



Biochemistry & Molecular Biology

MSU College of Natural Science | Newsletter for Alumni and Friends

From the Department Chair...

The student experience is a critical part of a department's measure of success. In the Department of Biochemistry and Molecular Biology (BMB), we have responsibilities for undergraduate BMB majors, BMB graduate students, graduate students in interdepartmental programs doing research in BMB labs, and for basic science education in the Colleges of Human and Osteopathic Medicine. There are exciting developments to report in each area.

Our undergraduate major continues to grow, though the rate of growth has slowed, giving us time to catch up. I am happy to report that the College of Natural Science (CNS) has provided funding for a professional advisor for our undergraduates and we were very happy to hire Kendra Pyle into this position. She has been able to provide many more services for students than was possible in the past. We continue to emphasize making laboratory experiences available to undergraduates and, last year, 162 students had some experience in our research laboratories. We are fortunate to have several scholarships and prizes that can be awarded to students to help them afford the time to carry out their research.

Our graduate students now come in through a new program—the BioMolecular Sciences Gateway. BMB associate professor John LaPres is director of this program, which is beginning its third year. The students admitted in the first year are now starting their research in BMB. The second-year cohort of students is currently doing rotations, and we are actively recruiting the third class. This program has been successful

in attracting top-notch students to MSU and in helping our new assistant professors attract students to their labs.

Education initiatives in both medical schools have resulted in innovative course designs. In the past, we had one curriculum for the 200 students in the medical schools, all provided through the East Lansing campus. We now serve 500 students in East Lansing, the Detroit Medical Center, the Secchia Center in Grand Rapids and the Macomb University Center. A new College of Osteopathic Medicine curriculum was introduced in 2012. BMB Professor John Wang has shouldered the majority of the effort in introducing this new curriculum for the department and, in 2013, BMB assistant professor Carol Wilkins was promoted to oversee semester two of this innovative curriculum. The College of Human Medicine has been developing new approaches to better integrate clinical experiences and basic science education through all four years of the curriculum.

We have increased our undergraduate teaching responsibilities by getting involved in teaching biology. Several of us now have part of our teaching duties in this introductory course. CNS has a comprehensive Biology Initiative to reinvigorate the undergraduate biology program.

Teaching is critical to our mission, but what distinguishes MSU and BMB from some very good four-year colleges is the research. The creation of new knowledge in addition to its dissemination is essential to the mission

of BMB. A number of research projects are highlighted in this newsletter. These projects address some of the major challenges facing society, including health care and the provision of energy.

The financial picture for BMB is favorable, all things considered. State funding is holding steady, but now accounts for just 10 percent of the total expenditures in BMB. Tuition is much higher than in the past and is more of an impediment to student access than is appropriate for a land-grant university. Professors work tirelessly to bring in new research funding, and this has held steady despite large reductions in overall success rates for submitted proposals. The university is working toward more philanthropy as a source of funding, and we are participating. We hope to develop endowed chairs to retain and help attract our best professors. We are fortunate to have two Hannah professorships and a Rosenberg professorship, but many more professors are of a caliber that would easily justify an endowed chair. I hope that I can report progress to you in this area next year.

In the meantime, I want to express my enthusiasm for what is happening in BMB and my optimism for greater things to come. 🍀



Thomas D. Sharkey, Ph.D.
Chair, Department
of Biochemistry and
Molecular Biology



Daniel Lichtstein, biochemistry, '70, is a professor of medicine and the regional dean for medical education at the University of Miami's Miller School of Medicine in Florida. In April 2013, he was recognized by the American College of Physicians (ACP) as a Master of ACP for his contributions to the field of medicine.

Ulrich Melcher, Ph.D., biochemistry, '70, is on the BMB faculty at Ohio State University, Columbus, where he teaches molecular genetics and nucleic acids and protein synthesis, and leads research on discovering the diversity and evolution of plant viruses. He is also assisting the endeavors of the National Institute for Microbial Forensics & Food and Agricultural Biosecurity.

Linda (Glass) Mamassian, biochemistry, '72, lives in Michigan and has been a self-employed book indexer and copy editor, specializing in chemistry, medical books and related topics since 2000. Previously, she worked as an analytical food chemist and taught high school chemistry.

Tom Rollins, biochemistry, '78; M.S., biochemistry, '81, was appointed last fall as San Diego site head and senior vice president of program and portfolio management at Cubist, Inc., a biopharmaceutical company focused on the research, commercialization and creation of pharmaceutical products

that address unmet medical needs in the acute care environment.

