MONTCLAIR STATE UNIVERSITY

Spring 2013

CSAM NEWSLETTER

College of Science and Mathematics

A Spectrum of Possibilities

In this Issue

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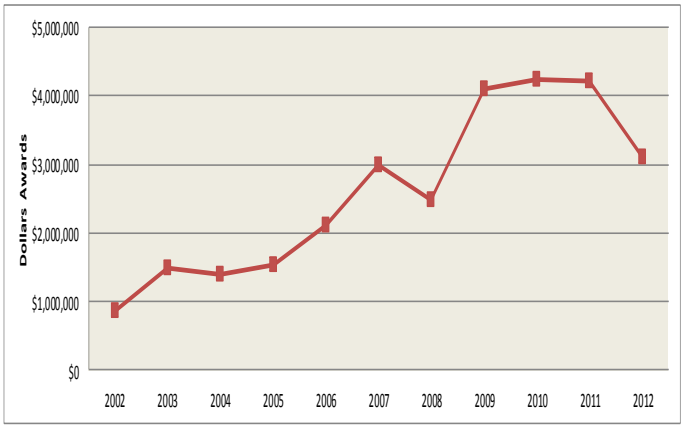
CSAM 's Decade of Growing Awards

Over the last decade, all measures of academic growth in the College of Science and Mathematics (CSAM) have increased significantly with a 45% rise in undergraduate enrollment, a 40% increase in graduate enrollment, a jump from 87 to 110 faculty members (with over 60% hired in this time frame), and remarkable growth in research grant support (see graph below for state and federal awards only between 2002 and 2012).



As federal funds have become tighter in our strained economy, last year showed a drop in external funding from national and state granting agencies reflecting constrained budgets but, as the graph demonstrates, CSAM overall has seen a steady climb upward. Federal funding has come from NIH, NSF, NASA, DARPA, EPA and others. Similarly our outstanding partnerships with industry have been sustained and grown. Today we have research and programmatic support from DuPont, Celgene, Merck, Roche, Bristol-Myers Squibb, PSEG, and others. After years of growth, a full summary of the progress in scholarship and programming will take a separate report. Here, however, is a very brief summary of some of the awards from our faculty's activity just this year:

Drs. Nina Goodey, John Siekierka, and James Dyer and Cigdem Talgar have been awarded a $166,475 NSF-TUES grant titled "Incorporation of Research Skills into the Undergraduate Biochemistry Curriculum to Create Extraordinary Scientists for the Modern Research Environment". The grant provides support to fundamentally transform existing biochemistry laboratory curriculum at MSU to an approach that better simulates research and produces scientists for the modern research environment. The grant will run until January of 2016.

Dr. Henk Eshuis was awarded a TURBOMOLE GmbH program development grant titled "Maintenance and development of the RIRPA module and application to alkane metathesis". Free access to the source code of the electronic structure method program TURBO-MOLE is granted for the duration of two years. Dr. Eshuis will use the development license to maintain and extend the program module RIRPA, which incorporates all functionality related to the Random Phase Approximation, a method he developed in previous research. The program will be used by his group to study the metathesis of alkanes and olefins in homogeneous

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From Dean Prezant

At times there is great consternation over the state of education, especially STEM education, in the United States. But a look at the status of higher education suggests that not only does this country remain at the front of the pack but that, contrary to recent pundit pronouncements, the American public remains fully vested in recognizing the importance of a post-secondary education. A recent Gallup/Lumina survey found that 97% of those asked agree that a degree or certificate beyond high school is important for financial security. Within the milieu of higher education we recognize learning takes place on various fronts. The classroom and more recently on-line education are most widely recognized but within the sciences there is a deep appreciation that experiential education in the form of hands-on research is perhaps one of the best learning experiences for students. The lead article in this edition of the CSAM Newsletter highlights the outstanding external grant support garnered by our faculty. Since 2002 CSAM has generated over $30,000,000 in external support for research from competitive federal and state agencies such as the National Science Foundation, the National Institutes of Health, the US and the NJ Departments of Education, the US Environmental Protection Agency and the National Aeronautic and Space Administration. Add to this well over $26,000,000 in the same time period received from private industry, foundations, and individuals to support our CSAM programs, such as our Science Honors Innovation Program (SHIP) funded by Merck and Roche, research support for our Sokol Institute for Pharmaceutical Life Sciences from Celgene, or Bristol-Myers Squibb's support of our Professional Resources in Science and Math (PRISM) housed in the BMS Center for Science Teaching and Learning, and of course our PSEG Institute for Sustainability Studies. CSAM is also deeply invested in pre-college STEM learning with strong external support. For instance, CSAM runs environmental summer camps offered by our Passaic River Institute and supported by, among others, BMW of North America and Covanta Energy, and for the past 11 years the Weston Science Scholars Program, funded by the Judy and Josh Weston Foundation, offers students from Montclair opportunities for working in faculty research laboratories during the summer. These funds in large part support student's hands-on experiences at the cutting edge for many science and math disciplines. Conceptually, these learning opportunities, so important to our students, have origins in the work of Piaget, Lewin and Dewey who independently laid the basis that demonstrated the merit of learning by doing (see Kolb, 1984)[1]. CSAM keeps this concept at the forefront of our STEM education activities with hundreds of our students pursuing research each year, many presenting at professional conferences and many also publishing their work in peer-reviewed journals and all with support from the agencies and donors that are in turn fully invested in the future success of our students as the next generation of STEM scholars. ♦

[1]Kolb, D. A. (1984). Experiential learning: Experience as the source of learning and development. New Jersey: Prentice-Hall.

