

CSAM NEWSLETTER

College of Science and Mathematics

A Spectrum of Possibilities

New Degree in Information Technology Offered

By D. Deremer, Department of Computer Science

Society is more and more dependent on computing while the need for people to do computing well continues to escalate. The wide range of computing activities after the 1990s is so vast that no one is able to do all of them satisfactorily. As a consequence, professional computing groups have organized computing into a few disciplines that focus on subsets of needs within this wide range. To prepare students in the theory and practical applications of computing, the Computer Science Department has supported the Computer Science computing discipline since 1975. The Computer Science major emphasizes the creation and deployment of new software, new ways to use computers, and the best ways that maximize computer speed and minimize computer space to solve problems.

As a complement to this degree, CSAM is now offering the Information Technology computing bachelor's degree. The Information Technology major emphasizes support of computer systems in organizations that include selection of hardware and software, integration of new components, maintenance, security, upgrades, and replacements. An Information Technology graduate understands computer systems and their software, and has a commitment to solve computer problems as they occur.

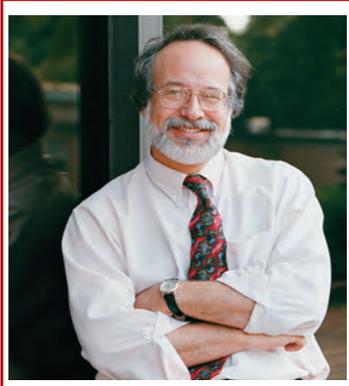
Computer Science and Information Technology are two computing disciplines that use computers to solve problems. Students in both Computer Science and Information Technology degree programs learn computing theory and computing practice. The B.S. in Computer Science is more theoretical while the B.S. in Information Technology is more applied. Information Technology prepares a student for a particular job while a Computer Science major's comprehensive education allows the graduate to adapt to new technologies and new ideas while working.

There are approximately 75 IT programs offered nationwide. To ensure that MSU is serving industry and students with a high quality IT education, the Computer Science Department designed the IT degree to be consistent with national IT accreditation standards. MSU's new major is only the second IT degree in the state of New Jersey and the first that stresses course work in the liberal arts, e.g., in humanities, social sciences, and the arts, in addition to the technical IT curriculum. Beginning with the first course, "Computer Concepts for Information Technology," students will develop practical IT projects and culminate in the senior year with a required internship for a practical IT experience. All the IT courses were developed and are taught by full-time Ph.D. Computer Science Department faculty.

According to the Bureau of Labor Statistics, a variety of careers are available for workers with specialized skills in computing. Through 2012 some of the fastest growing occupations are also in computing. With the introduction of the new B.S. in IT, the Computer Science Department expects both CS and IT graduates to participate even more fully in these computing career opportunities. More information about the computing disciplines; i.e., Computer Science and Information Technology, is available at <http://cs.montclair.edu>.

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From Dean Prezant



I have just returned from two weeks in the Gulf of Thailand where I had been invited to join eight other biologists and nine student trainees in an NSF sponsored research workshop in Kungkraben Bay. Represented were colleagues and students from England, Scotland, Brazil, Spain, Argentina,

Russia, Thailand and the United States. Kungkraben Bay is located in southeastern Thailand, not far from the Cambodian border and about 200 kilometers south of Bangkok. The workshop paired biologists with trainees for research on the understudied bivalve fauna of the Kungkraben Bay mangrove-mudflat habitat and for full exposure of non-Thais to southeastern Thai culture. We stayed at the Chanthaburi Campus of Burapha University, surrounded by rice paddies, shrimp farms and mangroves. Visiting local markets, I had the chance to sample jellyfish and horseshoe crab eggs (neutral on the jellyfish...avoid the horseshoe crab eggs!) I was lucky enough to be teamed with Chiarasak Sutcharit, an excellent "trainee" from Chulalongkorn University, Bangkok. Chiarasak had done some work with land snails but this was his first foray into the bivalve arena and this was my first foray into Thailand ecosystems. This lent itself to a strong, shared learning experience. By the end of the two weeks we had enough data (ecological and behavioral studies of two related species of understudied, but edible, bivalves) to produce at least one manuscript over the coming year. Immediately after the workshop, I met with the Vice President of International Relations on the main campus of Burapha University in Chonburi. We quickly found areas of mutual program interest and are now exploring ways to develop close ties between CSAM and the College of Burapha.

I write about this not because of the wonderful research opportunity I was afforded (many of our students and faculty do research around the globe – Vietnam, Antarctica, Argentina, Spain, Panama, China, Ireland, etc.), but because for two weeks a small international microcosm was centered in Thailand where we worked together, ate together, lived together, and produced an unending stream of data, cooperation, and links. It seems we, in the academic world, are often able to focus on what we have in common,

discuss and debate our differences and, in the end, bring our mutual energies and strengths together to produce a team generated product. Aside from the obvious lesson to be learned along the global political front, I believe this mode of operation reflects CSAM. We have a diverse, international faculty who put their time and energy into generating the best programs and opportunities possible. For example, new programs, such as the new B.S. in Information Technology produced by a team from the Department of Computer Science or the upcoming five year B.S./M.S. program in Marine Biology and Coastal Sciences designed by faculty from various departments, where CSAM focuses on shared experiences and the best approaches for our student's success. The opportunities our students have in our strong and diverse college reflect the commitment of our faculty to offering a learning experience that we hope prepares our students for the ever-shrinking global community - *A spectrum of possibilities.*



Working along the mangrove-mudflat in Kungkraben Bay, Chiarasak Sutcharit, Pongrat Dumrangrojwattana and Teerapong Duangdee

PRI Receives First Grant

The Passaic River Institute obtained its first grant recently from the U.S. Dept. of Agriculture National Research Initiative Competitive Grants Program. The project is entitled "Is urbanization of rural, water-supply watersheds a threat to water availability during dry weather in New Jersey? A historical, empirical analysis of the relationship between imperviousness and stream baseflow."

