

# CSAM NEWSLETTER

College of Science and Mathematics

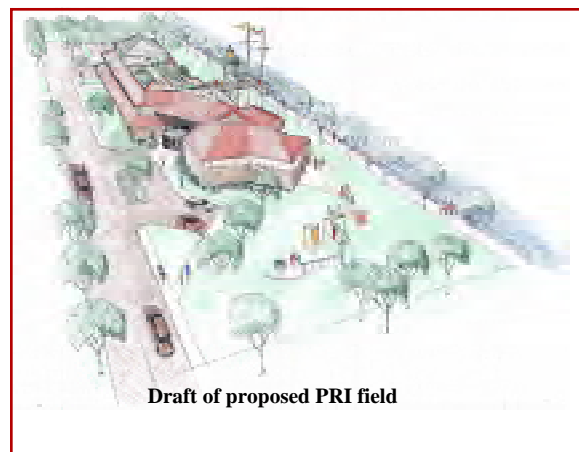
*A Spectrum of Possibilities*

## *Passaic River Institute Installs First Director; Pursues Research and Education Center on the River*

**T**he Passaic River Institute (PRI) was established with the mission to further environmental research and education and to seek solutions for environmental problems within the Passaic River Basin, which encompasses remarkable diversity. The Basin contains some near pristine and very environmentally important lands (namely the drinking water watersheds and reservoirs of the Highlands) and several large exurban/suburban wetland complexes in southern Morris County and along the Essex/Morris/Passaic county boundaries, most notably the Great Swamp National Wildlife Refuge. Along the lower reaches of the River, however, one will find some of the most densely populated land in the nation and severe environmental contamination.

Dr. Kirk R. Barrett joined MSU as the PRI's first director in September 2004. CSAM Dean Robert Prezant said "Dr. Barrett has outstanding qualifications as a researcher and administrator, and I am confident that he will help establish the Institute as a respected source for scientific information, research and community outreach." As director, Barrett brings a wealth of environmental knowledge and experience to his new position. Prior to being named PRI director, Barrett served for five years as the research director of the Meadowlands Environmental Research Institute of Rutgers University, in collaboration with the New Jersey Meadowlands Commission. He holds a doctoral degree in environmental engineering from Northwestern University and is a registered professional engineer and certified professional wetland scientist. He serves on the Environmental Commission of Essex County.

A high priority for the Institute is the cooperative establishment of an environmental center for field research and education on the River, complete with boat docks, laboratories and educational programs. The concept has strong support from industry, government and community groups and the PRI is working to insure their input. "Through our environmental center and other programs," Prezant said, "the PRI will conduct outreach and education efforts in the community to raise awareness of the river ecosystem. These efforts will be closely coordinated with MSU's programs in environmental science, including its new doctoral program in environmental management."



Draft of proposed PRI field

Another priority is to become actively engaged in the large project to remediate and restore the lower, tidal reaches of the Passaic, which is being led by federal and state agencies (see [www.ourpassaic.org](http://www.ourpassaic.org)).

PRI is seeking to develop cooperative relationships with the numerous nonprofit, scientific and governmental organizations working on Passaic River Basin issues, some for many years. "We need to learn what these experienced players believe are the most important issues, and how a university-based research institute can best help in their efforts," Barrett said. "We hope to announce a significant joint initiative with a prominent environmental group in the near future."

More information is available on the PRI web site at: [www.csam.montclair.edu/pri](http://www.csam.montclair.edu/pri)

## ***Biological Data Quality Research in the Department of Computer Science***

*By Katherine G. Herbert (Computer Science)*

**D**ue to advances in biological research, information in biological data repositories has grown substantially. As with any database, these data repositories now must cope with a number of database issues that are inherent to very large databases. The issues that these databases are facing can be addressed by a special field in database research called data quality. Data quality investigates maintaining databases and data repositories such that their data are accurate with respect to a number of factors. Some factors include accuracy with respect to the information available about the data item, correctness with respect to time and assurance that the data is not duplicated within the data set. Formally, these data quality issues can be classified to include synonymy, polysemy and data redundancy. However, due to the complex and diverse nature of the biological data, the problem of improving the data quality is non-trivial. Therefore, specialized techniques and algorithms are needed to address the data quality issues. If the data quality is not maintained or improved, recall and precision within a repository can be poor. This can result with the scientist either obtaining false information for his/her query or receiving so many bad results that the database query experience becomes frustrating. Moreover, if data is extracted from the repository by a third party or for data mining and knowledge discovery purposes, the applications and knowledge based on this data will either fail or be skewed by the inconsistent data.

