turn, vacated space in Mallory and Richardson will offer critical research and teaching venues for our other disciplines. The goal for "move-in" is three years. We are now going into fund raising mode to help us support this essential new facility. We hope, if you are contacted by our Development Office, you'll help continue to create the "spectrum of possibilities" that remain the academic life blood of our current and future students. For those who want to get an early start in assisting, can contact our Development Officer, Ms. Kathy Walsh at 973-655-3440 or walshk@mail.montclair.edu. And in three years, we look forward to welcoming you to CELS, the newest part of our CSAM Academic home. ♦

Institute for Sustainability Studies

by Mike Weinstein, Institute for Sustainability Studies

Among the early priorities of the MSU Institute for Sustainability Studies (ISS) is assisting in the "greening" of the MSU campus and developing opportunities for graduate research in sustainability science. In its first "official" month of operation, the ISS has been actively engaged in proposal writing, curriculum development, heading up an MSU IT energy conservation initiative, and in the publishing of numerous manuscripts and popular articles. Headed by Dr. Michael P. Weinstein, the ISS will serve as either Principal or Co-Principal Investigator on proposed projects with the USEPA, NSF-NOAA, PEW Charitable Trust, NIST, and proposed cooperative agreements with NSF-India, and Tianjin Oceanic Administration programs.

A "Green IT" initiative has been developed to contribute materially to on-campus sustainability practices. Elements for study may include energy use and conservation, power management, equipment provisioning and telecommuting. A project team will be assembled comprised of a lead student from the PhD program in Environmental Management and undergraduate students representing the College of Humanities and Social Sciences, the School of Business and the CSAM's Department of Computer Science. The goal will be to design and implement a rigorous study of IT practices in order to identify opportunities for more efficient operation and significant cost and energy savings.

Students involved in the Green IT undertaking will become acquainted with science research, "greening" of our university and reaching out to the MSU community (social learning). An ancillary benefit of this project will be to improve science literacy and informed decision making of the entire MSU community. The students will be asked to prepare a written plan of their approach to the study, draft and final reports, and possibly present their findings at both an on-campus venue (with invited decision-makers in attendance), and to the scientific community at a professional meeting. ♦

Using Hydro-raking to Restore Lake Wapalanne

by William Thomas, NJ School of Conservation

Since 1935, Lake Wapalanne has been the focal point of the New Jersey School of Conservation. That year, two hundred CCC volunteers built a 100 ft. earthen dam and field-stone spillway across one of the streams feeding the Big Flatbrook – one of New Jersey’s premier trout streams. The

resulting lake is a jewel in a landscape blanketed with glacial till as a result of thousands of years of glacial scouring and

deposition. Here the forest is in transition as the central oak-hickory forests begin to give way to the northern forests of beech, birch, maple and hemlock. Lake Wapalanne and the surrounding area supports a diverse fauna, and is especially rich in amphibians. Common species in the lake include Eastern Newts, Bullfrogs, Pickerel Frogs, Green Frogs, Spring Peepers, Spotted Salamanders, Northern Water Snakes, Eastern Garter Snakes, Eastern Ribbon Snakes, Common Musk Turtles, Eastern Painted Turtles, and Common Snapping Turtles. Other species found in the immediate vicinity of the lake include Redback Salamanders, Northern Brown Snakes, American Toads, Northern Gray Treefrogs, and Wood Frogs.

While Lake Wapalanne is a young artificial lake, it has nevertheless accumulated a reasonably thick layer of muddy, organic-rich sediments as it ages. The dam created a shallow lake that in its over 80 years of existence, has never been dredged. Years of sediment and the normal deposits of organic matter in the lake have recently been exacerbated by another source of organic material -- invasive

Eurasian milfoil. Over the years, this accumulation of organic matter has led to the steady eutrophication of the lake. Now seasonal hypoxia assures that much of this organic matter is preserved in the sediments.

Lake Wapalanne has now entered a stage in its lifecycle wherein milfoil covers the lake bottom and algal blooms occur earlier and often cover the surface of the lake. This spring, algal blooms were so thick that the School was forced to cancel two weeks of fish ecology classes. Should this continue,

the lake will no longer provide adequate habitat for bass, perch and bluegill. Since the outflow of Lake Wapalanne feeds the Flatbrook (one of New Jersey’s premier trout streams), reestablishing lake depth and the subsequent temperature of outflows is important to the health of the Flatbrook.

The typical “cure” for Lake Wapalanne’s problems is chemicals. However, we have come to realize that even chemicals approved for use in wildlife rich environments like this one are at best a temporary fix and may have unpredictable effects on the lake. Instead, we are using a new technology known as “Hydro-raking.” Hydro-raking is an emerging technology for managing invasive species such as Eurasian milfoil that minimizes the use of chemicals in lake management because it removes the invasive plants by the roots. To completely remove the plants, five cubic meters of soil is extracted along with the plant. Over a

period of two weeks, we expect to employ Hydro-raking to remove the invasive plants from this twelve acre lake and in so doing increase lake depth, increase visibility and reinvigorate a fishery that once supported trout.

More importantly, our efforts at lake management have provided the students and faculty of CSAM with a perfect opportunity to study the effects of Hydro-raking on the ecosystem. The faculty has responded enthusiastically, developing proposals ranging from lake geochemistry to surveys of the lake’s biodiversity. On any Friday this summer, you could run into Mary Egan trolling for ticks, Bob Prezant’s benthic group (Rebecca Shell, Alison Morel, Kevin Olsen) sampling the lake bottom; Paul Bologna has several exclusion cages along the western edge of the lake; the graduate team from Sarkar’s PhD program has been sampling water quality; and the team from Earth and Environmental Studies has cored our lake bottom.