The project will empirically investigate if and how much urbanization and its attendant increase impervious land cover (pavement and rooftops) is related to decreases in

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Parallel and Distributed Computing: A Powerful Tool in Modern Computer Science

By S. A. Robila and R. Zaritski

Department of Computer Science

Recent course offerings in the Department of Computer Science have reemphasized the important contributions of parallel and distributed computing in the advancement of sciences.

Dr. Zaritski's course "Parallel Architectures and Algorithms" (CMPT 680) focused on applications of parallel and cluster computing to scientific modeling. The culmination of the course was student research projects to study long-term evolution of large two-dimensional cellular automata on parallel Linux clusters. Students in this class were split into three research teams. The underlying physical system modeled by the first team was shark-fish (predator-prey) interaction in a simulated body of water. The second team used cellular automata to model an excitable medium (such as a cardiac tissue) and to study spiral wave aggregations in such a medium. The third team explored the emergence and evolution of stable structures, such as "gliders" and "pulsars", on a closed 2D cellular automaton wrapped around a torus surface. All three groups have carried out independent research that led to remarkable discoveries in how large systems governed by rather simple local rules can undergo unexpected long-term global self-organization (the property of "emergence"). A 20-processor Linux cluster used in these projects helped to speed up the computer simulations by more than 10 times. More information on these student research projects and the parallel Linux clusters can be found at <http://roman.montclair.edu/Research/Parallel>.

Alternatively, Dr. Robila's course on Computer and Data Security (CMPT 495/585), used distributed computing as a tool in solving security challenges. Traditionally, computer security applications are relying on the time complexity of mounting attacks against them. Barring any weaknesses in the techniques themselves, the strength of an algorithm is assessed against the number of efforts to break it,



usually comparable to brute force. Distributed computing constitutes an excellent alternative in the implementation of such attacks. Projects developed by students taking the course are showing first that a distributed computing environment can be easily built. Within several days, and using only freely available software, a team of students were able to turn a regular computer lab into a powerful cluster. They followed by testing it on cracking passwords. In a second project, a team has implemented a prime number generator using a Java based client/server architecture and an Oracle database. The application was complemented by the implementation of resiliency (reassigning jobs when a node dies). In both cases, the use of distributed computing has provided a speedup of several orders of magnitude over traditional attacks. Presentation and papers for these and several other projects together with course information (offered again in Fall 2005) are available at <http://csam.montclair.edu/~robila/SECURITY>.

On May 7, 2005, all the projects described above have been presented at the Sigma Xi Student Research Conference at Montclair State University. These exciting student hands-on research projects have relied on the availability of such important on-site resources as dedicated Linux clusters in the Parallel Computing Laboratory and a PC laboratory that was utilized as a cluster of workstations.



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stream baseflow (i.e., flow during dry weather) over the past 50 years in New Jersey, concentrating on rural (but urbanizing) water supply watersheds. The analysis will include the Wanaque and Pequannock River watersheds, which are tributary to the Passaic River and contain reservoirs which provide drinking water to millions in northern New Jersey. The project will help water supply managers assess the risk posed by urbanization and help them develop policies accordingly to protect surface water supply during drought. PRI Director, Dr. Kirk Barrett, is serving as Principal Investigator. The project was one of only 14 selected for funding out of 179 proposals received.

Bristol-Myers Squibb Center For Science Teaching & Learning

On October 24, CSAM will celebrate the opening of the Bristol-Myers Squibb Center for Science Teaching and Learning. President Cole will lead the program and introduce the keynote speaker, Sally Shuler, Executive Director of the National Science Resources Center (NSRC) in Washington, D.C., a nationally recognized leader in the development of inquiry-based K-12 science curricula and professional development programs. The NSRC is an organization of the Smithsonian Institution and the National Academies, and is a fitting role model for the CSAM center.

Funded by a facilities grant of \$500,000 from the Bristol-Myers Squibb Foundation, the 5-room center houses PRISM (Professional Resources in Science and Mathematics), a network of programs designed to improve teacher preparation in mathematics and science. PRISM programs have been supported by a variety of grants from the National Science Foundation, the State of New Jersey, the NJ Statewide Systemic Initiative, and private foundations including The Turrell Fund, The Martinson Family Foundation, and the Monell Foundation. A three-year Math-Science Partnership grant (\$538,000 for 2004-05; \$866,000 for 2005-06) from the NJ State Department of Education has expanded and strengthened PRISM programs. The corporate support of Verizon has provided video conferencing technology for three years of Rainforest Connection programs from PRISM.