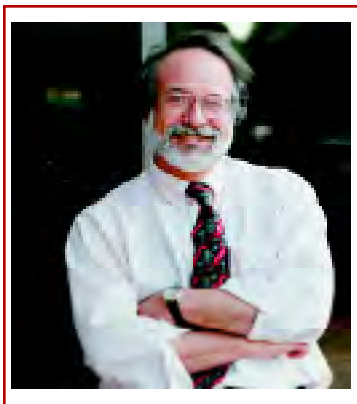
Data repositories are also expanding their functionalities, requiring more interactions among the data, thus creating more data quality problems. Currently, most data repositories are interrelating with each other, allowing users to access data from other repositories through the original repository's website. This creates a number of difficulties in combining the data in the repositories, known as integration problems. These difficulties include problems such as combining and reconciling both data and the format of the data. With biological research changing rapidly, creating more detailed information about biological processes, repositories must address the issue of how to integrate complex new data with older legacy data that follow different data models. Many data repositories endeavor to reduce redundancy and duplication within their databases in favor of giving the user highly documented summaries of the data. For example, the Protein Information Resource strives to provide users with highly annotated information about the proteins stored within its databases. To provide this, the data must be curated through both the curators personally reviewing each protein and automated computer-based algorithmic techniques. Since the process relies heavily on individual scientist evaluating the data, there can be inconsistencies in how the data is processed, resulting in errors. Data cleaning, algorithms that detect inconsistencies within data sets, can offer methods for making the curation process more automated. By developing and applying these algorithms specifically for biological data sets, some of these inconsistencies can be identified and eliminated. Finally, the discoveries in biology affect not only the scientific community, but also other communities such as the business and finance communities. Therefore, there is a need for simple interfaces that give results in a concise, easy to understand style. All of the challenges can be interpreted as data quality problems and addressed through data cleaning, data integration and exploratory data mining.

To address these concerns, the Department of Computer Science recently created the Biological Data Quality and Engineering Lab. This lab, under the direction of Dr. Katherine G. Herbert, researches methods for addressing data mining and data integration issues in phylogenetic (evolutionary) and protein data sets. It also investigates how to integrate and preserve data integrity within these resources. Moreover, it looks at methods to help these repositories integrate data so that these resources can reach a larger audience and also give the user a more valuable experience with his/her tools.

Current projects within this lab address issues concerning how to streamline and integrate phylogenetic data available on the World Wide Web. This research has many extensions, from environmental database applications to Homeland Security problems. More information is available at: [www.csam.montclair.edu/~herbert/BDQELab.html](http://www.csam.montclair.edu/~herbert/BDQELab.html).

## From Dean Prezant

I'm writing this article from the rainforest of Barro Colorado Island in Panama. The land is home to the Smithsonian Tropical Research Institute and is the backdrop for the Rainforest Connection, a program of the Professional Resources in Science and Mathematics (PRISM) and the Bristol-Myers Squibb Science Teaching and Learning Center. I'm here to help present live-time and interactive distance education programs to elementary school children back in NJ, NY and Texas and scout out some possible research sites (including sites in Gatun Lake, a lake that has periodic postings stating: "*Advertencia: Cocodrilos en el crea*"). While my small portion of the extensive Rainforest Connection program will focus on the non-vertebrate animals, I quickly recognized the photogenic qualities of some of the "charismatic megafauna" of the island and spent a great deal of time focused on howler monkeys, agoutis, and three-



toed sloths. The Rainforest Connection, developed and led by PRISM Director Dr. Jackie Willis, allows scientists to communicate directly with students in their home classrooms while broadcasting directly from a remote field site. Scientists can present on-location in Panama or elsewhere and answer questions posed by students. Students get a first hand look at some of the tropical wildlife and, through the kind support of Verizon, are able to have a direct connection with the scientists doing the research. The success of this program is evident in the rapid increase in the number of participating schools.

The Rainforest Connection is just one of the many important outreach programs organized and run by members of the College of Science and Mathematics. We host the northern regional Science Olympiad, the CSAM School of Conservation hosts the Envirothon, add in Math Day, Science Day, Adopt a Professor Program, our Sokol Science Lectures, PharmFest, and many more. It has become quite clear that our various outreach programs serve an important role in bringing the excitement of science directly to the community and pre-college students. It's equally clear that these programs demonstrate how our scientists are fully vested into the concept of helping our K-12 students and the community at large partake in a more exciting and clearer look at the future and the role science plays in it and in our everyday lives. If you have any ideas for additional outreach programs that make sense for CSAM, please do let us know. Now, I'm off to hunt for some shallow-water molluscs with hopes of not disturbing any crocodiles.