This is by far the largest burst of research activity ever conducted at Lake Wapalanne. The staff at the NJSOC is overjoyed with the response and we hope that this is the beginning of what will become a long-term relationship that will provide research and publication opportunities to students and faculty for years to come. We anticipate that this project will dramatically improve the Lake Wapalanne fishery and provide baseline data on lake chemistry and diversity, enabling lake managers everywhere to more effectively employ non-chemical means to manage invasive species. ♦

Pictures by R. Shell



Advisory Council News

CSAM is pleased to announce the addition of the following new members to the CSAM Advisory Council:

- Michel Bitritto, Director, NJ Meadowlands Commission Business Accelerator
- Frank Ciriello, Senior Vice President, Specialty and Primary Care Business Unit, Esai, Inc.
- Robert Graifman, Managing Member, Skyfarm Management and Managing Member, Federal Autocat Recycling
- Terence J. Gunning, Chief Executive Officer, Cadent, Inc.
- Paul Rabinovich, President, TerraCycle Investments, Inc. and Executive Vice President, Canus Corporation
- Chris Stevenson, Partner, Norris McLaughlin & Marcus (environmental law) ♦

Advisory Council – Member Profile

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



Dr. Paul J. Liroy, Professor and Vice Chair, Department of Environmental and Occupational Medicine at UMDNJ-Robert Wood Johnson Medical School (RWJMS), Piscataway, NJ has been a member of the Council since it's inception. He is Deputy Director for Government Relations at the Environmental and Occupational Health Sciences Institute (EOHSI), a joint program of

Rutgers University and UMDNJ, and is also the Director the Institute's program in Exposure Science. In addition, he co-directs the Center for Exposure and Risk Modeling at EOHSI. His academic Training includes a BA in Physics at Montclair State College 1969, MS in Physics, Auburn University 1971, and a PhD in Environmental Science, Rutgers University 1975. In 1998 he received the International Society of Exposure Analysis Jerome Wesolowski Award for Lifetime Achievement in Exposure Analysis, and in 2003 he was the recipient of the Frank Chambers Award for lifetime achievement in Air Pollution from the Air and Waste Management Association. In 2006 he received the RWJMS R. Walter Schlesinger Basic Science award for Mentoring. In March 2008 he was honored by Rutgers University as The Graduate School's Distinguished Alumnus for Physical Sciences, Mathematics, and Engineering. Dr. Liroy received the Distinguished Lecture Award from the International Society of Exposure Science in 2008. He recently received, from the Daughters of the American Revolution and the National Founders Trustees, the Ellen Hardin Walworth Medal for Patriotism and National Conservation Award for 2009, and he also received their State (NJ) and Chapter (Cranford) level National Conservation Award. Since 2002, he has been an ISI Highly Cited Scientist in

the area of Environment and Ecology having published approximately 250 scientific papers.

Dr. Liroy is a member of the Science Advisory Board (SAB), the US EPA (1991-2003, 2005-present), and is currently a member of the Board's Homeland Security Advisory Committee and the Asbestos Committee. He has also been a member of the National Academy of Sciences Board of Toxicology and Environmental Studies. Dr. Liroy was Vice Chair of the WTC Expert Technical Panel, and is a member of the New Jersey Domestic Security and Preparedness Planning Group and the NJ Preparedness College. He is currently an Associate Editor of two scientific Journals, Exposure Science and Environmental Epidemiology, and Environmental Health Perspectives, and is the Editor Emeritus of the Atmospheric Environment. Dr. Liroy also is an Advisor to the Italian American Commission of NJ. A Book on the WTC entitled *DUST: The Inside Story of its Role in the September 11th Aftermath* by Dr. Liroy will be published in January 2010. It is written for the general public.

He and a team of colleagues have also completed major research projects on the exposure and health effects caused by many toxicants and situations. One major effort was the aftermath of the World Trade Center disaster, and he expanded that effort to biologic and chemical warfare defense technology and exposure reduction strategies for homeland security and natural disasters. Other examples include pesticide and lead exposure among children, exposure to chromium in Jersey City, NJ, exposure response relationships for ozone and asthma. He is also a Co-Principal Investigator within the National Children Study (NCS) Vanguard Center for Queens NY and seven other counties in NY/NJ. This is a Consortium that includes Mount Sinai School of Medicine, Columbia University, the NYC Health Department and EOHSI. ♦

Biology Faculty Survey Pathogen Link to Amphibian Decline

by Kirsten Mosen and Lisa Hazard, *Biology and Molecular Biology*

Amphibian populations are declining due to a variety of factors, including habitat loss, introduced species, chemical pollution, and novel pathogens. *Batrachochytrium dendrobatidis* (Bd) is a pathogenic fungus that has been implicated in amphibian declines and extinctions worldwide. Screening animals for this pathogen usually involves invasive histological examination of skin samples. Recently researchers at the University of Maine developed a non-invasive molecular technique to screen for Bd DNA; this technique is suitable for screening both animals and environmental samples. While much of the United States has now been surveyed, New Jersey has not yet been evaluated. We have received funding from the New Jersey Department of Envi-

ronmental Protection's Conserve Wildlife Matching Grant fund to screen New Jersey amphibian species for Bd. This program is supported by the Conserve Wildlife NJ license plate fee.

We are currently using this non-invasive technique to screen skin, soil, and water samples from the New Jersey School of Conservation. Dr. Hazard, a physiological ecologist, is directing field sampling efforts, and Dr. Mosen, a molecular ecologist, is analyzing the samples. To date, we have examined three amphibian species native to New Jersey: Wood Frogs, Bullfrogs, and Eastern Newts. We

have not detected Bd in any of our samples; however, we are in the preliminary stages of this work. During the next year, we will sample amphibians throughout the state of New Jersey. We presented these preliminary results at the annual meeting of the Northeast chapter of PARC (Partners in Amphibian and Reptile Conservation) in August. Our work will be incorporated into the global database of Bd distribution maintained by Imperial College, London, and will enhance amphibian conservation and management efforts within New Jersey. ♦



National Institutes for Water Resources Awards Grant to EAES

by Kirk Barrett, *Passaic River Institute* and Josh Galster, *Earth and Environmental Studies*

Drs. Kirk Barrett (Passaic River Institute) and Josh Galster (Earth and Environmental Studies) were recently awarded a grant to investigate how land use change has affected streamflow. The project, entitled "Does urbanization decrease baseflow? A historical, empirical analysis in the coastal states of Eastern United States" will examine how urbanization has affected the low flow (i.e., baseflow) of streams. This has been a complex problem since initial studies have shown there to be conflicting results on how urbanization has impacted stream baseflow. For example, the increase of impervious surfaces that accompanies urbanization will decrease the infiltration of precipitation to the ground and limit the recharge of groundwater, but municipal water systems are notoriously leaky and can deliver millions of gallons per day in artificial recharge.