According to a recent National Center for Education Statistics study of eighth-graders, students in other industrialized nations perform better in mathematics and science than their counterparts in the United States. The study reported that higher levels of achievement were demonstrated when teachers placed emphasis on experiments, practical investigations, and problem solving - all key components of inquiry-based teaching methodologies.

In the recent academic year, PRISM provided professional development in inquiry-based approaches to more than 700 teachers in 48 school districts. Dr. Jacalyn Willis, PRISM founding director, said, "I am pleased that the new operations and facilities grants provide recognition of the successful 10-year track record of PRISM. The Bristol-Myers Squibb Center allows us to build on our successes, acquire new resources, add additional programming, and

expand into more school districts. The new center has attractive and versatile furnishings, an inviting design, communications equipment, and eye-catching artwork that combine to send the message that science and mathematics are exciting areas of study, valuable connecting paths to the world around us, and enjoyable pursuits for a fulfilling life."



Teachers from partnered schools (l-r) Lisa Gary (Montclair), Allison Morton (Montclair), and Jeanette Scillieri (Leonia) participate in an activity on bee adaptations.

PRISM programs support best teaching practices in mathematics and science through summer institutes, classroom coaching, workshops, conferences, field experiences, video conference dialogues with scientists and mathematicians, credit-bearing courses, and strategic planning programs for district staff. The Bristol-Myers Squibb Center for Science Teaching and Learning strengthens collaboration of scientists, mathematicians, and education professionals in the design and delivery of inquiry-centered teaching approaches. A signature program of PRISM that is slated for special expansion is The Rainforest Connection, which ties researchers in a tropical forest habitat in Panama directly to students in New Jersey classrooms. The research-centered video conferences will include new remote field locations, additional scientists, and more topics for the coming school year.

Numerous CSAM faculty members have provided subject matter expertise and hands-on teaching practices that have made many PRISM programs possible, including the "Hands & Minds" 3-day conference, attended by 300 math and science educators. The university-corporate partnership that supports PRISM programs may serve as a national model for improvement of science and mathematics education.

CSAM Enters Business Ventures

By John M. Berger

Department of Chemistry and Biochemistry

On July 13, 2005 Montclair State University and ReGenesis LLC of Montclair signed formal agreements initiating a business venture in consumer products. This collaboration allows ReGenesis to develop ingredients and delivery systems for topical skin care products in my laboratory. The agreement brings the rewards to Montclair State University of funding a chemistry graduate assistant and an undergraduate researcher. In addition, any patents that result from the work will be shared between ReGenesis and Montclair State University.

Two students have been hired to fill the new research positions. Mildred Njuguna, a Montclair graduate (BS'04) has accepted the graduate assistantship and junior biochemistry major Mallika Thomas has been working as the undergraduate student for over a month. These two students work with George Kellett, ReGenesis' chief chemist. I provide instrumental expertise, chemical consultation, and administrative support.

The founders of ReGenesis, Betty J. Murphy and James A. Smith have been developing consumer products since 1979 as Creative Products Resource (CPR), the predecessor to ReGenesis. They have a patent portfolio of over 50 technologies illustrating their creativity and expertise in products to address consumer needs.

"I believe this is a very positive step for CSAM and look forward to additional shared ventures that give our students and faculty new opportunities for collaboration with 'the real world'," said Dr. Robert Prezant, Dean of CSAM.

Negotiations are also underway with a Newark-based pharmaceutical company to carry out sterility testing of their products in the lab of Dr. Jeffery Toney (Chair of the Department of Chemistry and Biochemistry). The agreement will provide full support for a graduate assistant and shared patents. This company manufactures conducting gels for ultrasound and defibrillators. The current draft of the agreement is for a 6 month period trial basis. More than 20 samples have already been tested in Dr. Toney's laboratory.

SciInfo Students Intern at Novartis

By: Tazeen Fatima & Ronald Realubit

The Science Informatics program has a challenging list of requirements for its completion. Among these were two internships aimed at providing students with experience in the Science Informatics field. The first one was an in-house internship where the student can choose to work with any professor in the program. The second requirement is an industrial internship outside of the University. At the end of the Spring 2005 semester, we were offered a six-week summer internship with Novartis.

Novartis is a pharmaceutical company involved in the research and development of products to protect and improve health and well-being. They formed in 1996 from the merger of the CIBA-Geigy and Sandoz Laboratories in Basel, Switzerland. Some of their well-known products are: Diovan for hypertension, Gleevec for chronic myeloid leukemia and gastrointestinal stromal tumors, Lamisil for an antifungal agent, and Neoral/Sandimmun for an immunosuppressive agent for transplantations. They are ranked the 17th largest pharmaceutical company in the world. Their campus in East Hanover has an internship program that includes about 82 interns in different departments of the company. Fortunately, we were invited to be part of this program and we were assigned to the Integrative Expression Profiling (IEP) group of the BioMarker Development (BMD) department. BMD is part of the Novartis Exploratory Development (ED) group and deals with the effective profiling and selection of drug candidates for the overall drug development process. One of BMD's many missions is to improve research and development productivity by integrating the discovery and development process with biomarker activities and emerging new technologies. IEP is concerned mainly with the analysis of differentially expressed biomolecules, identification of biomarkers for efficacy, safety, and disease, and the profiling of Novartis compounds versus competitor compounds. IEP has a Statistics/Bioinformatics group, which was headed by Anthony Masiello in East Hanover. Anthony was our supervisor throughout the internship. Our department basically supported the clinical research scientists and data miners in BMD.