## PRISM Sponsors National Conference at MSU

### "HANDS and MINDS TOGETHER"

May 23-25, 2005

Hands and Minds Together is a showcase and exposition of What Works! Successful practitioners, consultants, and resource developers will present and exhibit information, strategies, and products implemented in high performing classrooms and schools.

What Works! Showcase and Exposition begins Monday, May 23, 2005 at 2:00 pm. Interaction with exhibitors, specialists, and product suppliers continues until 8:00 pm. On Tuesday, May 24 and Wednesday, May 25 at 9:00am, concurrent keynote addresses permit participants to select either a mathematics or science presentation. Among the choices are: Changing Mathematics Classrooms or Managing Uncertainty with Inquiry-Based Science Curricula; Try a FrogFest to Teach Big Ideas in Mathematics or Applying Brain-Based Research in Curriculum Design.

Throughout each day, simultaneous workshops in mathematics and science are presented in the morning and repeated in

the afternoon to accommodate participants' needs. Topics include: SCIENCE: Inquiry-based science instruction; Teaching tools in science; Inquiry in the physical sciences; Inquiry in middle school science; and Minds on science and technology. MATHEMATICS: Big ideas in mathematics; Teaching measurement and trig probability; Algebra – not just in high school; and Implementing change in mathematics self assessment.

The conference is an experience designed for the entire education community. CSAM faculty - Dean Hamden, Evan Maletsky, Mika Munakata, George Pangalos, Nancy Schultz, and Ken Wolff – are workshop presenters. The conference ends with a one-hour plenary session at 4:15pm titled, "Mathematics and Science: taking it all back home" presented by Dr. James Greenberg, an internationally recognized educator and researcher. Full workshop descriptions and registration information are on the web at [www.tlcpd.com](http://www.tlcpd.com).

To register call 1-866-460-8590, fax with payment to 1-877-677-6656 or 604-677-6656 or mail completed registration form with payment to: TLC Ltd. 1225 E Sunset Dr. Ste. 145-#833 Bellingham, WA 98226

## ***Dr. L. Kowalski Retires***

*By Helen Roberts (Mathematical Sciences)*

**D**r. Ludwik Kowalski, a physicist in the Department of Mathematical Sciences, retired June 30 after 35 years at MSU. Dr. Kowalski, who earned a PhD in Nuclear Physics from the University of Paris (Sorbonne) in 1963, joined Montclair's Physics group of the Department of Physics/Geoscience in 1969. (The Physics group later moved to the Department of Mathematical Sciences.) Dr. Kowalski served as Chair of Physics/Geoscience from 1971 to 1974. While at Montclair State, he collaborated with research teams at Columbia University and SUNY - Stony Brook and continues as a visiting scientist at Brookhaven National Laboratory. Dr. Kowalski has authored and coauthored over one hundred publications including a textbook based on his research and teaching. During his tenure here he taught a wide range of undergraduate physics courses, including University Physics I and II, College Physics I and II, Electricity and Magnetism, Concepts in Science, Nuclear Physics, Thermodynamics, and Mathematics of Physics. His dissertation was in experimental nuclear physics and his current research is in cold fusion. Dr. Kowalski was named a Distinguished Scholar at MSU. At the National Apparatus Competition of the American Association of Physics, Dr. Kowalski received a second prize award in 1992 and shared the first prize in 1994. He received the prestigious Margaret and Herman Sokol Award from Montclair State University in 1994. In addition to his strong research record, Dr. Kowalski experimented with new technology for teaching and shared his experience by conducting workshops and distributing notes on the internet. He also worked with students on independent research projects. Dr. Kowalski was a very productive researcher and educator and he was a valued member of the Department, CSAM and the University. We wish him well in his retirement.

## ***2005 World Year of Physics***

**T**he International Union of Pure and Applied Physics unanimously adopted a resolution declaring 2005 as the World Year of Physics to celebrate the 100th anniversary of Albert Einstein's legendary articles which provided the basis of three fundamental fields in physics: the theory of relativity, quantum theory and the theory of Brownian motion. For a list of international activities log onto [www.wyp2005.org](http://www.wyp2005.org). Montclair State University's Physics group will be commemorating the Year with multiple events on April 20, 2005. For further information contact Dr. Dean Hamden at [hamdend@mail.montclair.edu](mailto:hamdend@mail.montclair.edu).

## ***Workshop Offered by Center for Imaging and Optics***

*By S. A. Robila, G. Antoniou, and A. Gutierrez (Computer Science)*

**O**n November 19, 2004, The Center for Imaging and Optics and the Department of Computer Science organized a one day workshop titled "Research and Optics: Imaging and Education." The meeting brought together over 80 graduate and undergraduate students, faculty, researchers and high school students and teachers. The workshop attendees benefited from presentations given by researchers from eight institutions: Cooper Union, Montclair State University, NJIT, Rowan University, Stevens Institute of Technology, Bell Laboratories, Sensors Incorporated, and High Technology High School. The sessions represented a variety of topics that included multispectral and hyperspectral imagery, infrared sensor technology, texture classification, holography, image watermarking, non-invasive evaluation through imaging, image databasing, and magnetic resonance imaging (MRI). The speakers discussed the state of the art in these areas and indicated current collaboration and educational activities they are pursuing.