The grant will fund an empirical investigation of the relationship between urbanization and stream baseflow by examining the stream discharge records maintained by the United States Geological Survey in 10 states: NY below the Adirondacks, CT, NJ, PA, DE, MD, VA, NC, SC and GA. Gages that have continuous records for at least 25 years and have had substantial changes in the amount of impervious surfaces within the watersheds will be studied.

As a control, trends in 10 gaged watersheds per state that showed near constant imperviousness will also be analyzed. The baseflow will be separated from other stream flows using a digital filtering method and aggregate daily baseflow to create an annual baseflow time series for each gage. Finally, time series of three baseflow statistics: 1) annual baseflow per unit drainage area, 2) ratio of baseflow to precipitation, and 3) baseflow fraction of total flow. We will have both undergraduate and graduate students assisting us with these tasks.

This project will provide the most complete assessment about whether/how urbanization actually affects baseflow. Water supply managers and land development regulators can make use of this information to help better understand the effects of land development and manage it accordingly, especially in rural and water supply watersheds. The project results should be useful in assessing the threat posed by urbanization to dry-weather water availability and stream ecology.

Funding of \$82,489 for the two year project comes from the federal National Institutes for Water Resources. This project is one of only 6 funded, out of 60 submissions, and we believe to be the first for MSU ♦

Weston Science Scholars Program Celebrates its 10th Year

by Lynn English, Weston Science Scholars Program

The Weston Science Scholars Program, supported by Judy and Josh Weston and Family, is now celebrating its very successful 10th year. A pre-college research program, it offers select Montclair High School students the opportunity to learn science by “doing science”. This year,



40 students worked with university mentors in some of the following areas: Comparing Plant Communities between MSU campus and the School of Conservation with Dr. Paul Bologna; Web Design and Architecture with Dr. Jing Peng; An Analysis of Drinking Water Quality with Dr. Duke Ophori; Using Hyperspectral Imaging for Facial Recognition with Dr. Stefan Robila and Expression and Purification of Wild-type and Mutant Acetoacetyl CoA Thiolase with Dr. Jim Dyer, to name a few.

Students were required to present their research findings at two separate colloquia as the culminating activity

of the five week research period. In addition to this, scholars were invited to participate in several field trips to Liberty Science Center; Wetlands Institute; Intrepid Air, Sea and Space Museum; Mütter Museum and also the two day camp for Science and Seamanship where students traveled on the Pioneer, a vessel out of the South Street Seaport Museum.

Fall Activities are planned for 2009. If any MSU faculty wish to serve as a mentor for 2010, please contact Lynn English at ext. 5101 or at englishl@mail.montclair.edu ♦

Math and Science Day Inspires Middle School Students

Two hundred students from middle schools in Kearny and Lyndhurst spent a day at Montclair State University to experience interactive math and science presentations at the College of Science and Mathematics' second Math and Science Day. Part of the National Science Foundation's Graduate Teaching Fellows in K-12 Education (GK-12) program, Math and Science Day offers the students hands-on, age-appropriate learning opportunities designed to increase their interest in math and science.

Lead by Montclair State faculty and graduate students, a wide array of student-friendly presentations and workshops were offered at the event including, among others:

- “Jump Rope Arithmetic,” presented by Jonathan Cutler
- “The Segway,” presented by Dean Hamden
- “Amphibian Diversity,” presented by Lisa Hazard
- “Q & A with a Veterinarian,” presented by Bruce Henderson of Valley Animal Hospital, Clifton
- “Fractals,” presented by Marie McCrary
- “Fossils and Minerals” presented by Greg Pope
- “Seeing the Unseen: Spectral Imaging Reveals Secrets,” presented by Stefan Robila
- “Alpine Aromatics, Piscataway, Fragrance Intelligence,” presented by Sean Rodriguez
- “Liquid Crystals and Ferrofluids,” presented by Katarzyna Sieminska

The GK-12 Fellows in the Middle Program promotes math and science research and education by placing Montclair State graduate students in middle school classrooms to serve as resident scientists and mathematicians working together with the middle school teachers.

Supported by a \$2.8 million 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 is supported by a team of CSAM research faculty and graduate students. More information about the program may be found at <http://webhost.csam.montclair.edu/gk12> ♦



Kayla Serrano, a student from Kearny's Franklin Middle School prepares a section of an ice core for analysis in the Math and Science Day workshop, “Exploring Antarctica.”

New Faculty and Staff Join CSAM

CSAM is pleased to welcome the following new faculty and staff members: Department of Biology and Molecular Biology: Dr. **Vladislav Snitsarev**, Assistant Professor; and Dr. **Meiyin Wu**, Associate Professor; Chemistry and Biochemistry: Dr. **Linda L. Chang**, Assistant Professor; Computer Science: Dr. **Jerry Allen Fails**, Assistant Professor; Earth & Environmental Studies: Dr. **Mahmood Barbooti**, Visiting Scholar/Instructor, Dr. **Sudipta Rakshit**, Post Doctoral Scientist and Dr. **Sawahiko Shimada**, Visiting Professor; Mathematical Sciences: Dr. **Evan Fuller**, Assistant Professor, Dr. **Haiyan Su** Assistant Professor, Dr. **Ashuwin Vaidya**, Assistant Professor and Dr. **Dina Yankelewitz**, Assistant Professor; and the Institute for Sustainability Studies: Dr. **Michael P. Weinstein**, Acting Director. ♦

CSAM Student Delivers Commencement Address

By Marie Washington, Health Careers Program

May 22, 2009, Vaughn McE-nough not only graduated receiving a Bachelor of Science Degree Cum Laude, but made history! From a competitive pool of senior, peer applicants, Vaughn was selected as the undergraduate speaker, representing the class of 2009! Vaughn was the first Health Careers Program student to deliver greetings at a MSU Commencement!

A Molecular Biology major, Vaughn was an outstanding, well-rounded young man, who represented the spirit and intent of MSU and the Health Careers Program. His “footprints” were a reflection of service contributions and a certain level of academic competitiveness.