Our project was to implement certain user-specified functions in a software called GeneSpring. This software is used for expression data analysis and to help identify

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Steve Olson- Genetic Cartographer To The World

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

In a world that is polarized by disparate standards of living, political disagreement and clashes of religion and culture, take heart: Human beings have more in common than anyone ever suspected. Genetically, we truly are the brotherhood of man, or in more inclusive terms, one big family. The proof lies in the similarity of our DNA and in humanity's ultimately common lineage.

This was part of the intriguing message that the widely-published science writer Steve Olson brought to campus on March 9, 2005 in the Alexander Kasser Theater. Before a capacity crowd and through the sustaining support of Mrs. Margaret Sokol, Mr. Olson delivered the sixth Margaret & Herman Sokol Science Lecture, entitled "Mapping Human History."

Mr. Olson asserted that migratory patterns of human beings throughout the course of history may be verified and mapped by studying patterns of similarity in their DNA. In this way, the unique features of DNA make it the pre-eminent biomarker; a powerful molecular footprint that can trace racial and ethnic movements across the continents. This strategy has confirmed that "The homeland of anatomically-modern humans is Ethiopia," as Mr. Olson explained, and that "All genealogies inevitably converge."

Besides its capability to detect and confirm the broader phenomenon of human migratory patterns, Mr. Olson pointed out that DNA serves a more focused role. It allows us to zero-in on the identities of the specific ancestors of living human beings. For example, he told the audience, "Every white male in this room is descended from Aaron," the brother of the biblical figure Moses, who along with his male descendants, served the Israelites as priests. This lineage, Mr. Olson stated, can be proved by tracing it to Aaron's Y-chromosome, known today as the Y-chromosome of "kohanim," which means "priests" in Hebrew. Going even farther back, Mr. Olson told the audience, "Every male's Y-chromosome will lead to one man from 60 to 70 thousand years ago. This is the Adam of the Y-chromosome."

Mr. Olson's recent book, entitled *Mapping Human History- Genes, Race, and Our Common Origins*, was a finalist for the National Book Award. Within its meticulously researched pages, he reveals the breadth of thesis: "The study

of genetics has now revealed that we are linked; the bushmen hunting antelope, the mixed race people of South Africa, the African Americans descended from slaves, the Samaritans on their mountain stronghold, the Jewish populations scattered around the world the, Han Chinese a billion strong, the descendants of European settlers who colonized the New World, the native Hawaiians who look to a cherished past. We are members of a single human family, the products of genetic necessity and chance, borne ceaselessly into an unknown future."

Margaret and Herman Sokol Science Lectures Scheduled

The College of Science and Mathematics has set the dates for the year's Margaret & Herman Sokol Science Lecture Series. The lectures are scheduled for October 26, 2005 and April 6, 2006 in the Kasser Theater at 8:00 p.m. Tickets are free to the MSU community, including alumni, and \$10.00 for all others and will be available through the Theater's box office 4 weeks prior to each lecture.

The Fall 2005 Lecture (on Wednesday, **October 26, 2005** is entitled: "**Contamination Without Consent: How Chemical Pollutants in Air, Food, and Water Violate Human Rights**" by Dr. Sandra Steingraber.

Ecologist, author, and cancer survivor, Dr. Steingraber is an internationally recognized expert on the environmental links to cancer and reproductive health. She received her doctorate in biology from the University of Michigan and master's degree in English from Illinois State University. Her most acclaimed works are "*Living Downstream*" and "*Having Faith*." She also authored "*Post-Diagnosis*", a volume of poetry, and is co-author of a book on ecology and human rights in Africa, "*The Spoils of Famine*." She has taught biology at Columbia College, Chicago, held visiting fellowships at the University of Illinois, Radcliffe/Harvard, and Northeastern University, and served on President Clinton's National Action Plan on Breast Cancer. Dr. Steingraber is currently Distinguished Visiting Scholar at Ithaca College, NY.



MSU Celebrates Year of Physics

By Dean Hamden, Department of Mathematical Sciences

On the evening of April 18, 2005, in recognition of the 50th anniversary of Einstein's death, at 8:45 PM a light originating in Princeton, where Einstein spent most of his late years, was transmitted to Montclair State University via radio waves and other stations along the 50 mile route north. Dr. Dean Hamden and 50 of his students in the College Physics course (pictured below) were stationed on the roof of Science Hall to receive and transmit light on its route west.



MSU was part of worldwide 120,000 stations in a light relay illuminating the world. MSU transmitted light by radio waves, torches, lasers, search lights and high flying flairs to a station atop the mountain in Chatham on its way west. Light was transmitted across the United States, and by optic cable across the Pacific into China, and the route too the light overland into Asia and Europe to return by optic cable across the Atlantic hitting land in south Jersey and back to Princeton 24 hours later arriving on April 19.

It was exciting for all the students to participate in this worldwide effort as part of the World Year of Physics,



Dr. Hamden (second from left) and West (right) with the two Einstein look-alike contest winners

celebrating the 100th Anniversary of the publication in 1905 of Einstein's Theory of Relativity, Quantum Physics and Brownian motion.