The participants rated the organization of the meeting and the quality of the presentations as very good to excellent and expressed interest in participating in future meetings.

Full program of the workshop together with handouts for each presentation are available on the workshop website at [www.csam.montclair.edu/~cio/w2004/](http://www.csam.montclair.edu/~cio/w2004/).

The Center for Imaging and Optics, established in fall of 2004, originated from active research of faculty within the Computer Science Department at MSU. The Center has varied research, education and outreach activities focused on imaging and optics. The workshop and the Center are supported by a grant from the International Society for Optical Engineering (SPIE) and the Department of Computer Science at Montclair State University.

## ***Reconnect Satellite Conference***

**M**athematics of Elections and Decisions, a week-long conference is scheduled for June 12 to June 18, 2005 at Montclair State University. According to the organizers, Dr. Arup Mukherjee (Montclair State University) and Dr. Fred S. Roberts (Rutgers University), this conference will expose faculty teaching undergraduates to the mathematical sciences research enterprise by introducing them to a current research topic relevant to the classroom through a series of lectures by a leading expert and involving them in writing materials useful in the classroom.

The workshop will also offer the opportunity for junior faculty as well as mid-level and senior faculty to advance to research questions in a new area of the mathematical sciences. Participants will also acquire materials and gain ideas for seminar presentations and for undergraduate research projects. Moreover, this conference is aimed at reconnecting faculty to the mathematical sciences research enterprise by involving them in a leading research center which is a consortium of Princeton University, Rutgers University, AT&T Labs, Bell Labs/Lucent Technologies, NEC Research and Telcordia Technologies. There will be opportunities for participants to follow up after the conference by getting connected to DIMACS researchers and other DIMACS programs throughout the year and by preparing these materials for publication in the DIMACS Educational Modules Series.

Principal lecturer will be Dr. Donald G. Saari from the Institute for Mathematical Behavioral Sciences, Department of Mathematics and Economics, University of California, Irvine with guest lecturer Dr. Michael A. Jones, Department of Mathematical Sciences, Montclair State University.

Detailed Information is available at [dimacs.rutgers.edu/reconnect/Montclair/](http://dimacs.rutgers.edu/reconnect/Montclair/)



## **Andrew Knoll: Paleontologist with a planetary perspective**

By William M. Phillian- Candidate for a Master's Degree in Teaching Physical Science

**B**espectacled and casually dressed as he talked with a group of students in Science Hall's Sokol Room during a pre-lecture reception, Dr. Andrew Knoll could have easily been mistaken for a student himself. But that first impression was quickly belied by Dr. Knoll's prodigious knowledge of his subject. He is one of those talented scientists who not only breaks new ground in his field, but has a gift for expressing himself in simple terms.

Responding to a student's question, he recounted matter-of-factly the reason he had become a paleontologist. It was because as a boy, he said, he was fascinated to realize "that you could crack open a rock and see something preserved in it." That simple, seminal thought would lay the foundation of a career leading to a medley of distinctions in his field.

Dr. Knoll is a widely recognized authority on the origin of life and the chemical, physical, environmental and cosmic changes that affected its development. A denizen of the Harvard culture, he serves there as the Fisher Professor of Natural History and the Curator of the Paleobotanical Collections at the University Herbaria. He has also consulted with NASA on the Mars mission, appeared on Public Television's Nova series and is a distinguished author of works in his field, including the book entitled *Life on a Young Planet- The First Three Billion Years of Evolution on Earth*. On the evening of November 3, 2004, through the continuing beneficence of Mrs. Margaret Sokol, Dr. Knoll delivered the fifth Margaret & Herman Sokol Science Lecture entitled "*Are We Alone in the Universe?*"

The planet we live on tells a story etched into its many layers of rock, much like the age of a tree is revealed by the number of concentric rings found within its trunk. As Dr. Knoll observed, "this is a planet that records its own history." By revealing and studying their geological strata, not only can conclusions be drawn about the age of the planets, but also about the chemical and environmental conditions that existed at the time each stratum was formed and whether such conditions may have supported life. Observing that "We live at a moment of great astro-biological optimism," Dr. Knoll turned the focus of his lecture on recent discoveries made on the planet Mars. Aptly describing the role of the Mars Rover as one of "reconnaissance geology," he explained the significance of its detection of the mineral hematite. The Rover found hematite within numerous, tiny, spherical rock formations known as "blueberries" which were located inside a crater named Meridiani. Hematite, Dr. Knoll stated, is known to form only in the presence of liquid water. The importance of discovering hematite on Mars is that it reinforces the theory that water in the liquid state, the essential ingredient of life, once flowed there and that it may have supported life sometime during the planet's history. Further evidence that water once flowed on Mars may be seen in the chemistry and the texture of sedimentary rock found on the Martian surface, as Dr. Knoll explained by using a series of overhead images.



