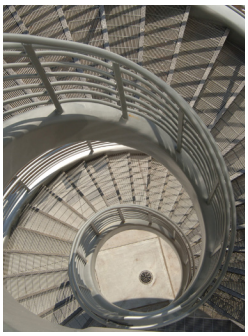


Winter, 2017

Life Scientist

UMD Department of Biology Newsletter

Contents

Letter from the Department Head

Dear Friends,

As I write this, I'm reflecting on my first year as Department Head. My primary realization is that it's a great time to be a biologist at UMD. So much has happened over the past year and I'll do my best to touch on the highlights (since the editor has told me I have limited space). First, we've grown and continue to enhance our diversity with new faculty and staff. We added several faculty last year who've strengthened our excellence in teaching and research, as you'll see in the following pages. These include Dr. Amanda Gruz, Dr. Jessica Savage and Dr. Huai Deng, who were tenure-track faculty recruited in 2015-16 that completed their first full year last year. We also had a successful search for a new Molecular Biologist, Dr. Jessica Sieber, who we are very happy to have transition to the tenure track this year. They are all doing well, building labs, nurturing research programs and recruiting excellent graduate and undergraduate students. We successfully recruited instructors Dr. Mark Osadjan and Dr. Katie Nemeth, who did an excellent job in their first year. Also, Dr. Joanne Itami, who was instrumental in developing our new curriculum, transitioned to full-time instructor last year.

All faculty and staff have contributed to our goals of implementing the curriculum that highlights the Bachelor of Science tracks in Ecology, Evolution and Behavior and Cell, Molecular and Development as well as the Bachelor of Arts tracks in Human Biology and Life Science. This new program continues to amaze us not only in popularity, but the high quality of students we are recruiting. Another critical aspect of our success includes our new office manager, Kathy Stewart, who has done an excellent job of facilitating grant submissions, new hires (see in the sections below), interactions with Human Resources and too many other things to name.

We've said goodbye to some old friends who we will certainly miss in the coming years. Lyle Shannon and Deb Shubat, who were both vital members of our department for more than 30 years, retired this year. We said farewell to Dr. Matt Andrews, who served as Biology Department Head for several years and the initial Director of Graduate Studies for the Integrated Biosciences Program. Dr. Andrews moved on to an Associate Dean position at Oregon State University last August. Also, we said goodbye to Doreen Wallace, who was our office manager for many years. We hope they, and all others who've shared in life experiences in the department, come back to visit.

UMD continues to feel the burden of increased costs and budget shortfalls. While Biology will shoulder a share of that, we continue to benefit from the hard work of faculty who continue to solicit external funding from state and federal granting agencies. We also are grateful recipients of generous gifts from our donors. I'd like to extend a huge thank you to all of you for your hard work and thoughtfulness that helps us in this difficult budget climate. We wouldn't be leaders without you.

Sincerely, Tom Hrabik

Spotlight on Outreach

This issue of Life Scientist highlights the work Biology students, faculty and staff are doing to engage with the surrounding communities to encourage interest in science, technology, engineering and math (STEM). Through workshops, mentorship, hands-on activities, our Outreach Program engages young people of all backgrounds to get excited about biology. Learn about some of the events that occurred during the past academic year and read an interview with Dr. Jennifer Liang about her outreach work. We conclude with an interview with Biology senior Matthew Ang.

Iron Range STEM Showcase, Hibbing MN

- In October, 2016, over 1,200 6th graders got hands-on with owl pellet dissections, idenifying animal signs and visiting the glow fish booth.

Science and Engineering Day, UMD Campus

- Middle and High schoolers came to UMD on Oct. 16th to learn a bit about genetics with Glow Fish observations with Dr. Jennifer Liang and Biology undergraduates.

Science on Tap

- The *Science of Brewing* was the topic of the first ever Science on Tap event on Nov. 12th, hosted by Bent Paddle. Biology booths helped adults learned about the role microbes play in fermentation, had a close-up look at different species of hops, and learned how to identify when good beer goes bad. Over 300 people attended this inaugeral event.