In addition, on April 27, Dr. Dean Hamden and the Physics Club conducted a campus-wide event celebrating the 100th Anniversary of the publication in 1905 of Einstein's Theory of Relativity, Quantum Physics and Brownian motion.

Convocation 2005

CSAM celebrated the achievement of almost 300 undergraduate students who received their bachelor degree this Spring. CSAM's Convocation ceremony was held on the evening of May 16 in the newly renovated Amphitheater. More than 1200 family and friends were in attendance. As part of the ceremony, the degree of Doctor of Science, honoris causa was bestowed upon Dr. Risa Lavizzo-Mourey, M.D., in recognition of a lifetime of service and dedication to critical health issues in our society. Dr. Lavizzo-Mourey is president and CEO of the Robert Wood Johnson Foundation.

Nine graduating seniors were also recognized as Outstanding Candidates in each of CSAM's academic disciplines. They were selected as exemplary CSAM students for their outstanding academic performance and service to the College, University and community. Congratulations to Doris Lui (Biology), Rishi Gunnes (Biochemistry), Dana Mazzaro (Chemistry), Nancy DiNapoli (Computer Science), Vera Lazar (Geography), Rachel Perez (Geoscience), Douglas Hahn (Mathematics), LaShire Hull (Molecular Biology), and Marie McCrary (Physics).



CSAM Service Awards

Each year, CSAM recognizes the essential nature of faculty service in keeping the Academy alive and moving forward. To place service as an important and viable component of faculty life, up to five faculty service awards (one per department) are awarded annually. Each department identifies its own nominees, through mechanisms determined by the Chair and/or department, representing an individual who has made important and lasting contributions to the Department, College and/or University. Awards are based on a long-term commitment to service as well as extensive service during the immediate past year but not on a single service effort. The Faculty 2005 Service Award recipients, pictured below (from left to right), are Drs. Scott Kight (Biology & Molecular Biology), Huan Feng (Earth & Environmental Studies), Andreas Koeller (Computer Science), Wiliam Parzynski, (Mathematical Sciences), and Saliya DeSilva (Chemistry & Biochemistry).



Dr. Patricia Kenschaft Retires

Dr. Patricia Clark Kenschaft, a mathematician in the department of Mathematical Sciences, retired June 30 after 32 years at MSU. Dr. Kenschaft earned her Ph.D. in Functional Analysis from the University of Pennsylvania in 1973. She was very active in and assumed leadership positions in professional societies such as the New Jersey Association for Women in Mathematics; Mathematical Association of America (MAA), New Jersey Section; New Jersey Faculty Forum, New Jersey Conference American Association of University Professors, Joint Committee on Women, Project of Resourceful Instructions of Mathematics in the Elementary School (PRIMES); Committee on Participation of Women (MAA); Montclair Site of New Jersey State Systemic Initiative in Mathematics Science and Technology, Mathematics

Coalition of New Jersey; and the Committee on Mathematics and the Environment (MAA). Since 1988, Dr. Kenschaft has been the host of Math Medley, a weekly hour-long call-in talk show on the net and radio in southern New England. Dr. Kenschaft has authored or edited a wide selection of books: *Change is Possible: Stories of Women and Minorities in Mathematics*; *Environmental Mathematics*; *Mathematics for Human Survival*; *Math Power*; *How to Help Your Child Love Mathematics Even if You Don't*; *Winning Women into Mathematics*; *Linear Mathematics: A Practical Approach*; *Mathematics: A Practical Approach*; *Calculus: A Practical Approach*; and *Childbirth, Cooperative Style*. She also authored numerous publications on a variety of topics and has given numerous presentations at conferences, professional meetings and organizations. We wish her well in her retirement.

Margaret and Herman Sokol Awards

On May 9, 2005 an award dinner was held honoring CSAM's faculty and students for being named recipients of the generous Margaret and Herman Sokol awards.

Pictured (bottom row) with Mrs. Sokol are Drs. Quinn Vega (Biology & Molecular Biology) and Jordan Feng (Earth & Environmental Studies), the 2004 and 2005 Faculty Fellow awardees, respectively. This year's Graduate Summer Research Fellowships (established in 2000) were awarded to Amy Fiorillo (Mathematical Sciences) and Janice Thomas (Chemistry & Biochemistry). The Graduate Fellowship in Science (established in 1984) was awarded to Vanessa Heba (Biology & Molecular Biology). Sandow Mark Yidana (Earth & Environmental Studies) received the International Graduate Study and Research award which was established in 1998.



From (l-r)
Top row: Fiorillo,
Yidana,
President Cole,
Thomas & Heba
Bottom row, Vega
Mrs. Sokol, &
Feng

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genes/pathways that are truly relevant to the research at hand. One of the data miners, Muriel Saulnier, had several automation requests that could be implemented by using GeneSpring's Application Programming Interface (API). During our internship we were able to implement three functional plugins into the software, which fully met the requirements of the user. Three programs were written in java and ran within the GeneSpring software. These plugins included a colored table which displayed user-specified data and it also had an option to save the table as an .xls file. Another plugin was also a table but it communicates with an internal database and it displays certain annotations for several genes selected in the program. The third program displays a table, which contains both the user-specified data and the gene annotations.