Vaughn’s ability to balance a rigorous science curriculum made it possible to serve in the position as Ambassador of the Admissions Office over the past four years where he shared posi-

tive experiences so that applicants would make the best decision in matriculating at MSU.

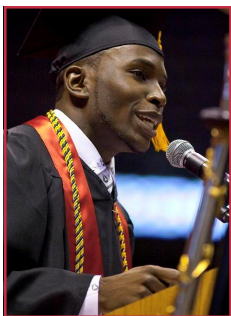
Serving as a legislator of the Student Government Association, membership with the Minority Association of Pre-Health Students, involvement with the Brotherhood (peer mentor organization), and serving as an Executive Board Member of Caribso were other on-campus contributions. Volunteering at the Newark Emergency Services For Families and active participation in the Annual Clothing Drive For Underprivileged were community service initiatives. In recognition of his outstanding service contributions to MSU, he was awarded the Dean of Students Award – Outstanding Junior (Spring 2008).

The kind of student who took great pride in learning, Vaughn was constantly in search of initiatives that enhanced his scientific knowledge. In 2006 he participated in the Summer Medical and Dental Education Program at UMDNJ and during the summer of 2007 he participated in the

Minority Student Summer Research Program at Albert Einstein College of Medicine. An opportunity to conduct research, supervised by a faculty mentor, Vaughn researched AIDS from a molecular biology perspective.

Maintaining cumulative GPA of no less than 3.56, Vaughn was also a recipient of the Dean’s List. During spring semester of 2008, he was one of ten New Jersey students who received the Dr. Martin Luther King, Jr. Commemorative Commission Award in the amount of \$5,000.00. In addition to completing undergraduate requirements as a Molecular Biology major, Vaughn also fulfilled requirements as an Honors Program student. Vaughn is currently preparing for the Medical College Admissions Test and will apply to medical schools.

The Health Careers Program staff is very proud of Vaughn’s community service endeavors, scholastic accomplishments, and making it possible for other Health Careers Program students to become keynote speakers at future MSU Commencements! ♦



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from the American Association of Physics Teachers in 1998. He published two articles about it with Ludwik Kowalski and Mary Derengowski-Stein in the American Journal of Physics. Bob favored demonstrations using real equipment, not just computer simulations or videos, sometimes with noisy bangs or roars. He forged ahead with the PASCO GLX explorer hand-held data collectors with various probes to attach. His article “RC Time

Constants for Measuring Instruments” was published in the Spring 2008 PASCO Newsletter. Bob is able to repair almost anything, or at least lend you the proper tool to do the job and instruct you on how to use it.

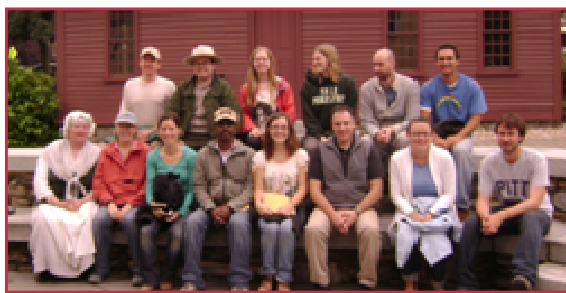
His children Roby, Wendy, and Meredith are grown now and have given him several grandchildren. We trust he will enjoy them and educate them as he has generations of MSU students. ♦

EAES PhD Candidate Selected as Hydrology Synthesis Scholar

by Ben Witherell, PhD candidate

In May, I was awarded a fellowship from the Northeast Regional Consortium for Hydrologic Synthesis to participate in the 2009 Summer Hydrology Synthesis Institute. As a PhD candidate in Environmental Management here at MSU, I was delighted to be selected as a Summer Scholar and to represent MSU at the national level. The Institute's summer research is part of a larger five-year project on "interdisciplinary synthesis research to understand the widespread alteration of hydrologic systems over local-to-regional domains focusing on the Northeast corridor of the U.S. over a 500-year period (1600 to 2100)." The National Science Foundation (NSF) and the Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI) jointly fund this pilot project toward the creation of a center for synthesis studies on an evolving human-water system.

The six-week program, directed by Dr. Charles Vörösmarty of the City University of New York, brought together a dozen early career researchers and doctoral students to investigate how hydrologic dynamics shaped human decision-making and how humans impacted hydrologic systems in the Northeastern U.S. during the nineteenth century. Some of the other institutions represented by this summer's scholars include Yale, Rutgers, U. Pittsburgh, U. of Texas (Austin), SUNY-Binghamton, UC Santa Barbara, East Carolina U.,



Tufts, U. Kentucky, and the U. Missouri. Additionally, this year's Scholars came from diverse disciplines including: environmental management and engineering, economics, landscape

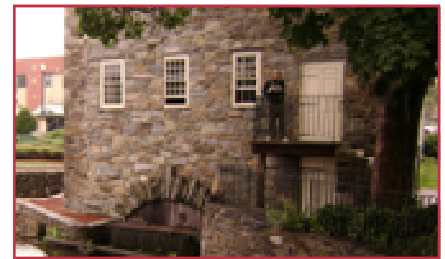
ecology, environmental history, climatology, hydrology, geography, geochemistry, geomorphology and urban planning. One concept being tested by NSF through the broader 5-year project is how can researchers go beyond the surficial cross-disciplinary activities to develop a broader understanding of each other's theoretical and methodological approaches that informs a deeper collaboration and synthesis.

As the 2009 scholars, we adapted a conceptual model developed by the 2008 Institute scholars that related hydrologic change in the colonial period to three primary drivers: land use/land cover, climate variability, and technology/engineering innovation. We applied it to the concept of water availability as the primary descriptor of hydrologic change in the nineteenth century. We defined water availability to include induced water scarcity due to water quality impairments and constraints imposed through legislation and court decisions, two factors that significantly influenced the amount of water usable for human activity in the Northeastern U.S. in the nineteenth century. In other words, we defined water available for human use to be equal to precipitation less the evapotranspiration losses, the amount unavailable due to water quality impairment, and the amount constrained by legal and regulatory allocation.

The program included two field trips to provide historical perspective, what I call close encounters with nineteenth century hydrology, to our research. We visited the Harvard Forest Long Term Ecological Research (LTER) site, where we witnessed hydrology in action (it poured during our field site walk) but also had an opportunity to meet with several researchers investigating the impacts of 300 years of agricultural activity and more recent afforestation on local hydrology. The group also visited the historic mill sites of the Blackstone River valley between Providence, RI and Worcester, Mass.