The theory that it may have supported life is dealt a severe blow by the presence of calcium sulfate and the mineral jarosite on the surface of the planet. As Dr. Knoll explained, calcium sulfate produces acid when dissolved in water and jarosite forms only under acidic conditions which are too harsh for living systems. If there ever was life on the red planet, he stated, "It must have arisen from chemistry that we don't understand very well, or a chemistry that is very different from that on earth. Life is a planetary phenomenon, part and parcel with surface phenomena. The question of whether life ever existed on Mars remains open, although Meridiani constrains speculation." On the other hand, Dr. Knoll noted that methane, the simplest organic compound, emanates from the surface of Mars, though it is impossible

to determine whether its origin is biological or non-biological.

Bringing his remarks back within earthly dimensions, Dr. Knoll made the surprising observation that the field of paleontology is indebted to, of all things, cholesterol. The tenacious nature of this seemingly ubiquitous lipid enables it to survive over the ages within the environment and to serve as a biomarker for ancient life.

## ***The Margaret & Herman Sokol Spring Science Lecture Series***

***“Mapping Human History”***

**Featuring Steve Olson**

Wednesday, March 9, at 7:30 p.m. Kasser Theater

Mr. Olson is science writer and editor specializing in science, technology and public policy. He served as special assistant in the White House Office of Science and Technology Policy (1989 to 1992).

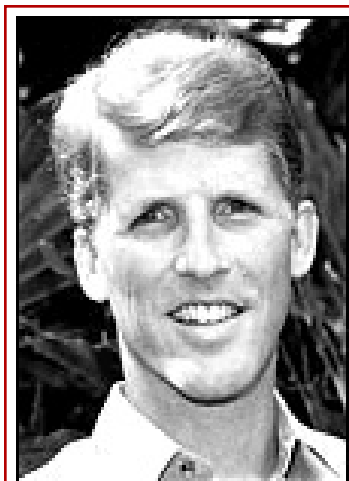
He is the recipient of the Author of Science-in-Society Award from the National Association of Science Writers and a National Book Award finalist for *Mapping Human History: Genes, Race, and Our Common Origins*. Other books he authored include:

*Shaping the Future: Biology and Human Values;*

*Biotechnology: An Industry Comes of Age;*

*Alcohol in America: Taking Action to Prevent Abuse; and*

*Count Down: Six Kids Vie for Glory at the World's Toughest Math Competition.*



***Admission is free to MSU students, faculty, staff and alumni; and \$10.00 all others***

***For tickets and information, call 973-655-5112***

### **Mark your calendar....**

March 3: CSAM Seminar in Chemistry & Biochemistry - Dr. Kraig Wheeler, Delaware State University  
“Design Strategies and Advances in Nanotechnology”

April 7: CSAM Seminar in Earth & Environmental Studies - TBA

April 15: Special lecture: Dr. Eloy Rodriguez (Cornell U.), founding father of Zoopharmacognosy - TBA

April 21: CSAM Seminar in Computer Science - TBA

## CSAM People

### Words from Dr. Aihua Li (*Mathematical Sciences*)

Since joining MSU and CSAM in September 2004, I have had a very busy but joyful first semester. After nine years of teaching at Loyola University New Orleans, I am happy to be back in the northeast as a member of the MSU mathematics faculty.

Born and raised in Beijing, China, I received a masters degree in mathematics from Beijing University of Science and Technology and taught for four years there afterward. In 1994, I received a doctoral degree from the University of Nebraska-Lincoln in the area of commutative algebra with a concentration in structures of commutative Noetherian rings and prime ideals. After graduation, I taught one year at Bismarck State College in North Dakota before taking the position at Loyola University New Orleans.

In 2002/2003, I spent my sabbatical year as a research associate professor at the Virginia Bioinformatics Institute at Virginia Tech, where I was involved in an applied project on problems raised from biology. Since then, my major research interests have switched to algebraic applications in modeling discrete dynamic systems and the effective computation methods. My other ongoing research topics include solving systems of polynomial equations and matrix equations (symbolically), powers of prime ideals and radical ideals, and sequences raised from the Fibonacci numbers. I am very happy to see my research is gaining interest from several faculty members at MSU and some collaborative work has been initiated.