Working at Novartis was definitely a positive experience for both of us and the company. The people were professional and friendly which resulted in an excellent atmosphere for a working place. Our project was presented to the Statistics/Bioinformatics group of IEP and now the plugins are currently being used and distributed by Novartis employees.

The overall experience from working at Novartis was definitely worthwhile. The opportunity to work with great people in a professional environment was a glimpse of the potential future for Science Informatics graduates. We would like to recommend our fellow Science Informatics students to spend their internship requirement at Novartis and experience the amazing opportunity we had this summer.

The CSAM Newsletter is published semi-annually by the College of Science and Mathematics. An extended version is available on-line at www.csam.montclair.edu

Robert S. Prezant, Dean
Jinan Jaber, Assistant Dean & Editor
Michael Kruge, Associate Dean
Raquel Peterson, Administrative Assistant
Tyra Addison, Secretary

It is distributed to MSU's administrators and CSAM's faculty, students and alumni. Back issues are available at www.csam.montclair.edu/events.

Your comments and news are solicited and welcomed.

Welcome New Faculty/Staff

Ms. Tyra Addison, Secretarial Assistant
Dean's Office

Mr. Thomas Hoskinson, Technology Support Specialist

Dr. Anat Hatzor dePicciotto, Assistant Professor
Department of Chemistry and Biochemistry

Dr. Bogdan Nita, Assistant Professor
Department of Mathematical Sciences

Dr. Kristen Monsen, Assistant Professor
Department of Biology and Molecular Biology

Dr. Sandra Passchier, Assistant Professor
Department of Earth and Environmental Studies

Dr. John Taylor, Professor and Director of the
Doctorate in Environmental Management Program
Department of Earth and Environmental Studies

Dr. Philip A. Yecko, Assistant Professor
Department of Mathematical Sciences

Dr. Danlin Yu, Assistant Professor Department of Earth and
Environmental Studies

Kudos

Dr. **Lora Billings** authored (Mathematical Sciences) delivered an invited co-authored paper, "Noise Induced Dimension Changing Bifurcations" at a minisymposium of the SIAM Conference of Applications of Dynamical Systems in Snowbird, UT. She also presented a co-authored paper at the Frontiers in Applied and Computational Mathematics minisymposium at NJIT titled "Chaotic Desynchronization of Multi-Strain Diseases." Dr. Billings also gave an invited colloquium lecture, "Epidemic Models and the Pattern of Outbreaks," at the Dept. of Theoretical and Applied Mathematics, University of Akron, Ohio, in March 2005.

Earth & Environmental Studies faculty Drs. **Stefanie Brachfeld**, **Z. Jordan Feng**, **Matt Gorrington**, and **Greg Pope** and **M. L. West** (Mathematical Sciences) received a \$197,649 one-year grant from the NSF Major Research Instrumentation, Earth Sciences Division for their work:

“Acquisition of a Vibrating Sample Magnetometer at Montclair State University.” Dr. **Stefanie Brachfeld** also received \$33,621 funding from NASA Mars Fundamental Research Program for a project titled “Integrated Mineralogic and Rock-Magnetic Study of Synthetic Martian Basalt: Implications for Understanding Crustal Magnetic Anomalies,” with colleague J.J. Hammer.

W. H. Freeman & Co. published the 5th edition of Dr. **Tom F. Devlin’s** (Mathematical Sciences) book “JMPing into the Introduction to the Practice of Statistics.”

Drs. **Katherine G. Herbert** (Computer Science) and **James H. Dyer** (Chemistry & Biochemistry) presented “Science Informatics at Montclair State University” at the DIMACS Conference on Linking Mathematics and Biology in the High Schools held at Rutgers University-New Brunswick in April 2005.

Dr. **Katherine G. Herbert** (Computer Science) was an invited presenter at the Saint Peter’s College Pi Mu Epsilon annual meeting in Jersey City on April 25, 2005. Her presentation was titled “Evolutionary Data Analysis and Data Management Issues.” She also presented “Phylogenetic Information Integration: Research Issues and Techniques” at the Joint Conference on Information Sciences 6th International Symposium on Computational Biology and Genome Information Systems & Technology, Salt Lake City, Utah, July 2005.

Dr. **Scott Kight** (Biology & Molecular Biology) presented “Stress and Reproduction in Terrestrial Isopods (Isopoda: Oniscidea)” at the annual meetings of the Central States Entomological Society, University of Kansas, in April 2005. He also presented “Lateralized behavior in giant waterbugs, *Belostoma flumineum* Say (Heteroptera: Belostomatidae)” and “T-maze learning in giant waterbugs, *Belostoma flumineum* Say (Heteroptera: Belostomatidae) with student **Julie Lucente** at the annual meetings of the American Entomological Society at the University of Delaware, November 2004.

Three MSU chemistry students won prizes in the student poster contest sponsored by the Laboratory Robotics Interest Group of the American Chemical Society. **Mipha Koh**, under the direction of **Dr. Jeff Toney**, won first prize for her poster “Inhibition of Xylella Fastidiosa Biofilm Formation via Metal Chelators.” Third prize is shared by **James Becker** and **Victor Geraldo** for their poster, “Expression and Purification of Acetoacetyl CoA Thiolase from Sunflower Cotyledon,” under the direction of **Dr. Jim Dyer**. **Mr. Kevin Olsen** (Chemistry & Biochemistry) organized the student poster

session for the meeting. **Janice Thomas** and **Mipha Koh** were also awarded \$1,500 travel award each by the American Society for Biochemistry and Molecular Biology, for their poster presentation, at the Annual ASBMB Meeting.