Rebecca (Ellis) Dutch, biochemistry and microbiology, '86, professor of molecular and cellular biochemistry, has accepted the additional position of associate dean for biomedical education at the University of Kentucky College of Medicine, Lexington, Ky.

John Geisler, biochemistry, '88, has held jobs at Isis Pharmaceuticals, San Diego, Calif., and JnJ near Philadelphia, and is currently trying to start his own biotechnology business, Mitochon Pharmaceuticals LLC, for the treatment of insidious neurodegenerative and metabolic diseases.

David J. Pepperl, biochemistry, '88, is a senior consultant and toxicologist at the Biologics Consulting Group, Inc., (BCG) based in the Washington, D.C., metro area. He just finished his 10th year with BCG.

Ruju (Bhatt) Srivastava, biochemistry and international relations, '93, recently joined BioMarin Pharmaceutical Inc., Novato, Calif., as executive director of product development, where he works on developing new cancer medicines.

Andrew Rader, M.S., physics, '98; Ph.D., physics and biochemistry, '02, joined State Farm Insurance (Indianapolis, Ind., area) as a data scientist in May 2013.

Andrew Spencer, Ph.D., biochemistry, '98, has worked at start-up biotechnology companies in Silicon Valley for the past few years, focusing on autoimmunity and renal disease. Currently, he serves on the management team at Ardelyx and leads their collaboration with AstraZeneca. He and his wife, Katie Miller (MD '00), live in Menlo Park, Calif., with their two sons, Will (6) and Pete (2).

Philip Bates, Ph.D., biochemistry and molecular biology, '08, became an assistant professor in the Department of Chemistry and Biochemistry at The University of Southern Mississippi, Hattiesburg, Miss., in August 2013.

Michael Bain, biochemistry and molecular biology, '12, is currently attending Wayne State University, Detroit, Mich., and will be graduating with a master's in basic medical science in May. He was recently accepted to the College of Osteopathic Medicine at Michigan State University, East Lansing, Mich., and will return this June to start medical school.

Silvan Omerovic, biochemistry and molecular biology, '13, has been accepted to the College of Osteopathic Medicine at Michigan State University, East Lansing, Mich., and will return to start medical school in summer 2014.

Faculty Honors

BMB professor **Dean DellaPenna** was named a University Distinguished Professor in recognition of his achievements in the classroom, laboratory and community by the MSU Board of Trustees in June 2013. DellaPenna is regarded as one of the world's foremost experts on the biosynthesis of nutritionally important micronutrients in plants. He has been instrumental in pushing the international community to take on the challenge of using genomics and biochemistry to tackle the biofortification of foods important to people in developing countries.

Pamela J. Fraker, University Distinguished Professor Emeritus of biochemistry and molecular biology, received the 2013 Outstanding Alumni Award from Purdue University in October 2013. Fraker earned her bachelor's degree with honors in biology from Purdue in

1966 and came to MSU in 1973. She retired in May 2012 after 39 years in the BMB department. In 2007, Fraker was the first woman at MSU to become a member of the National Academy of Sciences for her pioneering research in the area of nutritional immunology.

Professor **Christoph Benning** received the postdoctoral mentoring award and **Neil Bowlby**, assistant director of the BMB Undergraduate Program, received the undergraduate teaching award from the College of Natural Science during the college's 2013 awards ceremony.

Michael Feig was promoted to full professor in July 2013. His research focuses on using computational methods to study the structure, dynamics and energetics of biological macromolecules such as proteins or nucleic acids.



BMB retreat informs, builds camaraderie

BMB faculty members, like all scientists, are always attending meetings. Most of these meetings are held in far-away places—often in other countries and other states; they are rarely held at MSU. And why do they go to these meetings? To meet other scientists, find out what is new in their areas of research and, of course, to tell everybody what MSU is up to. But what about informing our colleagues just across the hall?

To catch up on all of the great research that is going on here at home, BMB had its first departmental research retreat in September 2013 at the Bengel Wildlife Center in Bath, Mich. Although it was only a few miles north from campus, it felt very much like being far from home.

The daylong retreat began with breakfast to get everybody energized. Faculty members then gave short talks about the latest and greatest research in their labs. In the afternoon, students and postdocs presented their research at a poster session.

“One key takeaway from the retreat was an awareness of just how much interdisciplinary work BMB is involved in,” said Thomas Sharkey, BMB chairperson. “More than half of all BMB



Retreat participants enjoyed some outdoor time during the BMB student poster presentation session.

published papers have more than one lab represented. That’s a lot of collaboration.”