Working with students on research projects has been one thing I love to do. At MSU I have found a way to continue this tradition. Currently two students from my Calculus I class are working with me on a problem derived from the class: searching function models for a roller coaster.

Many thanks to those who helped me during this challenging time. I wish you all a joyful and successful year in 2005.

## *Doctor of Environmental Management: An Introduction to some students:*

**Fatoumata Barry** received the masters degree in Geology from the University of Abidjan (Cote D'Ivoire) with a specialization in geophysics and hydrogeology from the University of Lausanne, Switzerland. "I possess some working experience in the Remote Sensing and Geographic Information Systems fields," said Barry.

Her research interests are focused on Groundwater Flow Modeling as it applies to 1) The delineation of well head protection area, 2) Groundwater Dating and 3) Wetlands Functions determination. The Groundwater Flow model can be used as a prediction tool once calibrated to help managers in their decision process. She is currently working on the update of Central Passaic River Basin Regional Groundwater Flow located in the central part of the Passaic River Basin, New Jersey. The study consists of modeling the flow of the groundwater under pre-pumping and pumping conditions. Barry explains that "Simulating water levels under predicted pumping stresses will allow for an evaluation of the impacts of increased pumpage on other users and contamination."

She is conducting dissertation research related to her area of interest with the New Jersey DEP on the Flow Model and is currently a graduate teaching assistant in Chemistry.

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A native of the Ironbound section of Newark, NJ, **Charles A. Berry** joins the program after 25 years of experience in private industry. His professional background includes laboratory tech and research chemist in the Fabric Dye, Plastic Additive, Soil Additive, and Petroleum Cracking Catalyst industries. Twelve of those 25 years were in customer service, sales and administration in the Plastic Extrusion and Plastic Injection Molding industries. He has also managed his own Technical Service-Sales Rep business.

Charles possesses a natural fit for the doctoral program. He completed the MS in Environmental Management from MSU in 1999 and has “been employed for the past fifteen and one-half years by the New Jersey State Department of Environmental Protection as Principal Environmental Specialist with the Northern Field Office of Water Compliance and Enforcement.” The Bureau is responsible for inspecting industrial facilities in the northern section of NJ that discharge process waters into the surface or groundwaters of the State. He adds that he also “inspected sewage treatment plants, and potable water treatment plants. Our Bureau is also responsible for enforcing current industrial and new municipal storm water discharge regulations.”

His research interest is in the recently enacted Private Well Testing Act of New Jersey. This Act requires that any private home with a potable water well must have the water quality of that well tested as part of the conditions of a sale. “The point of my research will be to analyze data from an environmental management point of view, taking into account the social, economic, and political effect of these regulations upon the individual home owner and the State,” explained Berry.

He intends to continue his employment with the DEP for another 5 years, at which time he hopes to have completed the requirements for the degree. His long-range plan is to teach, at the university level, in Environmental Management, Water Resource Management, Environmental History or courses in regulatory compliance. He adds, “If I have time, I plan to volunteer my services to any neighborhood environmental organization that needs help.

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As Director of the Environmental, Health and Safety office here at MSU, **Amy V. Ferdinand** ensures compliance with appropriate municipal, county, state and federal environmental, health and safety regulations and codes.

From 1990 to 1999, she served as Director of Environmental Control, Occupational Safety & Health Compliance at New York City Technical College. There she “assisted the college administration in devising compliance strategy and program development for New York State Right to Know Law, OSHA, Hazardous Communication Standards, Fire Safety regulations and Federal Environmental Protection Agency regulations.” Prior to that she was employed as a research scientist and Director of the Alternative Fuels Vehicle Program at New York City DEP. She also served as manufacturing engineer, within the Engine Division at Ford Motor Company in Dearborn, MI and as Environmental Engineer Intern at Allied Chemical Corporation where she coordinated pollution control programs at the regional level.

Amy is interested in studying the effects of environmental management decisions, such as New Jersey’s recent Smart Growth, Brownfield Redevelopment and Anti Sprawl Legislation, on the urban environment. She is “utilizing available geographic information systems (GIS) data from remote sensing and photogrammetry, as well as Global Positioning Systems (GPS), to study changes in the New Jersey side of the Hudson River Gold Coast.” This area extends 18 miles from Fort Lee at the George Washington Bridge to the southern tip of Bayonne.

She holds a bachelors degree from Howard University and a masters from Central Michigan University.

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**Naushad Kolikkathara** received his Master of Science degree in Geology from the University of Kerala, India and has been involved in various environmental conservation studies and tasks. He has extensive experience in coastal environment management projects using the advanced techniques of Remote Sensing and GIS for developing information system.