CSAM Helps Newark Schools Implement New Math Standards

By Ann Frechette, Dean's Office

Newark Public Schools (NPS) has awarded a $44,000 contract to Mathematical Sciences Professors Erin Krupa and Corey Webel to provide professional development instructional coaching to a cohort of forty 5th and 6th grade Newark Public School (NPS) teachers in support of Newark's implementation of the new Common Core State Standards for Mathematics (CCSSM).

New Jersey joined 44 other states in adopting the Common Core State Standards in 2010, which represent a significant shift from previous state standards. "The CCSSM are designed to be focused, coherent, clear, and rigorous. They are internationally benchmarked and based on empirical research on student learning", said Dr. Krupa.

"Most importantly, the CCSSM require teachers and education leaders to focus on depth and coherence rather than coverage and topic mastery to ensure all students have opportunities to develop deep and connected mathematical knowledge", Krupa added.

Funded by a U.S. Race To The Top grant, NPS is currently focusing on supporting Grade 5-6 mathematics teachers making the transition to the CCSSM. The professional development that is being provided by Drs. Krupa and Webel is based on CCSS-aligned tool kits developed by NPS. These tool kits include lessons, strategies, problems, and assessments that help students build conceptual understanding, develop procedural fluency, and engage in in-depth mathematics problem solving.

"We anticipate that students taught by teachers who participate in this training will develop their ability to reason about and communicate their understanding of the mathematical ideas outlined in the CCSSM", said Dr. Webel. ♦

Faculty Wins $1.3 M Wipro Science Grant

By Mika Munakata, Mathematical Sciences

Faculty members from the College of Science and Mathematics (CSAM) and the College of Education and Human Services (CEHS) have recently been awarded a $1.3 million grant from WIPRO, an IT corporation based in India. The project, the WIPRO Science Education Fellowship (SEF) Program, is a five-year project that will involve over 60 northern New Jersey K12 science teachers from high-needs schools. CSAM's Mika Munakata, Jackie Willis, and Colette Killian, and CEHS's Emily Klein and Monica Taylor (pictured below) will

work with partners at the University of Massachusetts Boston to run parallel programs in northern NJ and Boston. The team has selected Clifton, Montclair, Kearny, Paramus, and Orange as the five NJ participating school districts. The UMass Boston team will concurrently be working with five Boston-area school districts.

The WIPRO SEF program will work to make sustainable changes in the districts by supporting emerging teacher leadership. The participating teachers will be engaged in a two-year professional development program that emphasizes reflective practice, inquiry-based pedagogies, classroom research, and leadership. Ultimately, these teachers will be in positions to enact positive change within their school, district, and beyond. Also, this focused professional development program will prepare veteran teachers to help retain new teachers and help those teachers grow within the profession.

During their first year in the program, teachers will work in teams as they study their practice through video, team meetings, and visits to each other's classrooms. They will develop and execute an action plan that will form the structure of their professional development. In the second year of the fellowship, teachers will use this experience as a springboard for leadership activities. They will share what they have learned through their explorations of inquiry-based pedagogies and reflective practice through activities such as writing articles, presenting at conferences, leading teacher workshops, revising curricula, and being active in professional organizations.

The parallel structure between the programs at UMASS Boston and MSU will allow for numerous collaborations. The Boston and New Jersey teachers will communicate regularly throughout the school year and meet at least once a year during a culminating end-of-the-year conference to be held alternately at UMASS Boston and MSU. In addition to showcasing their work from the academic year, teachers will have the opportunity to meet informally and exchange ideas about science education. The hope is that these teachers will enter a community of SEF educators and will form long-lasting professional ties. Further, the UMASS and MSU project teams will collaborate on various aspects of the program, strengthening its overall implementation.

The kick-off celebration for the first cohort of SEF fellows will take place in June. Representatives from the school districts, WIPRO, UMass, MSU, and the community will participate in this celebratory event. ♦

Effects of Different Learning Environments on Students' Conceptions of Mathematics

By Erin Krupa, Mathematical Sciences

In the Spring of 2012 the Department of Mathematical Sciences piloted a new version of MATH 100, Intermediate Algebra, taught in the Red Hawk Mathematics Learning Center (RHMLC). The RHMLC is a high-tech "emporium" where the majority of learning takes place through interaction with a computer program. The software provides examples, explanations, videos, opportunities to practice, and feedback on incorrect solutions. Tutors are available throughout the day for one-on-one instructional help. There are also fo-

cus group sessions which allow students the opportunity to work together and receive direct instruction from a graduate teaching assistant. The RHMLC now has over 200 workstations and provides a computer-aided learning environment for MATH 061 (Basic Skills), MATH 103 (The Development of Mathematics), MATH 109 (Statistics), and MATH 114 (Mathematics for Business II, Calculus).

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CELS — An Update

During the November 2012 elections, the residents of NJ, recognizing the status and the infrastructural needs of the NJ higher education community, passed the long awaited bond referendum, "Building Our Future." Its passage makes $750 million in state bonds available for capital improvement grants to NJ public and private two– and four-year colleges and universities. The primary purpose of the Bond Act is to provide institutions with the financial resources to increase their capacity to serve the significant growth in the New Jersey student population by constructing or expanding classroom, laboratories, computer facilities and other academic buildings.