Here we were able to tour renovated water-powered textile mills and machine shops dating back to the late 1700s. We also toured the mill ponds and canals that were used to provide or enhance the "fall" of water that turned the large water wheels which provided power for the mills.

Slater's (pictured below) was the first large scale water-powered textile mill in the U.S. Prior to widespread use of the



steam engine, millworks typically were constructed beside streams and rivers in areas that provided natural water "falls" and were conducive to building impoundments for water storage. Some historians estimate that there may have been on the order of 10,000 mills built in the Northeastern U.S. between 1760 and 1840. The scholars estimated that the additional surface storage created by these reservoirs, and reservoirs constructed later in the century for water supply and canal feeders, resulted in an increase in regional water residence time of between 5 and 14 days during the nineteenth century.

It was an intense work environment, but also really energizing to work with such a diverse group of scholars at the cutting edge of inter-disciplinary research in hydrology and water resources. The six-week Institute ended with a capstone mini conference in West Point, NY, with all the principal investigators and a few other invited guests. We presented our preliminary findings and engaged in round table discussions of future research directions and how to leverage the summer's research into publications so that the methods behind the hydrologic synthesis can begin seeping into the larger water systems research community. ♦

Academic Scholarships Awarded

With generous support from **Novartis**, the first graduate fellowship is awarded to Aline De Oliveira. Majoring in Molecular Biology, Aline's fellowship includes remission of tuition and fees and \$5,000 stipend per year for two years.

CSAM also awarded its first **PharmFest Scholarships** for graduate studies to Mark Haverick and Agnieszka Zieba. Both awardees received the bachelor's degree from MSU in May 2009. Mark will pursue a master's degree in Biochemistry, and Agnieszka in Chemistry. Each will receive \$3,000 per year for two years. Proceeds from previous PharmFests fund these scholarships.

These three new awards are awarded to students who intend to pursue a career in the pharmaceutical industry

and who possess prior appropriate related work, internship or research experience.

Other scholarship recipients include:

- Lenin Aldaz, Viola Withney Pflieger Fund Award
- Manan Pandya, Jacob Goodman Scholarship
- Binta Jalloh, Al Stein Memorial Fund

And, the Montclair State University Alumni Association awarded

- Rachel Compton, Stone Scholarship
- Angela Teixeira, Reed/Lehmkuhl Scholarship
- Maryam Alapa, Reed/Lehmkuhl Scholarship
- Stephanie Barros, Reed/Lehmkuhl Scholarship ♦

Department Hosts 1st Bonnie Lustigman Symposium and Awards

by Quinn Vega, *Biology and Molecular Biology*

On March 26th the Department of Biology and Molecular Biology hosted the first annual Bonnie Lustigman Symposium and Awards Presentation. The afternoon began with presentations by the year's previous Lustigman award winners, Constantino Lambroussis on the "Indications of Potential Toxic/Mutagenic Effects of World Trade Center Dust on Cells *in vitro*" and Kristen Kwasek on the "Physiological and Behavioral Responses of Wood Frogs to Road Deicers".

The talks were followed by a keynote presentation by Dr. Stephen Hsu, a former MSU student of Drs. Lustigman and Lee, and professor at the Medical College of Georgia. His talk, "Green tea: From a Popular Beverage to Novel Therapeutics" provided the audience with a scientific explanation of the potential benefits of green tea both from a cellular and a physiological perspective.

The symposium was attended by a large number of students and alumni

as well as the family of Dr. Lustigman, including her husband Sheldon, daughter Alyssa, and daughter-in-law Jill. Next year's Fellowship recipients, Ananya Sengupta and Lina Halawani were announced.

The Bonnie Lustigman Research Fellowship has received support from the Lustigman family and has allowed both undergraduate and graduate students in the department to perform research that would not have been possible otherwise. ♦

Bob Dorner Retires

by Mary Lou West, *Mathematical Sciences*

Dr. Robert Dorner (Mathematical Sciences) retired from Montclair State University in June, 2009 after 41 years of service. He has seen many changes here and has made many friends who will miss him, but wish him a very happy new phase of life. Bob taught electronics and robotics in the Industrial Arts Department for many years, and when that department dissolved in the 1990s. He was welcomed into the physics group within Mathematical

Sciences. He has been a tremendous asset here, including organizing scheduling as department deputy chair. In the 1970s Bob was on the MSC Board of Trustees and active in the budding faculty union.

He loves fast vehicles from motorcycles to small aircraft and had a private pilot's License. Bob also loves high voltage electricity



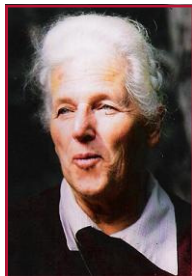
and ultra-strong magnets, especially the neodymium ones. His intellectual hero is Michael Faraday, titan of 19th Century electricity and magnetism who pushed the idea of lines of force. Bob was always designing and building equipment to use as demonstrations in physics classes. One apparatus is an oscillating Plexiglas blade with a sleek LED display unit to show the phase shift at resonant frequency. This won a prize for best apparatus

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Remembering Dr. S. Marie Kuhnen

by Barbara Brummer, BS'68, Director NJ Nature Conservancy

She inspired generations of biology teachers; she created a love of the outdoors in thousands of people who otherwise would never have come to know the beauty and complexity of nature. A woman ahead of her time – she became the first Chair of Montclair State's Biology Department when it was founded in the late sixties; she helped to found the School of Conservation in Stokes State Forest; she was a founding Trustee of the Pocono Environmental Education Center; she worked tirelessly to preserve the hemlock forest in Valhalla Glen in partnership with The Nature Conservancy well before most people had an appreciation of protecting unique natural communities. But most importantly,



she touched so many of her students' lives and instilled her spirit and enthusiasm for appreciation of the plants and birds around the world. She reveled in getting students outdoors – whether it was just up the street to Mill's Reservation, the Montclair Hawk Watch (NJ Audubon), the Pine Barrens, Tillman's Ravine, Brigantine, Delmarva Peninsula or the Adirondacks! Over 41 years, her teaching at Montclair State University was transformational for many students, myself included.