Spurred by the need to understand, assess, plan and integrate the human development activities, especially in urban areas, and to approach environmental problems in a holistic manner so as to minimize the short and long-term adverse impact on nature, he has begun researching the various effects of past industrial activities in and around the natural habitat areas of Essex county, New Jersey. Naushad writes: “The various ecological and socio-economic factors influenced by these hazardous sites and related brownfields remediation is being focused on in an attempt to propose appropriate environmental assessments for redevelopment, so as to return these affected sites to safe and productive use.” He is thus in the process of assessing the various technology options available for site-evaluation and remediation including the use of GIS for effective environmental management and decision-making. The effort is directed to encourage a holistic approach towards seeking solutions for urban environmental issues through the integration of the influencing factors of human activity.

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**Jamie Chin-Yi Lo** earned a BS in Finance from Stern Business School at NYU and a MA in Environmental Studies and Philosophy from Steinhardt's Education School also at NYU. Her professional background is grounded firmly in computer technology and GIS application. In her words, Jamie entered the doctoral program “for opportunities to get involved in science research, conservation design planning, education or analytical work in information and database management. I applied to Montclair’s Environmental Management program hoping to learn more about ecology (specifically .. freshwater aquatic and wetland ecology) .. as well as to gain technical skills in GIS and its application with statistics or building models.”

Jamie is currently a graduate research assistant for the Passaic River Institute, working for Dr. Kirk Barrett (Director of PRI). She is responsible for collecting and organizing GIS data for the Passaic River Watershed and developing an on-line electronic catalog of scientific/environmental documents and data about the watershed. Her research interests are in GIS, Landscape Ecology, and Wildlife and Habitat Conservation. With her dissertation advisor, Dr. Scott Kight (Biology & Molecular Biology), Jamie is developing a dissertation project that will involve landscape ecological analysis of freshwater macro-invertebrate community structure and environmental health in the NJ Highlands Protected Area. She expects to complete the requirements for the Doctor in Environmental Management in Dec. 2006.

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**Victor Onwueme** comes to Montclair University after a distinguished academic career with a Bachelors in Engineering from the Federal University of Technology, Owerri, Nigeria. Mr. Onwueme is presently a research assistant with Dr. Huan Feng (Earth & Environmental Studies) and is working on his doctoral dissertation in the characterization and assessment of contaminated sediments of the lower Passaic River, New Jersey. Victor states that he was motivated into environmental management by the conviction that the “skillful management of limited resources –human, natural and financial- is critical to the extrication from the current quagmire of sustainability in which the world finds itself.” It is further his belief that good leadership is an integral index in the equation for structural development. Upon completion of his degree, he hopes to continue to involve himself in the challenge of developing, adapting, modifying and verifying models on streamlining economic, environmental, and social needs with the view to increase awareness about responsible social development.

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**Sandow Mark Yidana** obtained his BSc (Hons) degree in Geology from the University of Ghana in West Africa in 2000. After serving for one academic year as a Teaching and Research Assistant at the department of Geology, University of Ghana, Mark enrolled at the Albrecht Christian University of Kiel, Germany, for the Master of Science program in Coastal Geosciences and Engineering. In 2003, he transferred to the University of Bremen to join a new program in Marine and Environmental Geosciences.

Mark states that in 2004 he “discovered that my professional fortunes lie in environmental management with a focus on water resources development and management.” He had developed an overriding penchant for the application of

numerical modeling techniques to facilitate water resources development and management in third world countries. This undoubtedly has its roots in the fact that Mark comes from a community in Ghana where unsustainable development and utilization of water resources is a critical issue relating to economic deprivation and falling primary health standards.

Since his admission to the program, Mark has been working with Dr. Duke Ophori (Earth & Environmental Studies) as his principal advisor. He is teaching undergraduate lab courses in Weather and Climate. His current interest is in regional hydrogeological modeling. Thus, for his doctoral dissertation research, Mark is working on 'Application of Numerical Techniques to advise on the efficient development and management of groundwater resources to meet growing socioeconomic needs in third world countries – A Case of the Volta Basin of Ghana'. He intends to finish the requirements for the program at the end spring 2007.

## ***Publications***

**G.E. Antoniou** (2004). "On the Realization of 2-D Lattice-Ladder Discrete Filters." *Journal of the Circuits, Systems and Computers*, 13:4.

L. Bitincka, and **G.E. Antoniou** (2004). "PDA—Based Boolean Function Simplification: A Useful Educational Tool." *Informatica*, 15:3, pp. 329-336.