The process now has proposals from each campus going forward for evaluation and prioritization by a review committee that will make their recommendation to the State. The College of Science and Mathematics was busy the last two weeks of February helping to construct a detailed and comprehensive funding application to the State for capital support for the future Center for Environmental and Life Sciences (CELS) and other major CSAM needs. The application described in detail current CSAM-related needs, opportunities and strengths, along with detailed explanations as to how the proposed building will address present deficiencies, maximize opportunities, and leverage the University's education, research and other assets. While we are still in active fund raising mode for this very important project, we are hoping the bond issue gives us a critical nudge towards ground-breaking. Stay tuned and as always, if you wish to support the CELS initiative, please contact Peggy Harris at harrisp@mail.montclair.edu. ♦

MSU Signs Agreement with BCC

By Lynn Schneemeyer, Dean's Office

Bergen Community College (BCC), located only a few miles from Montclair State University, is an important partner institution. About one third of the transfer students to MSU, almost 350 students a year, come from Bergen Community College. To help smooth the path to graduation for these students who are transferring into CSAM, we have worked with our counterparts at BCC to put in place a new articulation agreement that specifically covers STEM majors. The initiative to create this agreement was facilitated by a new Department of Education, STEM GPS grant that was recently awarded to BCC and specified articulation as a critical component of their program. The intent of the agreement is to help students, advisors and administrators at both BCC and MSU understand the course sequences that will allow students to graduate with their bachelor degree most promptly. The issue of course sequences and prerequisites is particularly important for students in the sciences and math. Making the wrong course choice can add time to graduation in any STEM major.

The intent of the new Articulation Agreement is to facilitate the smooth transfer and transition of graduates from Bergen Community College into appropriate upper level programs at Montclair State University and is in full compliance with New Jersey's NJ Transfer program. The agreement covers students graduating with a Bergen Community College's A.S. degree and entering into a STEM major within CSAM. The impact of this new agreement will be monitored and similar agreements with other local county and community colleges are anticipated. The new agreement between BCC and MSU was signed by MSU President Susan Cole (left) and BCC President B. Kaye Walter on January 28, 2013. ♦

USGBC Student Chapter Established

With the efforts of Environmental Management PhD students Amy Ferdinand and Sushant Singh, Montclair State has been honored with a new student chapter of the US Green Building Council. The USGBC is best known for providing the criteria and certification for "green building" known as LEED, Leadership in Energy and Environmental Design. LEED is a voluntary, consensus-based, market--driven program that provides third-party verification of green buildings. USGBC full members including architects, builders, planners, lawmakers, and advocate citizens, advance the goals of sustainable building, including LEED certification.

Our university chapter will introduce students to sustainable building ideas (interfacing with all the environmental sciences), provide initial support for becoming LEED-credentialed professionals, and provide career networking support. The club is open to all interested students, both undergraduate and graduate. Dr. Greg Pope will be the club's faculty advisor. After the first organizational meeting early Spring semester, the club intends to have regular meetings, to include guest speakers, field trips, and workshops. For more information,contact Dr. Pope at popeg@mail.montclair.edu. ♦

Developing Pharmaceutical Research Collaboration

By David Rotella, Chemistry and Biochemistry

Bristol Myers Squibb Company has been a partner with Montclair State in supporting the university's educational mission through sponsorship of the Bristol-Myers Squibb Science Teaching and Learning Center. Aside from their dedication to our STEM education initiatives, this major pharmaceutical company is engaged in discovery and development of new medicines for treatment of metabolic, cancer, psychiatric, neuro-degenerative, immunology, inflammation and infectious diseases. This requires basic and applied science discoveries to build a solid understanding of complex disease processes and therapeutic targets. To amplify internal programs the company actively seeks expertise and collaboration from university scientists whose research interests fit within these parameters. The Sokol Institute for Pharmaceutical and Life Sciences is actively building its mission of research that impacts human health. Toward this end, a group of CSAM faculty members have met twice with scientists from Bristol-Myers Squibb to explore potential collaborative research interests.

An initial meeting was held at the company's global research headquarters in Princeton and with the company kindly hosting MSU faculty members, undergraduate and graduate students. The group met with Bristol-Myers Squibb (BMS) scientists, heard an excellent presentation on the integration and application of diverse skill sets needed in drug discovery, toured chemistry and biochemistry laboratories and participated in a shared research poster session. A panel discussion with BMS senior research leaders provided advice on attributes needed for a successful pharmaceutical research career. In addition, a BMS medicinal chemist gave a seminar describing the discovery of a novel drug candidate for treatment of cancer. Students and faculty members actively engaged BMS representatives during each session and left the visit with a good understanding of how the company conducts and values pharmaceutical research. Key recommendations included demonstration of laboratory research experience, strong problem solving skills and a record of achievement and productivity in research. The group emphasized that the ability to work and communicate effectively with others is also essential in today's team based drug discovery environment.

Subsequently, BMS scientists visited Montclair State to learn more about the specifics of pharmaceutical related research underway within our College. Dr. Arthur Bertelsen, head of BMS's external collaboration group, described what BMS looks for in a collaborator and outlined resources and programs available from the company to support university research. The company uses a targeted approach for collaboration where a partner can provide useful technology, a novel drug target or even novel chemical matter. BMS has a grant program that provides funds for collaborative research between a BMS scientist and partner. The program should be proposed by a BMS scientist and is evaluated by other BMS staff for value, novelty and significance.