Ask anyone who took her courses which teacher stands out in memory, and the reply is most likely "Dr. Kuhnen!" Her students continually showed up at her home in Clifton even 20 years after her retirement. She spent her entire life living and working within a 10-mile radius in northern NJ, "But, I've traveled to all

seven continents" she once laughingly remarked—and undoubtedly left an impression on all of them.

Yes, she gave us all a new perspective on the natural world and we all had a lot of fun in the process. And yes, we will always remember those days, but most of all we will remember her – the energetic, demanding but fair – Dr. S. Marie Kuhnen, a woman whose passion and energy made an impression that changed lives.

A scholarship has been created in memory of Dr. Kuhnen. Donations to the scholarship can be made to: The S. Marie Kuhnen Scholarship Fund, MSU Foundation, 1 Normal Avenue Montclair, New Jersey 07043. For more information please contact Kathy Walsh at 973-655-3440 or walshk@mail.montclair.edu ♦

Convocation 2009

The College of Science and Mathematics held its annual Convocation ceremony on Saturday, May 16 at the University's Amphitheater.

Lisa P. Jackson, Administrator of the Environmental Protection Agency 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, Board of Trustees member Marilyn O'Connell and Dean Robert S. Prezant.

As in past years, Outstanding Students Awards were given to graduating seniors from each of CSAM's academic majors. The selection is based on academic



performance, as indicated by the Grade Point Average, involvement in research, service and leadership. This year's recipients (pictured left with Administrator Jackson) are:

Pamela N. Omesiete, Biochemistry
 Laura Panella, Biology
 Marc N. Muniz, Chemistry
 Chris Bogda, Computer Science
 Anthony Cauterucci, Geography
 David Cuomo, Geoscience
 Ewa Obruszkiewicz, Information Technology
 Jin Park, Mathematics
 Vanessa Espinosa, Molecular Biology
 Kwang Jae Bae, Physics

Vanessa Espinosa was also named Outstanding Student for carrying Undergraduate Research and Elizabeth Arango (pictured right) represented the graduates as Student Speaker. ♦



CSAM Annual Awards

The annual College of Science and Mathematics awards ceremony was held on April 29, 2009. Graduate students, faculty and staff were recognized for their service, teaching and research. Congratulations to the following:

Outstanding Master's Students

Katie Elizabeth Vasquez, Biology
Winder B. Perez, Molecular Biology
Jacque Lynne Lamb, Chemistry
Ludmila Krasilshchikova, Computer Science
Gina M. Mongiello, Environmental Studies
Cathleen Lauren Dale, Geoscience
Alexander Kastan, Statistics
Kristina L. Oriente, Mathematics
Amy L. D'Ambola, Teaching Middle Grades Mathematics

Margaret and Herman Sokol Awards

Faculty/Student Research Award

Nina Goodey/Andrew Mauro, Chemistry & Biochemistry
Lisa Hazard/Kirsten Kwasek, Biology & Molecular Biology
Shifeng Hou/Robert Cuellari (Chemistry & Biochemistry)

Summer Graduate Student Research Fellowship

Justin W. Kulick, Earth & Environmental Studies
Thomasz Kurcon, Chemistry & Biochemistry

Graduate Fellowship in Science

Marc Muniz, Chemistry and Biochemistry
Anila A. Rambal, Earth & Environmental Studies
Elizabeth Stagg, Earth & Environmental Studies

CSAM Awards of Excellence

Carolyn Witte, Secretarial/Administrative Assistant
Yoko Sato, Professional Staff
Matthew L. Goring, Faculty Service
Dajin Wang, Faculty Research
Diana Thomas, Faculty Teaching

Special Recognitions

Robert F. Dorner, Retirement
Anne Krause, Fond Memory

Margaret and Herman Sokol Faculty Fellow

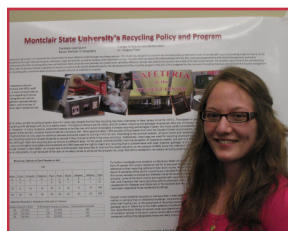
Mark Chopping (Earth and Environmental Studies) ♦

3rd Student Research Symposium

by Diana Thomas, Mathematical Sciences

The Third Annual Student Research Symposium held on April 30th was again a success due to the tremendous participation by student, faculty and staff.

Sponsored by the Montclair State University CHSS/CSAM and Sigma Xi, the Student Research Symposium showcases and awards outstanding student scholarship and research by providing an academic venue to share their research with the academic community and their peers.



Students from both colleges had the opportunity to showcase their research in poster format or in a fifteen-minute presentation, which includes ample time for discussion and

questions and answers. There were a total of 32 student talks and 68 student posters, and overall 145 students participated including those in team presentations.

All students in the year-long interdisciplinary Senior Research and Writing Seminar in Jurisprudence present their research on topics as diverse as the creationism/evolution controversy, ethical considerations in the creation of a paid organ donor bank system, the right to physician-assisted suicide, individual rights to bear arms under state law and non-traditional perspectives on law school education.

CSAM is proud of our students who presented their original work. ♦



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Kudos

The National Institute of Health Joint NSF/NIGMS Mathematical Biology Program awarded Dr. **Lora Billings** (Mathematical Sciences) a three year \$799,310 grant titled Multi-scale modeling of infectious diseases in fluctuating environments. The objective of this grant is to develop new mathematical models and methods that predict and prevent outbreaks of infectious diseases. The work will be conducted by a consortium with the College of William and Mary, Johns Hopkins Bloomberg School of Public Health and Naval Research Laboratory.

Dr. **Stefanie Brachfeld** (Earth and Environmental Studies) has received \$119,406 for her project entitled "Enhancing Holocene Ice Sheet and Ice Shelf Geochronology using Geomagnetic Paleointensity Variations." The project examines sedimentary records of climate change and magnetic field variability from Maxwell Bay, South Shetland Islands. Two undergraduate students from MSU will participate in the research. This is Dr. Brachfeld's tenth grant from a federal agency. Currently, she has a CAREER award, and is a PI on an international collaborative International Polar Year grant in Antarctica.