Of course, any good research meeting can’t be just all about science, added Michael Feig, BMB professor and retreat coordinator.

“The BMB graduate students did a fantastic job of setting up grills and serving everybody hamburgers and hot dogs to end

the day,” Feig said. “Luckily, the weather played along and the beautiful views of nature inspired all kinds of interesting discussions—some about science and some not, neither of which may have happened just meeting in the hallway in the BMB building. At the end of the retreat, everybody left happy, knowing that they are part of great team!”

New Faculty

The Department of Biochemistry and Molecular Biology has hired three faculty members since its last newsletter.



Martha A. Faner joined the department in August 2013 as an instructor in the College of Osteopathic Medicine at the Detroit Medical Center campus. She received her Ph.D. from Wayne State University, Detroit, Mich., in 2013 and is currently teaching BMB 515 (Medical Biochemistry and Molecular Biology), BMB 527 (Medical Genetics) and MMG 532 (Medical Microbiology).



Jian Hu joined BMB as an assistant professor in August 2013. His research focuses on metal homeostasis, specifically metal transporters. Before coming to MSU, Hu was an associate research scientist at Yale University, New Haven, Conn. He received his Ph. D. in 2004 from Peking University, Beijing, China.



Cheryl Kerfeld joined MSU as a Hannah Distinguished Professor, specializing in structural and functional characterization of bacterial microcompartments and of proteins involved in photoprotection in photosynthetic organisms. She has a joint appointment with BMB and the MSU-DOE Plant Research Lab, and leads the Bioinformatics Education and Structural Bioengineering Group. Kerfeld came to MSU in July 2013 from the U.S. Department of Energy Joint Genome Institute at the University of California, Berkeley. She received her Ph.D. in structural biology from the University of California, Los Angeles.

New research at cellular level could yield big results

Monique Floer, BMB assistant professor, is embarking on a study that could lead to a better understanding of heart disease.

Her work is being funded by a three-year, \$210,000 American Heart Association Scientist Development Grant. These grants are given to young investigators who are in their first four years of holding an independent position. Floer joined MSU's Department of Biochemistry and Molecular Biology in August 2011.

Floer's study is focused on gene regulation in macrophages—a type of cells that are part of the immune system—in response to attacks by different pathogens.

“Macrophages are the first cells to respond to infection and are necessary for wound healing,” Floer said. “Macrophages also play an important role in atherosclerosis, which is the primary cause of heart disease.”

Floer's approach is unique. She will be using a quantitative method she helped develop while she was a postdoc at the Sloan-Kettering Institute. Using this



Monique Floer, BMB assistant professor, is studying how macrophages, a type of cell that is part of the immune system, can express specific genes for specific functions and why other cells cannot.

method of examining chromatin—the combination of the DNA and associated protein—Floer's research team will be able to precisely determine the amount of nucleosomes bound to any region in the genome in a population of cells.

“This will give us unique insight into the dynamics of nucleosome binding in living cells. Understanding these basic mechanisms of gene regulation will have implications for many diseases where gene expression is misregulated, including cancer,” she said.

“I am grateful that the American Heart Association supports basic science and has provided us with this funding,” Floer noted. “Support for basic science has dwindled in recent years, with many funding agencies shifting their focus to translational science.”

Floer believes that reduced funding for basic science will lead to a decrease in the number of new drugs that could be brought into the pipeline for clinical testing.

“Unless we reverse this trend quickly, we will eventually run out of new drugs that can be tested,” she said. “I also believe that doing basic science requires very different skills from those required for translational science; if we were to lose this sector of science it would be very difficult to recover it.”

Stoltzfus provides input on education research during ASBMB workshop

John Stoltzfus, BMB assistant professor, participated in a workshop focused on developing concept-driven teaching strategies in biochemistry and molecular biology.

The workshop was held at Viterbo University in La Crosse, Wisc., on Nov. 9, 2013. It was sponsored by the American Society for Biochemistry and Molecular Biology (ASBMB) as part of a long-term project aimed at implementing recommendations from the American Association for the Advancement of Science's (AAAS) Vision and Change in Undergraduate Education.

“One of the biggest benefits of the workshop is the sharing of ideas between faculty members who teach biochemistry

courses at a diverse set of institutions,” Stoltzfus said.