Professors Nina Goodey and Carlos Molina gave seminars on their current work on dihydrofolate reductase and ICER, respectively. In a joint poster session other faculty members, including John Siekierka, David Talaga, Yvonne Gindt and Diana Thomas, shared their ongoing medicinal and pharmaceutical research activities in kinase inhibitor discovery, protein structure, enzyme function and mathematical models for energy expenditure. BMS colleagues learned about the proposed Center for Environmental and Life Sciences building, toured laboratories in Science and Richardson Halls, and had the chance to discuss common interests throughout the day.

Both groups concluded the second meeting with a newfound appreciation of common links and a strong desire to continue to develop mutually beneficial connections. The incipient connection opened the door widely for MSU faculty members to enhance established contacts with BMS scientists and develop shared paths that could lead to innovative discoveries. ♦

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http://csam.montclair.edu

Advisory Council — Member Profile

Terence J. Gunning, currently Chief Operating Officer of MedLabs Diagnostics, a diagnostic testing and services laboratory, has 30 years of management experience in the healthcare industry including diagnostics and services, medical devices and consumer healthcare products. He is spearheading the transformation of the oldest laboratory in the state of New Jersey into the fastest growing and most advanced boutique laboratory in the tri-state metropolitan market.

Prior to MedLabs, Terry was CEO of Cadent, a worldwide medical service and device start-up headquartered in Carlstadt, New Jersey. Terry's tenure as CEO of Cadent brought a tripling of revenue and significant improvement in operating profit and cash flow concurrent with several successful capital fundings. As President of Datascope's Cardiac Assist Division (CA), Terry brought significant sales increases, the launch of three new products, CA's first successful acquisition and re-establishment of CA as the worldwide leader in counterpulsation therapy. As Vice President and Head of the Corporate Anatomic Pathology Division, and as Vice President, Marketing, for Quest Diagnostics, he led several growth initiatives resulting in significant top- and bottom-line improvements.

His resume includes marketing-related senior management positions with Johnson & Johnson Consumer Products and Bristol-Myers Squibb. Terry received an MBA in Finance and Accounting from Columbia University and a BS in Chemistry from Montclair State University.

Terry has been a member of the College of Science and Mathematics Advisory Board since August. Terry and his wife Kathy are married 22 years and are the proud parents of four children. They reside in Basking Ridge, NJ. ♦

Featured Alumna - Lisa Buono

Lisa C. Buono '79 proves that there is an array of options out there for graduates of CSAM. Her degree in chemistry and minor in mathematics led her to a career in the Over-the-Counter drug marketplace, a segment of the pharmaceutical industry.

"My degree helped me to approach problem solving in a logical way. It really helped me to THINK. I had an advantage because I was able to understand the chemistry behind different aspects of pharmaceuticals. I understood the formulating that was going on in the plants. I understood the creating and testing that was going on in the labs. These things weren't foreign to me."

This knowledge of areas outside of marketing, where she built her career, gave Lisa a greater appreciation for how teams work. "You get things done as a whole. I can appreciate the work that is done by every functional area." After Montclair, Lisa went on to receive her MBA. Coupled with her background in chemistry, the MBA "meshed very nicely" and helped her get into consulting within the pharmaceutical industry and then into staff positions at Lederle and Wyeth Consumer Healthcare. Currently, she is the Director of U.S. Over-the-Counter Medicines at Actavis, Inc.

Calling herself a "thinker" and a "studier", her time at Montclair State was spent focusing on her studies. However, she still keeps in touch with many of her classmates. "I made an awful lot of good friends, some of whom I still see. They've gone on to do very well for themselves." Lisa remains in contact with two of her former lab partners, Laura La Marca Spaulding and Roberta Ducci '79, and recalls others as well including David Oxley '79, Anthony Pico '79, George Stiff and Terence Gunning '79. "At the time, there were very small class sizes. There were no more than thirty of us, so everyone moved through the program together and knew one another well."

Lisa fondly recalls a professor, Dr. Kasner, whom she says paid "super attention to us." While her classmates had plans to go on to medical school or receive their PhDs, Lisa was headed off to business school. "Lisa, 'the sellout', he announced, you're going off to business school."

She credits much of her success to Montclair State: "I received a wonderful foundation in chemistry and more while at Montclair State. The faculty was just great. My education laid the foundation for success in all elements of my work, including marketing, marketing research, and brand management. The experience assisted me in leadership roles and with mentoring and training people in my areas of responsibility." ♦

CSAM Offers Accelerated BS/MS Programs

An accelerated or combined bachelor and masters degree program is probably the best value in higher education today. A graduate degree differentiates students from others holding only bachelor's degrees, demonstrates a deep commitment to a particular area, provides research experience and deepens a student's expertise in a field. CSAM offers students the following five-year (accelerated) combined BS/MS or BS/MAT:

- Marine Biology and Coastal Sciences
- Biology
- Chemistry
- Computer Science
- Geoscience Teaching
- Mathematics (concentration in Statistics)/Statistics
- Mathematics/Statistics and
- Sustainability Science

Several other 5-year combined programs are being planned and will be offered soon.

The 5-year accelerated programs accommodate highly-motivated undergraduate students in CSAM. Students are accepted into the program during their junior year having maintained an overall grade point average of at least 3.0. The first 12 credits of graduate study are taken during the senior year and are charged at the undergraduate tuition rate.thus discounting total costs.