The Council on Undergraduate Research (CUR) welcomed 60 undergraduate students (from several hundred applicants) from across the nation to Capitol Hill to present the results of their independent research in science, engineering, and mathematics. **Marie McCrary** presented her re-search, undertaken with her Dr. **Lora Billings** (Mathematical Sciences) on “Epidemics in Multi-strain Disease Dynamics.”

Dr. **Aihua Li** (Mathematical Sciences) served as co-organized of the 2005 Nebraska Commutative Algebra Conference. The conference was supported by NSF and the U. Nebraska-Lincoln. In March Dr. Li delivered a seminar presentation on her time series project at Clemson U. She also presented “Polynomial Modeling of Discrete Time Series” at the MAA NJ spring meeting. In June, Dr. Li gave three research/teaching presentations in the U. of Sci. & Tech. Beijing, Beijing Jiaotong U., and U. of Petroleum of China. In July, Dshe gave an invited talk, “Symbolic Computation in Modeling Discrete Time Series,” at the Inter’l Workshop of Numeric-Symbolic Computation in Xi’an, China.

Mr. **Kevin Olsen** (Chemistry & Biochemistry) delivered an oral presentation to the Chesapeake Bay Chapter of the Laboratory Robotics Interest Group in March 2005 titled “Plumbago, Bamboo, Goldenrod, and God’s Almighty Workshop, or Did Thomas Edison Invent High Throughput Screening?”

For the second consecutive year, Drs. **Stefan Robila** and **George Antoniou** (Computer Science) received a \$2,000 Educational Grant from the International Society for Optical Engineering (SPIE). The grant will be used to develop K-12 Imaging and Optics Outreach activities.

Dr. **Stefan Robila** (Computer Science) served as panelist in the “Future of Imaging E-Mail Roundtable” published in the Advanced Imaging Magazine. He also organized and moderated “Advances in Hyperspectral Imagery Processing”, a special session sponsored by the Remote Sensing Applications Division as part of the American Society for Photogrammetry and Remote Sensing’s Annual Conference, in Baltimore, MD, March 2005.

The NJ Commission on Cancer Research awarded **Sophia Spadavecchia** (BS ‘03 - Biology) a 2-year grant for her thesis project at UMDNJ International Center for Public Health.

Publications

W.-w. Tung, Y. Qi, J.B. Gao, Y. Cao, and **L. Billings** (2005). "Direct characterization of chaotic and stochastic dynamics in a population model with strong periodicity." *Chaos, Solitons and Fractals*, 24, pp. 645–652.

I. B. Schwartz, **L. Billings**, and E. M. Bollt (2005). "Dynamical Epidemic Suppression Using Stochastic Prediction and Control." *Physical Review*, E 70, 046220.

K. G. Herbert, S. Pusapati, J.T.L. Wang, and W.H. Piel. (2005). "Lineage Path Integration for Phylogenetic Resources." *Proceedings of 17th International Conference on Scientific and Statistical Database Management*, in press.

K.G. Herbert and J.T.L. Wang (2005). "Phylogenetic Information Integration: Research Issues and Techniques." *Proceedings of the Joint Conference on Information Sciences 6th International Symposium on Computational Biology and Genome Information Systems & Technology*, in press.

S.L.Kight and **M. Nevo** (2004). "Female terrestrial isopods, *Porcellio laevis* Latreille (Isopoda: Oniscidea) reduce brooding duration and fecundity in response to physical stress." *Journal of the Kansas Entomological Society*, 77, pp. 285-287.

S.L. Kight, **C. Eadie**, **D. Lynch**, **J. Coelho** & **A. DeWera** (2005). "Classical conditioning of red-backed salamanders, *Plethodon cinereus*." *Bulletin of the Maryland Herpetological Society*, 41, pp. 68-84.

A. Li (2004). "Polynomial Models of Discrete Time Series." *Proceedings of Dynamic Systems and Applications*, 4, pp. 68-73.

J.G. Moloughney, **J. Thomas**, and **J. H. Toney** (2005). "Novel IMP-1 Metallo-b-Lactamase Inhibitors can Reverse Meropenem Resistance in *Escherichia coli* expressing IMP-1." *FEMS Microbiology Letters*, 243, pp.65-71.

K. Olsen (2005). "Early Investigations of Methane in New Jersey." *The Indicator*, January, p. 20.

K. Olsen (2005). "Time-, Money-Saving Robots are the Rage in State-of-the-Art Labs." *LifeSciTech*, 4:2, p. 18.

K. Olsen, (2005). "Who Invented the Twisty Little Bit of Wire Inside the Light Bulb?" *The Indicator*, June, p. 5.

S. A. Robila, A. N. Kumar, D. Baldwin, C. Bates Congdon, (2005). "Considerations on Undergraduate Computer Science Research." *Journal of Computing in Colleges*, 20:5, pp. 91-95.

S. A. Robila (2005). "Interdisciplinary Undergraduate Research with Focus on Hyperspectral / Multispectral Imagery." *Proceedings ASEE Mid-Atlantic Conference* (on CD, 11 pages).