CLOCKWISE FROM TOP: Biology professor Dr. Jessica Savage demonstrates the effects of light on plant cells by making "leaf tattoos" at the 2016 Science and Engineering Day; IBS graduate students Charlie Liggett and Jolene Prochazka along with Greenhouse Manager Matt Jahnke help visitors learn about how humans domesticated crops; Biology Club Members Emma Licht (l) and Shannon McCallum (r) talk about Kambaucha and the fermentation process at Clyde Iron Works.

- The *Science of Food* (March 30th), held at Clyde Iron Works, was an interactive evening where guests could sample and learn the science behind about different foods like Kombucha (fermented tea) and lutefisk and discover techniques in molecular gastronomy. Other booths focused on the history of crop domestication and historical techniques that were used to prepare and store seasonal foods.

K-12 STEM Activities

- Biology faculty, staff and students throughout the academic year, participated in a variety of in-class and after school STEM activities. Lessons included *Superheroes of the Boreal Forest*, *Owl Pellet Dissection Lab*, *Body Defenders*, *Amazing Animal Adaptations* and *Bacteria is Everywhere*.

Please contact the SCSE Outreach Coordinator for any outreach questions or requests at scsek12@d.umn.edu.

Interview with Dr. Liang

Dr. Jennifer Liang was awarded the faculty SCSE Spirit of Service Award for Outreach this spring. She has been a dedicated and inspirational member of the Department of Biology and we interviewed her to find out more about her work with outreach.

Can you tell us about how you incorporate outreach into your undergraduate classes? Outreach can be done in a range of scales. An example of large scale outreach would be BIOL3001 Outreach to the K-12 Science Classroom. This course was entirely devoted to students developing and teaching their own lessons. For classes such as Genetics Lab or Developmental Biology, I have independent projects and doing a service learning project is always an option. Lastly, I do one-off events where students can sign up for as little as one hour to teach children about science. My latest favorite activity is to bring cockroaches to K-12 classrooms.

"Outreach isn't just about teaching content; it's about changing attitudes about science."

How does outreach benefit undergraduate students? Creating and presenting a hands-on science lesson is a great way to introduce undergrads to new ways they can give back to their community. In general, the undergraduates at UMD are excited about these kinds of opportunities and are looking for them. These students are going to graduate and become the scientists of their communities. If they already have a foot in the door with these sorts of experiences, it will help them get started with their own ideas for community outreach. Outreach also offers leadership opportunities and increases confidence. Students are comfortable with the content that they would use to teach a younger student, they can start to think of new and creative ways to convey information.

How does the community benefit? It is really surprising how kids pick up phobias and dislikes. One of our goals is to change students' attitudes about biology and science. The hissing cockroaches have been wonderful in accomplishing this. To get someone to hold the cockroach and look at it as a really cool organism instead of something yucky or scary reminds students that biology and science are cool and fun. Outreach isn't just about teaching content; it's about changing attitudes about science.

NAME: MATTHEW ANG, SENIOR
MAJOR: BIOLOGY
CAREER ASPIRATION: DENTISTRY

What first prompted you to sign up for your first outreach lesson?

Our dental club president mentioned that members had the opportunity to volunteer at the elementary schools in Duluth, and the excitement of mentoring young students is always something I look forward to.

What was your favorite Outreach lesson?

My favorite lesson was the owl pellet dissection lab. Most students had never encountered a pellet and jumped at the chance to pick it apart. They found everything from fur to feathers, and even a surprising number of bones. Towards the end, students wanted to show off what they found through the microscopes we provided.

What do you enjoy about teaching STEM?

The enjoyment comes from witnessing the kids' hesitancy or curiosity towards science turn into excitement and fun. More specifically, I love answering questions in spurts of ten or twenty at a time.