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## Kudos

**Eric J. Chapman** and **Dr. Robert S. Prezant** (Dean's Office) presented "Comparative shallow water biodiversity of macroinvertebrates from Sandy Hook, New Jersey, Caumsett State Park, New York and Assateague Island, Maryland" at the Sandy Hook Association for Research and Education. Brookdale Community College.

**Drs. Youngna Choi, Michael A. Jones, Mark Korlie, Aihua Li, and Diana Thomas** (Mathematical Sciences) served as judges for the 2004 MAA Undergraduate Research Poster Competition. And, **Dr. Li** gave a presentation in a contributed paper session.

**Dr. Charles G. Du** (Biology & Molecular Biology) presented "Comparative Sequence Analysis of Long Terminal Repeat Retrotransposons of Orthologous Regions among Maize, Sorghum, and Rice" at the Cold Spring Harbor Laboratory Conference - Plant Genomes: From Sequence to Phenome (Cold Spring Harbor, NY).

Math students **Luba Lidman** and **Marie McCrary** were two of the prizewinners at the January 2005 Joint National Meetings of the AMS and MAA in Atlanta. There were 126 students from colleges and universities across the country participating in the competition of undergraduate research. Luba presented her work with advisor Dr. Diana Thomas on “Ducci Maps.” Marie presented her work with advisor Dr. Lora Billings on “Bifurcations in Multi-strain Disease Dynamics.”



Marie getting ready for the session



Luba and Dr. Thomas with poster

In November 2004, Dr. **Katherine G. Herbert** (Computer Science) presented “XML Clustering by Principle Component Analysis” at the IEEE 16th International Conference on Tools in Artificial Intelligence in Boca Raton, FL. She also presented “Data Cleansing and Knowledge Bases” at the 4th Emerging Information Technologies Conference in Princeton, NJ in October.

Dr. **Jinan Jaber** (Assistant Dean) served on a panel, “Outreach or Overreach? The Role of The Dean’s Office in External Programming,” at the 2004 national meeting of the Council of Colleges of Arts and Sciences. The session was moderated by Dr. **Robert Prezant** (Dean) who also served on the panel “Differentiated Faculty Workloads: Models for Individualized Faculty Effort.”

At the January 2005 Winter Meetings of the American Mathematical Society (AMS) and Mathematical Association of America (MAA), Dr. **Michael A. Jones** presented (a paper co-authored with Dr. **Diana Thomas**), “Dynamics of Nim Induced Difference Equations,” in the AMS-SIAM Special Session on Dynamic Equations on Time Scales; Integer Sequences and Rational Maps and presided over the MAA’s General Contributed Paper Session. He presented the same talk at the Department of Mathematics and Computer Science Colloquium, Clarkson University, Potsdam, NY.

Dr. **Michael A. Jones** (Mathematical Sciences) was appointed to the Editorial Advisory Board, MAA Spectrum Book Series for a three year term from January 2005 to December 2007. He also served as a grader for the 65th Annual International William Lowell Putnam Competition in Mathematics.

Dr. **Pat Kenschaft** (Mathematical Sciences) conducted a session at the December conference of Women in Mathematics at Marymount College in Tarrytown, NY titled, “Righting the Angle: Improving Mathematics, Science, and Technology Education for Girls and Women in K-12.”

Dr. **Michael A. Kruge** (Associate Dean) delivered an oral presentation titled “Geochemical Screening of Contaminated Marine and Estuarine Sediments” at the 2004 American Geophysical Union/Canadian Geophysical Union Joint Assembly in Montreal.



**Dr. Aihua Li** (Mathematical Sciences) participated in the NJ- NExt (New Experience in Teaching) Workshop, held during the NJ Mathematics Association of America fall meeting (Nov.) in the College of New Jersey. She shared her teaching experience with the other 16 NJ-NExt fellows during the workshop. She is also co-PI for a \$12,000 NSF conference grant for the 2005 commutative algebra conference to be held in Lincoln, Nebraska.

**Aihua Li** (Mathematical Sciences) refereed three research articles for the following journals: *Linear Algebra & Its Applications*, *International Journal of Mathematics & Mathematical Sciences*, and *mathematics and Computer Education*.

In 2004, Dr. **Robert S. Prezant** and **Eric .J. Chapman** (Dean's Office) presented "In-utero responses in Bellamya brood to a potential predator" to the American Malacological Society meeting in Sanibel, FL. They also presented "Predator induced changes in juvenile output in the live bearing snail Bellamya chinensis at the Mid-Atlantic Malacologists meeting held at the Delaware Museum of Natural History.

Dr. **Rolf Sternberg** (Earth & Environmental Studies) presented a paper titled "Geography and the Student " at the August 2004 International Geographic Union annual meeting in Galsgow.

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