Dr. **Mark Chopping** (Earth and Environmental Studies), was awarded a grant of more than \$500,000 from NASA to map changes in shrub abundance and biomass in the Arctic tundra.

Dr. **Charles Du** (Biology and Molecular Biology), along with Dr. Hugo Dooner (PI, Rutgers University) and Dr. Randall Kerstetter (Co-PI, Rutgers University) received a three-year \$1.2 million research grant from the National Science Foundation. The grant, entitled "Facile Production and

Efficient Indexing of Transposon-tagged Lines Using Next-generation Sequencing Technology for Maize", will provide the researchers with an opportunity to use next generation sequencing technology to analyze the maize genome. As co-PI, Dr. Du will carry out bioinformatics analysis for sequence assembly, annotation, and mapping of millions of short reads to the maize reference genome; develop a web-searchable database of insertion site sequences cross-referenced to lines hosted at Montclair State University. Through the grant, MSU will receive over \$200,000 to support a bioinformatics server and undergraduate research.

Dr. **Lisa Hazard** (Biology and Molecular Biology) was elected to membership in The Honor Society of Phi Kappa Phi. She has also been named to the Nominating Committee for the Society for the Study of Amphibians and Reptiles, as well as the Student Support Committee for the Society for Integrative and Comparative Biology.

Dr. **Mark Korlie** (Mathematical Sciences) was elected Sectional Governor for New Jersey on the Board of Governors of the Mathematical Association of America.

Drs. **Aihua Li** and **David Trubatch** (Mathematical Sciences) were awarded a grant for Academic Year 2009-2010 by the Council for Undergraduate Research in Mathematics. This NSF grant, subcontracted with Brigham Young University, will provide stipends and travel expenses for a group of 5-6 undergraduates who will work on individual and joint research projects and present their results at the CURM Spring Meeting in March 2010. The grant will also provide faculty stipend for the academic year 2009-2010 and faculty

training in the summer.

Dr. **Bogdan G. Nita** (Mathematical Sciences) has been selected by the Society of Exploration Geophysicists to receive the J. Clarence Karcher Award. This very prestigious international award is given in recognition of significant contributions to the science and technology by a young researcher (under 35).

Dr. **Sandra Passchier** (Earth and Environmental Studies) has received \$75,817 for a one year pilot study to focus on the analysis of sediment cores in the Ross Sea area using an integrated approach involving laser particle size analysis, scanning electron microscopy of quartz micro-textures, sediment geochemistry and heavy mineral analysis. Two graduate students will work closely with Dr. Passchier on this project which is her third NSF-funded grant.

Dr. **Stefan Robila** (Computer Science) has received an NSF Major Research Instrumentation grant 190,010 to purchase equipment that will support a high performance computer cluster. Senior personnel on this project include **Lora Billings, Anna Feldman, Bogdan Nita, and Dajin Wang.**

Dr. **Johannes Schelvis** (Chemistry and Biochemistry) has been awarded \$419,453 for a three-year project entitled "Molecular Mechanisms in Photolyase and Cryptochrome," to study how DNA damage caused by exposure to solar ultraviolet light is efficiently repaired by bacterial enzymes and how that may translate to more efficient repair of this specific DNA damage in humans. This project will provide training for a graduate student in time-resolved laser spectroscopy and career mentoring for a postdoctoral associate

and the graduate student. This is Dr. Schelvis's second NSF grant at Montclair State.

Associate Dean **Lynn Schneemeyer** has been selected as a fellow of the American Association for the Advancement of Science (AAAS). Election as an AAAS Fellow is an

honor bestowed upon members by their peers for meritorious efforts to advance science or its applications.

Promotions and Tenure

Drs. **Aihua Li** (Mathematical Sciences) and **Katherine Herbert** (Computer Science) were awarded tenure. Drs. **Huan Feng** (Earth and

Environmental Studies) and **Reginald Halaby** (Biology and Molecular Biology) were promoted to the rank of Professor and Dr. **Youngna Choi** (Mathematical Sciences) was promoted to the rank of Associate Professor. Congratulations to all! ♦

Faculty News

Lisa Hazard (Biology and Molecular Biology) served as a judge for student papers for the Frederick H. Stoye Award for Best Student Paper in Physiology/Physiological Ecology (American Society of Ichthyologists and Herpetologists) and the Society for Integrative and Comparative Biology student awards, Division of Comparative Physiology and Biochemistry. She presented a talk on Amphibian Diversity to middle school students at the MSU Math and Science Day, NSF GK-12 Program.

Ludwik Kowalski (Mathematical Sciences, retired) continues to be active in the field that used to be called cold fusion. Now called Condensed Mass Nuclear Science (CMNS), the field is as controversial as it was twenty years ago, when Fleischmann and Pons issued their famous press release in Salt Lake City. A good summary of results can be found in Edmund Storms, "Science of Low Energy Nuclear Reactions: A Comprehensive Compilation of Evidence and Explanations about Cold Fusion," World Scientific Publishing Company (2007). Ludwik's current investigation was prompted by Richard Oriani's a 2008 publication, "Reproducible Evidence for the Generation of a Nuclear Reaction During Electrolysis,"

Dr. **Aihua Li** (Mathematical Sciences) was invited as a faculty mentor to participate in the CURM (Center for Undergraduate Research in Mathematics) spring conference held in Brigham Young University. She also participated in the 17th International Conference on Interdisciplinary Mathematical & Statistical Techniques (IMST 17) held in Pilsen, Czech Republic. She organized and chaired a special session, "Graphs and Combinatorics", and presented a joint paper: "Interlace Polynomials of Ladder Graphs", co-authored by Qing Wu from Beijing Jiaotong University, and was invited to give a presentation in the 3rd International Workshop on Matrix Analysis and Applications held in Li'an, China. The title of the talk is: "Solving Certain Matrix Equations Using Advanced

Symbolic Techniques". Dr. Li served as a reviewer on 5 mathematics articles for *Mathematics Reviews* and refereed one paper for *Discrete Event Dynamic Systems*.