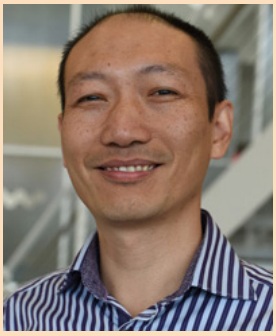
Any funny stories you remember from your outreach experiences?

After one of our lessons, one girl wanted to guess the age of all the leaders. She guessed all of them within a year or two based on where we attended college until she sized up my friend Brandon "Bearclaw" McCormick, who is 6'5". She stared up at him and said, "Now how old are you supposed to be?"

What did you think about receiving the SCSE Spirit of Service Award for outreach?

Receiving the award shows that I can make a lasting positive impression on my community by simply volunteering whenever I can.

Meet Our New Faculty

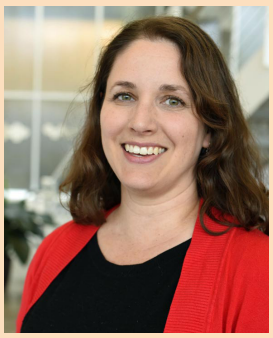


DR. HUAI (HOWARD) DENG, PH.D.

Huai (Howard) Deng joined UMD Biology department in Fall 2016 as an assistant professor. With expertise in cellular, molecular, and developmental biology, Dr. Deng uses the fruit fly (*Drosophila*) to study the novel functions of the key detoxifying factors, Keap1-Nrf2, in epigenetic and developmental regulations. This research will help our understanding of how environmental toxins shape development and cause diseases at molecular level. The Deng laboratory is also interested in visualizing protein interactions on chromatin using fluorescence imaging, and has recently published a protocol for this new method. Dr. Deng desires to share his academic experience with students through both classwork and lab-mentoring. He has brought up-to-date scientific topics and technologies, as well as his original research, into BIOL 3100 Cell Biology and BIOL 4199 Frontiers in Cell Biology. Graduate student Jennifer Carlson and two UROP-supported undergrads, Michaela Tonsanger and Charles Smith, are currently working on different projects in the Deng lab.

DR. AMANDA GRUSZ, PH.D.

Dr. Amanda Grusz joined the Department of Biology at UMD in Fall, 2016 following her previous post as a Postdoctoral Researcher at the Smithsonian Institution, Washington, DC. Her interests include botany, natural history, genetics, genomics, chromosome biology, and evolution. Dr. Grusz uses molecular and morphological approaches to study diversification in plants. Current projects in the Grusz lab include: biogeographic, evolutionary studies of cross-continental hybridization in the Cliff Fern genus, Woodsia, on the Laurentian Shield; bioinformatic analysis of genome structure in early vascular plants, with a focus on the evolution of "jumping genes" and their implications for genome size and function; as well as range-wide studies of reproductive mode (sexual vs. asexual) and population genetics in the New World desert fern. The Grusz lab includes Josh Horky (Lab Manager and Research Associate), undergraduate researchers Blake Fauskee (UROP), Patrick Fehrenbach (UROP), Amanda Vu (Pathways program), and Ashley Marcuson (Bridges program). Graduate student Ashley Zenzen joined the lab as an exceptional undergraduate with a gift for mentoring and will continue focusing on natural history, taxonomy, and evolution.



DR. KATIE M. NEMETH, PH.D.

Dr. Katie Nemeth, assistant professor, joined the Biology Department as an instructor in Fall, 2016. She completed her doctoral work in Biomedical Sciences at St. Jude's Hospital through the University of Tennessee. Her training was in cancer research and preclinical pediatric studies. During her post-doctoral work, she sought out educational training opportunities, which lead her to become a National Academies Educational Fellow in the Life Sciences. She conducted and published an educational study focusing on students' misconceptions in science.

She is excited to continue her strong interest in education in our department. Her passion is in designing active learning and inquiry-based labs. She not only wants the students develop skill sets, but to also foster their wonderment of science. With her freshman course, she has implemented an experiential lab where students learn vital group communication skills in a lab setting. Her current classes include General Biology, Senior Seminar and Genetics Lab.