A combined degree program is an attractive, efficient and fast track option for students aiming for an increasingly competitive job market. Alternatively, the MS preparation gives students a strong base for doctoral studies. Indeed, a combined 5-year BS/MS program at MSU is a fast track to success. ♦

A Path to Nursing Careers for CSAM Students

A new avenue to nursing careers for Montclair State University students has been created through a recent agreement with Seton Hall University's College of Nursing. The program is presently focused on CSAM Biology majors, who earn a Bachelor of Science degree from MSU and a Master of Science in Nursing from Seton Hall University in 5 years. The program is offered to highly-motivated undergraduate students majoring in Biology (or a closely related major) and interested in a health-related career. Students in the program are expected to complete their major, minor, distributional and general education requirements during the first three years at MSU and maintain a minimum cumulative science grade point average of 3.20 and an overall grade point average of 3.0. Successful program graduates will be Master's-prepared, eligible to take the NCLEX for RN licensure and will have the additional CNL certification that affirms that nurses have the skills to improve outcomes, reduce costs and decrease medical errors. Students interested in this program should contact their academic advisor or Ms. Gennae Hinson, Director, Career Services for CSAM at hinsonge@mail.montclair.edu or at 973-655-7793. ♦

CSAM Collaborates on Math and Science Days

By Gurkon Kose, Apple Educational Services and Jerry Fails, Mathematical Sciences

Science and technology underpin nearly every aspect of our society, making STEM skills necessary for all students to make informed decisions about every aspect of our life, regardless of whether or not they pursue careers in STEM. In order to help youth prepare for these challenges, STEM learning opportunities can be fun, engaging and challenging beyond the traditional school day. Programs and events are offered throughout the country to excite and motivate students to excel in STEM subjects and potentially pursue careers in STEM fields. Combining STEM learning with after school programming offers students a fun, challenging, hands-on introduction. In mid-January, over 130 middle school students from 15 schools across New Jersey and neighboring states participated in an on-campus three-day program,"Math and Science Days". It was collaboratively organized by CSAM and Apple Educational Services, Inc., a nonprofit organization located in Moonachie, NJ. The goals of the event are to The goals of the event were to: offer experiential learning activities that require students to plan, investigate and communicate; provide opportunities for students to work collaboratively; and, allow students to connect with STEM professionals as mentors and role models.

Dr. Jerry Alan Fails from the Department of Computer Science welcomed the group on behalf of CSAM. Energized by his remarks on "Science and Math: Just Do It", the students and coaches were focused and ready to begin the innovative instructional sessions in the days that followed. Instructors from area colleges volunteered to lead the daily events. After each morning's 50-minute lesson, students rushed to the hallway to solve the "Question of the Hour" for an opportunity to win a prize.

In the afternoons, students put their hands on projects that included: a "mousetrap vehicle", a Lego robotics programming,a "boomilever", and other construction projects. In all of these projects students designed, built, and tested their creations and oftentimes evaluated and

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622 Years Cumulative CSAM Excellence in Education

CSAM's faculty achievements are numerous and frequent. They are often recognized and acknowledged. But seldom are the years of dedicated teaching and mentoring are recognized. In December, 2012, CSAM held a special award ceremony highlighting the outstanding teaching achievements of our faculty with 35 and more years of service. Awards were presented to:

Thomas (Tom) Devlin, (41 years) - Professor, Department of Mathematical Sciences
Ann Marie DiLorenzo, (37 years) - Professor, Department of Biology and Molecular Biology
Carl Gottschall, (46 years) - Professor, Department of Mathematical Sciences
Dean I. Hamden, (46 years) - Assistant Professor, Department of Mathematical Sciences
John (Jack) L. Isidor, (39 years) - Professor, Department of Chemistry and Biochemistry
Marc L. Kasner, (39 years) - Professor, Department of Chemistry and Biochemistry
Stephen (Steve) J. Koepp, (39 years) - Professor, Department of Biology and Molecular Biology
William (Bill) R. Parzynski, (44 years) - Professor, Department of Mathematical Sciences
Helen Roberts, (40 years) - Professor, Department of Mathematical Sciences
Harbans Singh, (41 years) - Professor, Department of Earth and Environmental Studies
John G. Stevens, (43 years) - Professor, Department of Mathematical Sciences
Rolf Sternberg, (42 years) - Professor, Department of Earth and Environmental Studies
Robert (Bob) Taylor, (42 years) - Professor, Department of Earth and Environmental Studies
John V. Thiruvathukal, (42 years) - Professor, Department of Earth and Environmental Studies
Thomas (Ted) E. Williamson, (41 years) - Professor, Department of Mathematical Sciences

Picture (from left): Williamson, Parzinski, Kasner Thiruvathukal, Isidor, Roberts, Devlin, Hamden, DiLorenzo, Sternberg, Gottschall, and Singh

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My colleague, Dr. Corey Webel, and I , both mathematics educators in the department of Mathematical Sciences, are conducting a research study investigating the impact of the RHMLC and measuring the effects of different learning environments on students' conceptions of mathematics. We have been collecting data since the initial pilot semester, when there were six sections of MATH 100 taught in a traditional face-to-face format, and six sections offered in the RHMLC. The quasi-experimental study assesses student learning in each format as measured by the common final and a set of open-ended problem solving questions, and also takes into consideration performance and enrollment in future math courses. Other data includes background information such as GPA and SAT scores, a survey exploring students' views about mathematics and their experiences in the RHMLC, and interviews with a subset of participants. This data will be used to control for initial differences as well as to explore the factors that influence student achievement in the RHMLC.

We have completed the data collection from the Spring 2012 cohort and we are currently analyzing the data to formulate preliminary conclusions. The follow-up data collection from the Fall 2012 is almost complete and the analysis will take place this spring. We hope to share the results and findings in May. ♦

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Microbial ecology Dr. Jennifer Krumins is the recipient of a $65,014 US EPA grant to study the "Role of plant and soil community structure in riparian soil nutrient retention" in Barnegat Bay.