S. A. Robila (2005). "An Investigation of Spectral Metrics in Hyperspectral Image Preprocessing for Classification." Special Session on Advances in Hyperspectral Imagery Processing, *ASPRS Annual Conference* (on CD, 9 pages).

S. A. Robila (2005). "Subpixel Target Detection in Hyperspectral Data Using Higher Order Statistics Source Separation Algorithms." *SPIE Computational Imaging III*, 5674, pp. 424-431.

J.H. Toney and **J.G. Moloughney** (2004). "Metallo-b-Lactamase Inhibitors: Promise for the Future?" *Current Opinion in Investigational Drugs*, 5, pp. 823-826.

N.J. Sharma, **J.H. Toney**, and D.M.P. Fitzgerald (2005). "Expression, purification, crystallization and preliminary X-ray analysis of *Aeromonas hydrophila* metallo-b-lactamase." *Acta Crystallographica Section F: Structural Biology and Crystallization Communications*, F61, pp. 180-182.

U. Theuretzbacher and **J.H. Toney** (2005). "Nature's clarion call of antibacterial resistance – are we listening?" *Current Opinion in Investigational Drugs*, 6, in press.

D. Wang (2004). "An Energy-Efficient Clusterhead Assignment Scheme for Hierarchical Wireless Sensor Networks." *Proceedings of Fourth International Symposium on Communication Systems, Networks and Digital Signal Processing* (CSNDSP'04), pp. 306-309.

Z. Jiang, J. Wu, and **D. Wang** (2005). "A New Fault Information Model for Fault-tolerant Adaptive and Minimal Routing in 3-D Meshes." *Proceedings of 2005 International Conference on Parallel Processing* (ICPP'05), pp. 500-507.

Chen, Q., A. Oppenheim, A. and **D. Wang** (2005). "Survival Analysis and Data Mining" *Encyclopedia of Data Warehousing and Mining*, Idea Group Reference, pp. 1077-1082.

CALENDAR OF EVENTS

October 6, 2005

CSAM Symposium
“Air Quality and Human Health After 9/11”
8:30 a.m. to 11:30 a.m.
Richardson 120

October 6, 2005

CSAM Seminar in Biology & Molecular Biology
Dr. Miriam Bucheli, Harvard Medical School
“RNA Processing and Transcriptional Termination”
4:00 p.m. – 5:00 p.m.
Sokol Seminar Room - Science Hall

October 18, 2005

CSAM Science Lecture
Dr. Eloy Rodriguez, Cornell University
“Amazing Drug Discoveries from the Tropical Jungles of Africa, The Caribbean and the Amazon”
10:30 a.m. - 12 noon
Sokol Seminar Room - Science Hall

October 24, 2005

Opening Celebration of the Bristol-Myers Squibb Center for Science Teaching and Learning
9:30 a.m. 11:30 a.m.
Blanton Hall

October 26, 2005

Margaret & Herman Sokol Science Lecture
Dr. Sandra Steingraber, ecologist, author, and cancer survivor
“Contamination Without Consent”
8:00 p.m.
Alexander Kasser Theater

November 3, 2005

CSAM Seminar in Earth & Environmental Studies
Dr. Tim Lowenstein, SUNY Binghamton
“Reviving Ancient Microbial Life”
4:00 p.m. – 5:00 p.m.
Sokol Seminar Room -Science Hall

November 10, 2005

CSAM Seminar in Computer Science
Dr. Jie Wu, Florida Atlantic University
“Self Organization in Mobile Ad-hoc Networks”
4:00 p.m. – 5:00 p.m.
Sokol Seminar Room -Science Hall

November 17, 2005

CSAM Seminar Chemistry & Biochemistry
Dr. Edward J. Kennelly, CUNY Lehman College
“Botanicals for Women’s Health and Cancer Prevention”
4:00 p.m. – 5:00 p.m.
Sokol Seminar Room -Science Hall

December 1, 2005

CSAM Seminar in Mathematical Sciences
Dr. Daniel Goldman, NJIT
“Microcirculatory Transport: Modeling and Application”
4:00 p.m. – 5:00 p.m.
Sokol Seminar Room - Science Hall

January 12, 2006

Northern NJ Regional Science Olympiad
(Science competition for area middle and high schools)

February 9, 2006

CSAM Seminar in Earth & Environmental Studies
Dr. Harold Tobin, New Mexico Institute of Mining & Technology
“Getting Inside the Plate Boundary: Subduction Zone Megathrusts in IODP”
4:00 p.m. – 5:00 p.m.
Sokol Seminar Room -Science Hall

March 9, 2006

CSAM Seminar in Biology & Molecular Biology
Dr. Douglas Tallamy, University of Delaware
4:00 p.m. – 5:00 p.m.
Sokol Seminar Room -Science Hall

March 22, 2006

PharmFest
9:00 a.m. – 3:00 p.m.
University Hall

April 6, 2006

Margaret & Herman Sokol Science Lecture
Dr. Roald Hoffmann, Winner of 1981 Nobel Prize in Chemistry & 1990 Priestley Prize, writer of essays, non-fiction, poems and plays
“Chemistry’s Essential Tension: The Same and Not the Same”
8:00 p.m.
Alexander Kasser Theater