DR. MARK OSADJAN, PH.D.

Ever since growing up on a farm in northern Illinois, Mark has been interested in how life persists in stressful environments. This interest ultimately led him to earn a Ph.D. in molecular and integrative physiology in 1997. Since that time, Osadjan has taught at the University of Colorado-Boulder, the University of Chicago, and now at UMD, involving many aspects of human and animal physiology, general biology, gender studies, nutrition, and exercise science.

Dr. Osadjan joined UMD's Department of Biology in Fall, 2016 to expand the human biology program. His current focus is to teach Human Anatomy and Human Physiology. He looks to develop related offerings over the coming years for both biology majors and non-majors. He's always looking to involve students in his projects, and he welcomes ideas for new classes.

DR. JESSICA SAVAGE, PH.D.

Jessica Savage is a plant physiologist/ecophysiologist who received her Ph.D. in Plant Biological Sciences from the University of Minnesota Twin Cities. Prior to moving back to Minnesota, she completed a postdoctoral position at Harvard University investigating the physiology of sugar transport in plants. She also worked as an independent research fellow at the Arnold Arboretum at Harvard studying floral physiology. This spring, Dr. Savage received a grant from the National Science Foundation to investigate how the vascular system impacts seasonal changes in plant growth. This research is focused on understanding what determines the timing of leaf out and flowering (i.e. plant phenology) in woody plants. She also received a Sinnott Award to start a new research project at the Arnold Arboretum this summer. Two Master's students, Natalie McMann and Erin O'Connell, are in her lab group as well as several undergraduates. Dr. Savage developed new curriculum and labs for BIOL 4604 Plant Physiology this spring. and is teaching BIOL 2802 Ecology Lab and the graduate level IBS 8011/8013 Integrated Biological Systems this fall.

DR. JESSICA SIEBER, PH.D.

Jessica Sieber joined the faculty as an assistant professor in Fall, 2017. Her research relies on a diversity of techniques to elucidate microbe-microbe and microbe-host interactions. Each human harbors and maintains a microbiome that is unique to that person's diet, environment, genetics, and ancestry. Understanding how alterations of the microbiome influence overall metabolic function is important for human health. In addition, she is applying what she has learned about these interactions and microbial physiology to the microbiota of the hibernating ground squirrel. The gut microbiome of hibernating mammals contains many uncultured microorganisms that are also in humans. By studying individual microorganisms from these animals, we can begin to understand how a microbiome survives and thrives in the intestine during the drastic changes that occur during hibernation. These microbes may play a critical role in fat metabolism and vitamin production to benefit the host. Dr. Sieber will be teaching BIOL 4231 Molecular Biology.

This year's award winners are pictured on Swenson Science Building's spiral staircase.

2017-2018 Scholarships and Awards

The generosity of alumni and friends make it possible for the Department of Biology to present annual awards and scholarships to students within the department. this year's reception was held on April 21, 2017. Congratulations to this year's recipients!

A. JANE BERRY WARREN MEMORIAL SCHOLARSHIP
- Abbygail Coyle

CRISTINA MARIE SHERER GUIMARAES MEMORIAL SCHOLARSHIP
- Emily Hartman

ED AND ALMA TURCOTTE SCHOLARSHIP
- Cindy Leung, Allison Krueger, and Vaughnetta Ngaling

ERNEST AND TYYNE NIEMI SCHOLARSHIP
- William Otten

MCCABE SCHOLARSHIP
- Shelby Muscha

MOWBRAY SCHOLARSHIP IN THE BIOLOGICAL SCIENCES
- Alayna Mackiewicz

PETERSON MEMORIAL SCHOLARSHIP
- Emily Johannsen

SIKANDER M. KARIM PRE-VETERINARY AWARD
- Noah Olson

DR. T.O. ODLAUG MEMORIAL SCHOLARSHIP
- Shane Johannsen, Rachel Veillette, and Shayla Stoterau

EXCELLENCE IN ACADEMICS AND RESEARCH AWARD
- Emma Licht

T.O. ODLAUG OUTSTANDING SENIOR BIOLOGY STUDENT AWARD
- Loranzie Rogers, Jr.