The National Science Foundation awarded Dr. Eric Forgoston $12,000 to continue his work on "Understanding the dynamics of stochastic disease spread in metapopulations".

Dr. Kirsten Monsen-Collar is a co-PI on a $88,900 multi-agency Research Conservation Needs (RCN) Grant funded through the Northeast Association of Fish and Wildlife Agencies (NEAFWA). The project is designed to survey for the presence of the amphibian pathogen *Ranavirus* in a five state area (MD, DE, NJ, PA, and VA) and involves collaboration of co-PI's from the MD Department of Natural Resources, the USGS Patuxent Wildlife Research Center, the NJ Division of Fish and Wildlife, the PA Fish and Boat Commission, the VA Department of Game and Inland Fisheries, the DE Division of Fish and Wildlife, and Towson University. Dr. Monsen Collar's will test wood frog larvae collected from all five states for the presence of *Ranavirus.* This project is part of the ongoing amphibian disease ecology research being conducted by Dr. Monsen-Collar, Dr. Lisa Hazard, and Ph.D. student Paola Dolcemascolo.

Faculty members from the College of Science and Mathematics and the College of Education and Human Services have recently been awarded a $1.3 million grant from WIPRO, an IT corporation based in India. The project, the WIPRO Science Education Fellowship (SEF) Program, is a five-year project that will involve over 60 northern New Jersey K12 science teachers from high-needs schools. See separate article on page 3 of this Newsletter.

Dr. Sandra Passchier received a new $118,937 NSF-OPP award: "The Stratigraphic Expression of the Onset of Glaciation in Eocene-Oligocene Successions on the Antarctic Continental Margin", that will run through May 2016.

The Celgene Corporation, Division of Global Health, continues to support the work of Drs. John Siekierka and David Rotella in the Sokol Institute for Pharmaceutical Life Sciences. The new award for $208,000 will extend their research program for the development of novel anti-filarial parasite therapeutics through 2014.

Dr. Robert W. Taylor received a $30,000 grant from the Vietnam Educational Foundation for a course and research program at the Ho Chi Minh University of Natural Resources and Environment in Ho Chi Minh City, Vietnam for "Technologies and Strategies for Climate Change Adaptation in Global Cities" with an emphasis on climate change adjustment strategies and planning for Ho Chi Minh City (Saigon).

The National Science Foundation has renewed funding for the multi-institutional Garden State Alliance for Minority Participation in the Sciences for the fourth year in the amount of $112,187. Dr. Robert Prezant is a Co-PI on the original proposal representing MSU and Dr. Quinn Vega is the Director of this important program designed to increase the numbers of and opportunities for underrepresented minorities entering the sciences.

Drs. Dibyendu Sarkar and Yang Deng received $344,286 from the DuPont Corporation from their Research Opportunity in Remediation Science and Engineering Program to examine remediation of mixed contaminant plumes using ferrate.

Dr. Pankaj Lal is assessing socioeconomic impacts of forest biomass based biofuel development in rural communities in the southeastern United State through a US Department of Agriculture grant of $349,963.

Dr. Meiyin Wu has had a CSAM NSF funded Research Experience for Undergraduates award renewed for the year with an additional $119,939 added by the NSF to bring total to date to $373,618. The award runs from September 2014. This continued funding allows MSU to continue this student-research program on transdisciplinary environmental science research on forest lakes in northwest New Jersey and takes advantage of our NJ School of Conservation in Stokes State Forest.

Through an NSF Major Research Instrument grant award Drs. Ashuwin Vaidya, Philip Yecko, Arup Mukherjee and David Trubatch received $171,135 for the acquisition of an imaging system for the study of complex fluids.

Newark Public Schools has awarded a $44,000 contract to Drs. Erin Krupa and Corey Webel to provide professional development instructional coaching to 5th and 6th grade Newark Public School (NPS) teachers (see page 2). ♦

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calculated the physics behind their creations. At the end of two days of hard work, students competed in science and math competitions. Certificates, medals, and gift cards were distributed during the award ceremony. Looking at the end product, one could tell that everyone took Dr. Fails' advice to: "Observe, be curious, be creative, work hard, and have fun!" ♦

Faculty Activity

Dr. **Yang Deng** (Earth and Environmental Studies) has recently been selected into the Wetlands Mitigation Council of New Jersey under the NJ Department of Environmental Protection. He is one of the seven members in the Council with a 3-year term.
Dr. Deng presented "Formation of Trihalomethanes (THMs) during Chlorination of Landfill Leachate" (co-authored with N. Li) at The 2nd International Conference on Environmental Pollution and Remediation in Montreal, Canada.

Dr. **Reginald Halaby** (Biology and Molecular Biology) served as a Peer Reviewer for the journal *Molecular Biology Reports*. And, he presented a poster titled "The effects of triptolide on breast cancer and prostate cancer cells" at the 13th Annual Research Centers in Minority Institutions (RCMI) International Symposium on Health Disparities in San Juan, Puerto Rico.

Dr. **Lisa Hazard** (Biology and Molecular Biology) was elected to a 2013-2016 term to the Board of Directors of the Society for the Study of Amphibians and Reptiles. Dr. Hazard presented "Integration of physiology and conservation: lessons from the Nagy lab" at a special session at the Society for Integrative and Comparative Biology Annual Meeting, San Francisco. A co-authored paper by Snyder, T.J., P. Dolcemascolo, L.V. Araya-Jara, L. Hazard and K.J. Monsen, "Habitat use and population demographics of two aquatic turtles species in a temperate forest lake" was also presented at same meeting.