ASBMB is offering this series of workshops across several regions of the country in order to strengthen education research in biochemistry and molecular biology, form new collaborations between teachers and researchers interested in how students learn discipline-specific content, and create a central repository for instructional resources. The first workshop took place Nov. 2, 2013, at the University of San Diego. The last in the series will take place at Georgia State University in July 2014.

Stoltzfus's group defined a specific learning goal relating to energy transformations and Gibbs free energy. They then developed a template for learning activities that is

applicable to a variety of systems that involve energy transformation. For example, the group thought the activities could be applied to systems as diverse as glycolysis, muscle contraction and flagellar motion. They also developed a scoring key for the activity.

“One function of the ASBMB workshop is to develop research-quality assessment tools that allow us to study how well students understand key concepts in biochemistry,” Stoltzfus said. “These assessment tools will guide future research on how undergraduates learn biochemistry. My participation in the workshop allows ideas and priorities from MSU to be incorporated into these assessment tools.”



Accomplishing much with little

“My only request is that he doesn't mention his religion in school,” the principal told my mother. I was just starting first grade. I remember standing beside my mother at the time, and while I didn't understand, I just did what I was told.”

Raeuf Roushangar, now an MSU biochemistry and molecular biology senior, recalls that moment to this day.

He was born in Oman—a small country on the Persian Gulf—to an Iranian father and an Egyptian mother. Unlike the majority of Egyptians and Iranians, he was of the Bahá'í faith.

When Roushangar was four years old, his father returned alone to his homeland of Iran due to a serious health condition, while Roushangar's mother took him and his two brothers back to her homeland of Egypt.

“There, I endured hateful and discriminatory actions for nearly two decades due to Egypt's intolerance of religions other than Islam and Christianity,” Roushangar said.

After his first year at Cairo University, he was suspended because of his faith.

“The only chance I had to continue my higher education was to come to the United States,” Roushangar said.

He arrived in Grand Rapids, Mich., in 2008. During the first six months, he was homeless.

Though he had relatives who lived in Grand Rapids, Roushangar said, “I've always been independent. I wanted to find my own way.”

At night, he walked the streets. During the day, he spent time at the library, which he described as a source of enlightenment; it provided a safe place to sleep, as well as a treasure trove of knowledge.

When asked how it felt to be homeless those first few months, Roushangar responded: “I had never felt more free, welcomed and secure in my life.”



Raeuf Roushangar (left) has been accepted into the biochemistry master's degree program at the University of Michigan for fall 2014. He plans to complete that degree by spring 2015 and then go on to medical school. He is shown here in the lab with Brian Schutte, BMB adjunct faculty member.

He eventually was hired as a tutor at Grand Rapids Community College.

“In my life, I always find people who believe in me,” he said.

After two years, he transferred to MSU and soon secured a position as an undergraduate research assistant in the lab of Brian Schutte, BMB adjunct faculty member and associate professor of microbiology and molecular genetics. He works alongside BMB graduate student Youssef Kousa, who is from Egypt.

“Youssef has played an important part in Raeuf's life . . . bringing him into my lab, training him, working with him, mentoring him,” Schutte said. “Mentoring is really important; that's a word we use a lot.”

Schutte's research focuses on the gene that causes cleft lip (cheiloschisis) and cleft palate (palatoschisis), which are among the most common birth defects worldwide.

Roushangar said that one of his best experiences at MSU has been “the opportunity to be involved in research like this with a great expert in the field—Dr. Schutte—and being mentored by one of the best grad students—Youssef.”

Roushangar plans to attend medical school to help serve the underserved. His goal is to be a physician scientist, specializing in neurology.

In September 2010, his freshman year at MSU, Roushangar founded the nonprofit organization Generate Help 2 Heal Generations (GH2HG), along with fellow freshman and computer science major Marco Botros, who is also Egyptian.

The organization's mission is to collect, catalog and ship unused medical supplies from the United States to poor communities around the world.

In 2011, he traveled to Iran and was able to locate his father, whom he hadn't seen since he was four years old. Roushangar currently keeps in touch via Skype with his mother and relatives in Egypt.

“The scars from my childhood experience remind me of how far I have come and how much further I can still go,” Roushangar said.

“What I went through growing up has made me who

I am today. I learned from the negative side of my life to light candles in response to any darkness around me. Regardless of the size of the mountain one has to scale, I have learned to react with the power of love and well-being. I would just hope that no one else has to go through what I did.”



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Senior off to Cambridge on Marshall Scholarship

BMB senior Craig Pearson has been awarded a Marshall Scholarship, making him MSU's 16th Marshall Scholar. Pearson, from Bloomfield Hills, is also majoring in neuroscience and English.