OUTSTANDING GRADUATE TEACHING ASSISTANT AWARD
- Madaline Cochrane, Fatima Alwan and Jennifer Krznarich

OUTSTANDING UNDERGRADUATE TEACHING ASSISTANT AWARD
- Bailey Rasmussen

OUTSTANDING FRESHMAN BIOLOGY STUDENT AWARD
- Hanna Anderson

BIOLOGY ALUMNA NAMED TO SCSE ACADEMY

Dr. Lisa Schulte Moore , M.S. Biology 1996, was inducted into the SCSE Academy of Science and Engineering on September 8, 2017. Dr. Schulte-Moore spent the day on campus where she meet with faculty, had lunch with current graduate students and presented a seminar to the Biology community. She came to UMD with a B.S. in Biology from the University of Wisconsin Eau Claire and earned a Ph.D. in Forestry at the University of Wisconsin Madison. Dr. Schulte Moore is now a professor in the Department of Natural Resource Ecology and Management at Iowa State University. Her research addresses the strategic interaction of perennials into agricultural landscapes to meet societal goals for clean water, healthy soils, abundant wildlife and inspiring recreational opportunities. She is the co-founder and co-leader of the Science-based Trials of Rowcrops Integrated with Prairie Strips (STRIPS) project which pioneered the prairie strips conservation practice. She lives in Ames, Iowa and also spends time at a diversified family farm near Strum, Wisconsin.

Acting Dean Andrea R. Schoekker and Dr. Lisa Schulte-Moore

Gifts to the Department

The department of biology warmly thanks the following alumni and friends who supported our students and programs with a charitable gift.

Thomas Becker, M.D. & Caroline Boehnke-Becker, M.D.
John M. Bernard
Edward T. Bersu
Jon C. & Suzanne C. Birch
George E. & Elaine D. Ahlgren
Timothy A. & Sally T. Buck
Theron E. Odlaug
Matthew & Katherine Andrews
Adam P. Foss
Matthew E. Cousins
Dennis P. & Claudia M. Casey
Eric S. Goldschmidt
Briana Gross
Jennifer G. & Steve Pacheco
Kathy Enghauser
Karen Stauber
Nancy Averill
Margaret T. Dooley
Kevin B. & Sharon W. Dooley
Hollie L. & Barbara Collins
Kriste A. Ericsson
Daniel R. Engstrom & Barbara A. Coffin
Cynthia L. & Bruce C. Roskaft
Jerome W. & Beth L. Fahrmann
Dr. Omar F. S. & Susan Guimaraes
Barbara C. Farrell
Dorace J. Goodwin
Kenneth & Linda L. Holmstrand
Betty J. Foster
Paul T. & Helen B. Hanten
Drs. Brent M. & Dayle K. Haglund
Donn T. & Paula E. Johnson
Philip D. Loucks
John C. & Barbara Jo S. Kohlstedt
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Dr. Jerome A. & Harriet Klun
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Dr. Gerald J. & Bonnie B. Niemi
James E. Niemi
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Ann M. Hupperts
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Kay J. Williams & Bernard J. Battig
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Eleanor A Robien Trust
Margaret T Dooley Trust
Despain-Odlaug Thoughtful Fund - Fidelity Charity

Faculty News

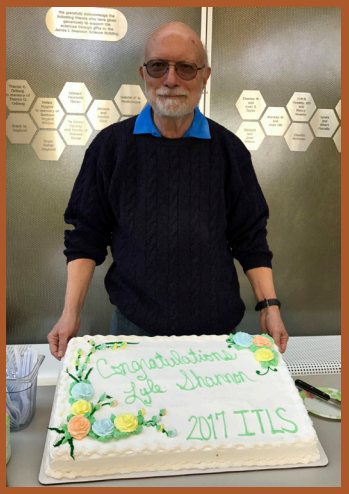
Dr. Huai Deng is serving as book volume editor "Nrf2 and its Modulation in Inflammation" in the *Progress in Inflammation* book series.