Dr. **Shifeng Hou** (Chemistry and Bio chemistry), as the chair of Environmental Implications of Nanomaterials and Nanotechnology section, participated the 2nd Annual World Congress of Nano-S&T 2012, at Qinng Dao, China. He also had an invited report, the "Surface Design and the Applications of Carbon-based Nanomaterials for Environmental Protection."

Dr. **Pankaj Lal** (Earth and Environmental Studies) presented "Biofuel Certification Protocols and Sustainability Standards – What, How, and When", "Supply Chain Management Analyses for Bioenergy Production" and co-presented " Mechanics of Profitability Analyses for Biofuels" at the Indo-US Joint Clean Energy Research & Development Partner's Workshop held in Hyderabad, India. He gave a webinar as part New Jersey Technology Community Tech Industry Webinar on Energy/Environment. His webinar focused on bioenergy research. He was also a discussant in Regional Economics Network Meeting held at Bloustein School of Planning and Public Policy, Rutgers University.

Dr. **Erin Krupa** (Mathematical Sciences) is the recipient of this year's Elon College Distinguished Alumni Award in the Natural, Mathematics and Computing Sciences. Congratulations!

Dr. **Aihua Li** (Mathematical Sciences) gave an invited presentation, "Zero Divisor Graphs of Upper Triangular Matrix Rings over Commutative Rings", at the Conference on Commutative Rings, Integer-valued Polynomials and Polynomial Functions held in Graz, Austria. She also gave a Biever Lecture at Loyola University New Orleans titled "What Mathematics can do in Bioinformatics?" She also participated in the 2012 Trends in Undergraduate Research in Mathematical Sciences Conference and gave an oral presentation titled "REU Programs, Opportunities, and Funding Support at Montclair State University and from New Jersey MAA Section". The trip was funded by NSF/NSA through MAA. Dr. Li reviewed the book "Taking Sudoku Seriously – The Math Behind the World's Most Popular Pencil Puzzle" for Mathematics Reviews and refereed a paper for the Journal of Combinatorial Mathematics and Combinatorial Computing (JCMCC).

Dr. **Bogden Nita** (Mathematical Sciences) presented at the SIAM Conference on Imaging Sciences "A One Dimensional Algorithm for Seismic Imaging and Inversion: Theoretical Development and Numerical Tests."

Dr. **Sandra Passchier** (Earth and Environmental Studies) chaired a session at the Fall meeting of the American Geophysical Union in San Francisco.

Dr. **John Siekierka** (Chemistry and Biochemistry) presented a paper co-authored by students and colleagues D.S. Mortensen, V. Khetani, Y. Satoh, B. Cathers, S. Canan, J. Zeldis, A. Nawrocka Chojnowski, A. Patel, R. Goldberg, and D. Rotella titled "Novel inhibitors of the *Brugia malayi* stress-activated protein kinase, Bm-MPK1" at the American Society of Tropical Medicine and Hygiene 61st Annual Meeting in Atlanta, Georgia.

A recently published article in the New England Journal of Medicine, "Myths, Presumptions, and Facts about Obesity", by Dr. **Diana Thomas** (Mathematical Sciences) as one of the co-authors has received national attention. Dr. Thomas was featured on CBS News http://newyork.cbslocal.com/video/8291744-debunking-obesity-myths/

Dr. **Corey Webel** (Mathematical Sciences) was recently interviewed by Samuel Otten of Math Ed Podcast about his forthcoming article in Mathematical Thinking and Learning. The interview can be found at http://www.mathedpodcast.com. ♦

Student News

Environmental Management Ph.D. student **Melissa Hansen** (advisor Dr. Sandra Passchier (Earth and Environmental Studies) presented a poster at the Fall meeting of the American Geophysical Union in San Francisco.

D'Alessio, M., L. Gross and **J. Guercio** (Biology and Molecular Biology) co-authored a prep book for high school students entitled AP Biology Crash Course (2nd ed. Piscataway, NJ: Research & Education Association).

Doctoral student **Nanzhu Li**, under the supervision of Dr. Yang Deng, (Earth and Environmental Studies) recently won a $5,000 Graduate Student Grant of New Jersey Water Resources Research Institute (NJWRRI). Her proposal is entitled "Developing an environmentally friendly water reuse technology using ferrate (VI)". The one-year grant will partially support her dissertation research. Nanzhu has been a PhD student in the doctoral program in Environmental Management since 2011.

Mary Salim (Biology and Molecular Biology) has been selected as a 2013 Howard Hughes Medical Institute (HHMI) EXceptional Research Opportunities Program (EXROP) award recipient. Mary was in the first cohort of the Phage Genomics Research course offered in the Department of Biology and Molecular Biology in the fall 2011semester. This is the first time that MSU was invited by the Howard Hughes Medical Institute to nominate students for this very competitive and prestigious award. ♦

Publications

Casazza, K., K.R. Fontaine, A. Astrup, L.L. Birch, A.W. Brown, M.M. Bohan Brown, N. Durant, G. Dutton, E.M. Foster, S.B. Heymsfield, K. McIver, T. Mehta, N. Menachemi, P.K. Newby, R. Pate, B.J. Rolls, B. Sen, D.L. Smith Jr., **D.M. Thomas,** D.B. Allison (2013). "Myths, Presumptions, and Facts about Obesity." New England Journal of Medicine, 368:5, pp. 446-454.