The Marshall Commission provides support to approximately 40 of the most outstanding undergraduates in the country to study at any university in the U.K. Marshall scholarships pay tuition and fees, personal travel, book allowances and a living stipend for up to three years of study.

Pearson plans to pursue his doctorate in clinical neurosciences at the University of Cambridge. His passion for wanting to develop treatments for blindness and other visual impairments stemmed from a high school volunteering experience in which he worked with students who have visual impairments.

"I am thrilled to have been selected as a Marshall Scholar," Pearson said. "It's an

enormous honor and a validation of all the hard work I've put in during my time at Michigan State, and I couldn't be more excited to begin my studies in the U.K."

Pearson, also an Alumni Distinguished Scholarship recipient, a 2013-2014 College of Natural Science Dean's Research Scholar, and a 2012 Goldwater Scholar, serves as an undergraduate research assistant in the MSU Department of Small Animal Clinical Sciences and an undergraduate lab manager and lead undergraduate researcher for the MSU Digital Humanities and Literary Cognition Lab. He also served on MSU's 2013-14 Homecoming Court.



BMB senior Craig Pearson has been named a 2014 Marshall Scholar.

"I look forward to pursuing my doctorate in clinical neuroscience and researching new treatments for glaucoma and other conditions affecting the eye," he added. "I'm humbled and grateful for all the opportunities I've had at MSU and all the people who have helped me along the way—I can't wait to see what comes next!"

BMB senior lands MARC Fellowship

Kelly Montgomery, a senior from Detroit, Mich., majoring in human biology, has been awarded the Spartan MARC Fellowship.

This is the first year of the MARC (Minority Access to Research Careers) program. The program's goal is to increase the number of underrepresented minority students who pursue doctoral degrees in the biomedical sciences. Montgomery works for BMB professor David Arnosti in his Gene Expression in Development and Disease Initiative laboratory, through the BMB Department's IDEAS (Increasing Diversity and Education Access to Sciences) Program.

"I am delighted to have been selected as a Spartan MARC Fellow; above all it has been an enormous blessing," Montgomery said. "The program is ensuring my professional and academic success within the sciences and continually propelling me toward my desires. I am focused on becoming involved with a branch of natural products research, and the MARC program provides the support, resources and encouragement to ensure that my desires become a reality and, for that, I am most grateful."



Kelly Montgomery (left) a human biology senior, works for BMB professor David Arnosti in his Gene Expression in Development and Disease Initiative laboratory.

The MARC fellowship is funded by the National Institute for General Medical Sciences, a division of the National Institutes of Health, and provides research training with a mentor in the student's junior and senior years. The fellowship covers tuition and fees for the fall and spring semesters, and offers a stipend for living expenses.

Li receives graduate poster honors



BMB doctoral student Jie Li won best graduate poster presentation award at the 2013 annual meeting of the Midwestern Section of the American Society of Plant Biology, held at Chicago State University in March 2013. Li's poster was entitled "Identification and characterization of two novel proteins with regulatory and synthetic roles in cell expansion," which is the major focus of his Ph.D. research. Li's Ph.D. advisor is BMB assistant professor Susanne Hoffmann-Benning.



Engineering plants for better biofuel production

BMB professor Christoph Benning and colleagues were initially the “odd people out” at the Great Lakes Bioenergy Research Center (GLBRC) because, while other researchers were primarily focused on making ethanol from crop residues and cell walls, they were trying to synthesize oil in vegetative tissues for use as a biodiesel fuel or other products.



MSU has successfully engineered a plant with oily leaves—a feat that could enhance biofuel production as well as lead to improved animal feeds.

“Now our oil project is distinguishing the GLBRC from other bioenergy research centers,” Benning said. “Ethanol is still the biggest biofuel out there, but the possibilities for using plant oils, especially for biodiesel products, are now an accepted part of the biofuels research.”

During five years of work, Benning and the research team began by identifying five genes from one-celled green algae. From the five, they identified one that, when inserted into *Arabidopsis thaliana* (one of the model organisms used for studying plant biology), successfully boosted oil levels in the plant’s leaves. To confirm that the improved plants

were more nutritious and contained more energy, the research team fed the leaves to caterpillar larvae. The larvae that were fed the oily leaves from the enhanced plants gained more weight than worms that ate regular leaves.

Traditional biofuel research in this area has focused on improving the oil content of seeds because oil production in seeds occurs naturally. Little research, however, has been done to test oil production of leaves and stems because plants don’t typically store fats/lipids in these tissues.