In 2017, ***Dr. Julie Etterson*** and her colleagues completed a long-term seed banking project of wild populations (> 5 million seeds) that will provide research material to study evolution in response to climate change and other anthropogenic forces over the next 50 years across the United States.

Dr. Ron Moen was awarded the Distinguished Moose Award from the journal *Alces*, a journal devoted to the biology and management of moose.

Dr. John Pastor's paper was invited for the 20th Anniversary edition of the journal *Ecosystems*; was awarded the David W. Schindler Distinguished Ecologist Award from Trent University.

Prof. Gerald Niemi, along with a host of colleagues, completed a nine year project on Minnesota's first breeding bird atlas. The atlas summarizes the historic and current distribution and abundance of 249 bird species that are known to nest in Minnesota. In addition, the atlas website summarizes breeding habitat, population abundance, and conservation status of these species. It is the first comprehensive summary of Minnesota's breeding birds since the 1930s. The public website can be found at *https://nbirdatlas.org*



Instructor Lyle Shannon retired in December, 2017 after teaching for over 20 years in the Department of Biology. While Lyle was an outstanding teacher, he will be most remembered for his sense of humor, his hawaiian shirts and his devotion to his students. Lyle was awarded the UMD Chancellor's Award for Excellence in Teaching in 2013 and he was named SCSE Outstanding Faculty Advisor. in 2008. Lyle was awarded the Department of Biology's Inspirational Teacher of the Life Sciences awarded twice. He was the inaugeral winner in 2009 and, in 2017, the selection committee gave the award to Lyle in recognition for his career as an outstanding educator. Lyle Shannon was honored at a reception for receiving the 2017 Inspirational Teacher of the Life Sciences Award on March 31st. The title of his seminar was "Trust me, I'm a Scientist: Promoting Science in an Era of Fake News." The entire department wishes Lyle and his wife, Terrie, much happiness.

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Spotlight: Ozersky Lab

While Winter Ecology is one of the main areas of research in Dr. Ted Ozersky's lab at the Large Lakes Observatory, work does not slow down during summer months. Graduate students Kirill Shchapov, Andrew Camilleri and Felicia Williamson are busy conducting field sampling, lab research and reporting on their findings. on the food web of Lake Superior, harmful algal blooms and invasive mussels

Kirill Shchapov (PhD), pictured above last winter with his sled and ice auger, works year -round examining how the organisms of the lake survive and behave throughout a full annual cycle. Almost nothing is known about the biology of Lake Superior in winter and Kirill is undertaking the first study to examine the world below the ice. This work will help to better understand and predict how the ecosystem, water quality and fisheries of Lake Superior and other large lakes will be modified under changing climate conditions.

Andrew Camilleri (MSc) spent his first field season snorkelling at 40 different places along the shores of Lakes Superior and Michigan. He is working to understand how environmental conditions affect the growth of bottom-dwelling algae, which can pose a serious threat to ecosystem health if proliferating in excess. Andrew is deploying experimental algal colonization tiles and sampling water quality from near-pristine northern Lake Superior to some of the most polluted parts of the Great Lakes in Green Bay, WI.

Felica Williamson (MSc) has spent the past two years researching how invasive zebra mussels affect lakes throughout Minnesota, and has written her thesis on the topic. Her work showed that invasive zebra mussels can affect the way important elements are cycled in lakes, with consequences for productivity and water quality. This may help predict which lakes are more susceptible to being negatively affected by zebra mussel invasions, improving prioritization of introduction prevention measures.

In addition to continuing their current research this fall and winter, the Ozersky' lab will be starting a new, NSF-funded project to study the effects of invasive quagga mussels on sediment and water chemistry and the ecological health of the Great Lakes.