Chu, W., N. Gao, **Y. Deng**, D. Yin (2012). "A predictive model for the formation potential of dichloroacetamide, an emerging nitrogenous DBP formed during chlorination." *International Journal of Environmental Science and Technology*, 9:4, pp. 701-704.

Datta, R., **P. Das**, S. Smith, **P. Punamiya**, D.M. Ramanathan, R. Reddy, **D. Sarkar** (2013). "Phytoremediation potential of vetiver grass [*Chrysopogon zizanioides (l.)*] for tetracycline." *International Journal of Phytoremediation*, 15, pp. 343-351.

Deng, Y., J. Englehardt, S. Abdul-Aziz, T. Bataille, J. Cueto, O. DeLeon, M.E. Wright, P. Gardinali, A. Narayanan, J. Polar, S. Tomoyuki (2013). "Ambient Iron-Mediated Aeration (IMA) for water reuse." *Water Research*, 47, pp. 850-858.

Feng H., Y. Qian, F.J. Gallagher, M. Wu, W. Zhang, L. Yu, Q. Zhu, K. Zhang, C.-J. Liu, R. Tappero (2012). "Lead accumulation and association with Fe on *Typha latifolia* root from an urban brownfield site." *Environmental Science and Pollution Research* DOI 10.1007/s11356-012-1298-x.

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Halaby, R. (2012). "Does apoptosis regulate the function of retinal photo receptors?" *MEHDI Ophthalmology Journal,* 1, pp. 21-23.

Krumins, J.A., D. van Oevelen, E. van Donk, W.H.G. Hol, W. de Boer, M. Viketoft, G.B. de Deyn, F. Monroy-Martinez, J. Middelburg, P.C. de Ruiter, T.M. Bezemer, J. van de Koppel, E. Thebault, W.H. van der Putten (2013). "Soil, fresh water and marine sediment food webs: similarities and differences in their structure and functioning." *BioScience,* 63:1, pp. 35-42.

Li. L., N. Gao, **Y. Deng,** J. Yao, K. Zhang (2012). "Characterization of intracellular & extracellular Algae Organic Matters (AOM) of *Microcystic aeruginosa* and formation of AOM associated disinfection byproducts and odor & taste compounds." *Water Research*, 46:4, pp. 1233–1240.

Ma, X., A. Gurung, **Y. Deng** (2013). "Phytotoxicity and uptake of nanoscale Zero-Valent Iron (nZVI) by two plant species." *Science of The Total Environment*, 443:15, pp. 844–849.

Nagar, R., **D. Sarkar**, K. Makris, R. Datta (2013). "Inorganic arsenic sorption by drinking water treatment residuals amended sandy soil: Effect of soil solution chemistry." *International Journal of Environmental Science and Technology*,10, pp. 1-10.

Nwachukwu M. A., **H. Feng**, J. Alinor (2012). "A comparative analysis of trace metal pollution parity between sandy and shaly soils; evidence from two mechanic villages in the Imo River basin." *Environmental Earth Sciences*, 65:3, pp.765-774.

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Punamiya, R. Datta (2013). "Mechanisms of ciprofloxasin removal by nano-sized magnetite." *Journal of Hazardous Materials*, 246-247, pp. 221-226.

Rakshit, **S**., **D. Sarkar**, E. Elzinga, P. Tan, C., N. Gao., **Y. Deng**, N. An, J. Deng (2012). "Heat-activated persulfate oxidation of diuron in water," *Chemical Engineering Journal*, 203, pp. 294–30.

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Tasy A, G.L. Santamaria, **B.G. Nita** (2013). "Numerical evaluation of a one-dimensional inverse scattering algorithm for simultaneous seismic imaging and inversion." Volume 219, **Issue**, 29, p. 10.

Taylor, R., J.S. Carandang, C. Alexander, J.S. Calleja (2012). "Making global cities sustainable: Urban rooftop hydroponics for diversified agriculture in emerging economies." *OIDA International Journal of Sustainable Development*, 5:7, pp. 11-28. ♦

Upcoming Events

Tuesday, March 19: Sustainability Seminar
Dr. Julie Lockwood, Rutgers University.
Contemporary Evolution of Island Birds
4:00 p.m.—Sokol Seminar Room

Tuesday, March 26: Sustainability Seminar
Dr. Steve Jenks, NJDP
The Solar Cell of Tomorrow: New Designs and Methods for Solar-Generated Electricity
4:00 p.m.—Sokol Seminar Room

Tuesday, April 2: Sustainability Seminar
Dr. Peifeng Zhang, CUNY
Removal of Pharmaceuticals from Contaminated Water Using Sewage-Sludge Derived Adsorbents
4:00 p.m.—Sokol Seminar Room

Wednesday, April 10: The Margaret and Herman Sokol Science Lecture
Women in Science
8:00 p.m.—Kasser Theater

Saturday, April 21: Student Research Symposium
8:00 a.m. - University Conference Center
http://csam.montclair.edu/srs/

Friday, April 26: Sustainability Seminar
Dr. Neil Johannsen, Pennington Biomedical Research Center will train MSU students on collecting metabolic and physiological measurements.

Friday April 26: 65th Annual North Jersey ACS Undergraduate Research Conference.
12—5 pm Sokol Room

Sunday, May 19: CSAM Convocation
7:00 p.m. - Sprague Field
http://csam.montclair.edu/convocation/

Friday, May 24: University Commencement
10:00 a.m. - IZOD Center, Meadowlands Sports Complex
http://www.montclair.edu/commencement/