Drs. **Kirsten Mosen** and **Lisa Hazard** (Biology and Molecular Biology) presented "Molecular screen for *Batrachochytrium dendrobatidis* in New Jersey amphibians" at the Partners in Amphibian and Reptile Conservation, Northeast Chapter Annual Meeting in Watkins Glen, NY. At the same conference Dr. Hazard and student **K. Kwasek** presented "Effects of road deicers on survival and behavior of larval and adult wood frogs." This paper was also presented at the Society for Integrative and Comparative Biology Annual Meeting. In addition, Dr. Hazard presented "Behavioral aversion of two New Jersey amphibian species to road deicers" at the Joint Meeting of Ichthyologists and Herpetologists (ASIH/HL/SSAR).

Dr. **Sandra Passchier** (Earth and Environmental Studies) and students continue to work on samples taken from the ANDRILL-SMS project core, drilled in 2007 in Antarctica. This work is supported by a total of \$117,297 in NSF funds through sub-awards from the ANDRILL Science Management Organization at the University of Nebraska Lincoln. Two MSc students in Geoscience, **Candice Falk** and **Dan Hauptvogel**, are now officially listed as office scientists. Both Candice and Dan received stipends and tuition waivers from the ANDRILL program.

Johannes Schelvis (Chemistry and Biochemistry) gave an invited talk entitled "Resonance Raman characterization of the interaction of thromboxane synthase and prostacyclin synthase with substrate analogues" at the 2nd Georgian Bay International Conference on Bioinorganic Chemistry.

Professor **Qing Wu** from Beijing Jiaotong University visited the Department of Mathematical Science from September 2008 to February 2009. During her visit, she collaborated with Drs. **Jonathan Cutler**, **Aihua Li**, and

Mika Munakata on research projects in graph theory and mathematics education. Professor Wu also participated in some classroom activities and taught two experimental classes to pre-service teachers.

Dr. **Danlin Yu** (Earth and Environmental Studies) traveled this summer to China where he presented an invited talk, "Development of urban geography and geographic information science: China and US" at the Institute of

Geographic Science and Nature Resource Research, Chinese Academy of Sciences in Beijing, and on the "Regional development in China: a spatial and spatiotemporal perspective" at the International Conference on Globalization, Innovation, and Urban-Regional Development in Shanghai. He also presented a paper titled "Spatial interpolation via GWR, a plausible alternative?" at the 17th International Conference on Geo-informatics. ♦

Student News

Students **B. Anand, J. Piemonte, C. Feldman, E. Silverthorne** and Professor **S. Wunderlich**, working with Dr. **David Konas**, presented "Cooked Foods in Eldercare Living Centers: Do Vitamin C Levels Meet Expectations?" at the 2009 Joint Annual National Meeting of the Agriculture, Food, and Human Values Society (AFHVS) and the Association for the Study of Food and Society (ASFS), Pennsylvania State University and at the 2009 Annual Meeting of the New Jersey Dietetic Association, New Brunswick, NJ.

Ms. **Padmini Das**, a graduate student of Environmental Management pursuing doctoral studies was awarded a \$2,310 student research grant from the Geological Society of America.

Rocio Duchesne Onoro and **Rushita Desai**, both pursuing the Master's in Statistics degree, were two of 20 students to be awarded scholarships from SAS Institute to participate in the SAS Global Forum 2009 conference. SAS Institute is the leader in business analytics software and services and the largest independent vendor in the business intelligence market. Rocio and Rushita were able to expand their knowledge of the software, investigate applications of statistics to areas such as genetics and data mining, and to network with other SAS software users and potential employers.

Maria Morales, an undergraduate

pursuing the Mathematics degree with a Concentration in Statistics, spent six weeks this summer at Boston University learning the principles of applied biostatistics, meeting practicing biostatisticians, epidemiologists, and statistical geneticists, and working with actual data collected in internationally recognized studies that have been funded by the National Heart, Lung, and Blood Institute. Her participation was fully funded by NIH as part of the Summer Institute in Biostatistics (SIBS) program. Only 75 students nationwide were awarded the opportunity to participate in the program.

Three Environmental Management



Ph.D. students (pictured above) recently won awards for the student poster competition at the Hudson Delaware Chapter meeting of the Society of Environmental Toxicology and Contamination. Similar to its parent organization, HDC-SETAC promotes the advancement and application of scientific research related to contaminants and other stressors in

the environment, education in the environmental sciences, and the use of science in environmental policy and decision-making." **Padmini Das** was awarded a \$500 first place prize of \$500 for her poster entitled "Chemically enhanced phytoextraction of 2, 4, 6 trinitrotoluene (TNT) by Vetiver grass from a low organic matter containing soil." **Pravin Punamiva** received (\$250) second place for his poster entitled "Phytoextraction of lead using a metal-accumulating grass (*Vetiveria zizanioides*) in the presence of an arbuscular mycorrhizal fungus, *Glomus mosseae*." **Michael Hardy** was awarded third place and \$150 for his poster entitled "Removal of heavy metals from shipyard stormwater using residuals of drinking water treatment." in the meeting's poster competition. All three candidates, under the supervision of Dr. Dibs Sarkar, are conducting research focused on environmental quality and remediation. Two of them also recently received graduate student research grants from the Geological Society of America. "These awards recognize both the high quality of the graduate students and the research conducted in the Environmental Management PhD program," said Dr. Sarkar ♦

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Upcoming Event

October 20th, 2009

Renowned Italian physicist, **Dr. Eugenio Coccia** will deliver the Fall 2009 Margaret and Herman Sokol Science Lecture titled "Gravitation: From Galileo to Einstein and Beyond." Dr. Coccia is the director of the INFN National Laboratory of Gran Sasso, the world's largest underground laboratory for astroparticle physics. Most recently, he was full professor of gravitational physics at the University of Rome Tor Vergata.

Gravitation is responsible for keeping the Earth and the other planets in their orbits around the Sun, for keeping the Moon in its orbit around the Earth, and for heating the interiors of stars to very high temperatures allowing the formation of the chemical elements we need for life. The talk will describe the breakthroughs of Galileo Galilei and Isaac Newton and the vision of Albert Einstein who described gravity as a curvature of space-time, making it possible for us to understand fascinating cosmic phenomena like gravitational waves, black holes and 'spaghettification.'

The event is co-sponsored by the MSU Coccia Institute. Scheduled to begin at 8:00p.m. in the Kasser Theater, it is free to MSU students, faculty, staff and alumni and \$15.00 to the general public. ♦