“Now, it’s a proven concept that can be used to boost a plant’s oil production for biofuel use, as well as improve the nutrition level of animal feed,” Benning said.

For the next phase of the research, Benning and colleagues will work to enhance oil production in grasses and algae that have economic value.

“If oil can be extracted from leaves, stems and seeds, the potential energy capacity of plants could double,” said Benning, who believes that the oil produced will burn directly in an engine that uses No.

4 diesel fuel—the type of engines used in trains, ships, generators and power plants (though not in cars or trucks, but that might be another area of research later). “In addition, if algae can be engineered to continuously produce high levels of oil, they can become a viable alternative to traditional agricultural crops used for biofuels.”

Other BMB faculty members on the research team are professor Gregg Howe, associate professor Gavin Reid, and John Olhrogge, University Distinguished Professor of plant biology. 🌱

Alternative fuels research gets a boost with new funding

The U. S. Department of Energy has renewed \$125 million in funding for the Great Lakes Bioenergy Research Center (GLBRC), which extends its funding until the end of 2017.

GLBRC began in 2007 as a partnership between the University of Wisconsin-Madison and MSU, using the original \$125 million five-year grant. The project now includes more than 400 faculty, staff and students from both universities. The goal of the GLBRC is to bolster research on alternatives to fossil fuels and provide a scientific foundation for the large-scale production of advanced biofuels to meet U.S. energy needs.

BMB faculty members are playing significant roles in the GLBRC. Ken Keegstra, University Distinguished Professor of biochemistry and molecular biology, was the scientific director during the first five years of the project and will continue in that role. BMB associate professor Eric Hegg is now the GLBRC associate director at MSU. Hegg also will continue to serve as co-leader of the conversion area, one of four research areas for the GLBRC, and in that capacity serves on the GLBRC management team. Other BMB faculty involved in GLBRC research are Christoph Benning, A. Daniel Jones and Curtis G. Wilkerson.

Two areas where GLBRC researchers have contributed significantly over the past five years are producing oils in the vegetative parts of plants and modifying plant cell walls for use in the production of ethanol.

“Our two major goals for the next five years are overcoming the things that are preventing biofuels from being economical—sustainable production of crops with desirable biofuels characteristics and energy-efficient conversion of biomass into fuels and chemicals,” Keegstra said.

c/o College of Natural Science
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Plant biotechnology symposium breeds success

More than 165 participants gained a broad overview of the latest in plant biotechnology research at the 2nd Annual Symposium on Plant Biotechnology for Health and Sustainability, Oct. 25-26, 2013, on the MSU campus.

The symposium, held in the Molecular Plant Sciences Building, is designed to encourage training opportunities for students in plant biotechnology. The two-day event included a dozen presentations from industry and academia on topics ranging from careers and career paths to the role of plants in the production of pharmaceuticals and biofuels, enhancing human nutrition and the sustainability of modern agriculture.

Participants were enthusiastic about the opportunities that the event provided.

"I really enjoyed the symposium," said Andrew Funk, a Ph.D. student in BMB University Distinguished Professor Dean DellaPenna's lab. "Finding applications for the work we do is something that I put a lot of value in. I like seeing avenues for



Symposium participants listen to a presentation by MSU professor Chris Adami on the "Evolution of Games Microbes Play."

application and hope that the work we do will benefit someone eventually."

In addition to hearing his professor—BMB and Plant Research Laboratory scientist Gregg Howe—present at the symposium, agronomy junior Dalton Ferreira found that the symposium gives students a chance to see what they want to do after graduation.

"It's a great opportunity to hear about what other people are doing and to broaden your knowledge about what's going on in the field," he said.

The symposium, sponsored by the MSU College of Natural Science, is expected to become an annual university event.

Save the date!

All alumni and friends are invited.

John A. Boezi Memorial Alumnus Lecture

Presented by Richard W. Wozniak
Professor, Faculty of Medicine,
Department of Cell Biology,
University of Alberta

April 17, 2014
11:30 a.m. – 12:30 p.m.
101 Biochemistry Building, MSU

Annual Department of Biochemistry & Molecular Biology Banquet

April 17, 2014
5:00 – 9:00 p.m.
Walnut Hills Country Club,
East Lansing, Mich.

R. Gaurth Hansen Lecture

Presented by Heather Hirsch
Senior Scientist in Research
Solutions and Bioinformatics,
Merck Research Laboratories

April 17, 2014
(Hirsch will offer her reflections during the annual BMB Banquet.)