



Michigan Technological University
Biological Sciences



Fall 2019 Newsletter

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About the Department

Greetings from the Department of Biological Sciences at Michigan Tech! We have had a tremendously productive year. Our faculty, staff and students are actively engaged in diverse research topics ranging from vaccinology, diabetes, cancer, bioenergy, CRISPR/CAS9-mediated genome editing and ecology of the Great Lakes. Every year, hundreds of students are engaged in “hands-on” research from their freshman year. We are always striving to provide the best opportunities for our students, and the next few years promise even further expansion. However, we still have many big needs in the areas of laboratory improvements and student scholarships. Your support will help us to get to where we want to be. Please stop by the department office (Room 740) on the 7th floor of Dow Building whenever you are in the campus vicinity. We would be very pleased to meet with you and arrange a tour of the teaching and research laboratories during your visit. We always welcome our Alumni and friends!

With best wishes,

Shekhar Joshi

Chandrashekhar Joshi, Professor and Chair, Department of Biological Sciences
Contact Dr. Joshi at cjoshi@mtu.edu or 906-487-2738



What are our faculty doing for educating students?

Rupali Datta's research involves the use of phytotechnologies to degrade or remove pollutants from contaminated soil and water.

John Durocher is researching how can lifestyle strategies (fitness, sleep, mindfulness) improve cardiovascular health?

Karyn Fay teaches and mentors all the future Medical Lab Scientists that will soon be working in our hospitals and clinics.

Paul Goetsch's research aims to understand how multiple cell types originate from one cell and one genome.

Mike Gretz is interested in studying algal extracellular polymers and Biocomposites.

Erika Hersch-Green is a plant community evolutionary ecologist who studies plants and their interactions with other community members including plants, herbivores and pests, and pollinators.

Casey Huckins' research has focused on the conservation of native species, limiting the effects of introduced species and restoring systems such as rivers and the populations they support that have been degraded by the actions of humans.

Shekhar Joshi works on genetically engineering bioenergy crops and trees to improve biofuel production from woody materials.

Charles Kerfoot researches on various aspects of the Great Lakes and surrounding area. Recently he worked with several agencies for remediation of stamp sands in Grand Traverse Bay.

Amy Marcarelli is fascinated by the small things that are sometimes ignored or discounted - small streams and the Great Lakes, small biogeochemical fluxes, and small organisms. She studies the connections among these small things that make ecological systems more diverse and stable.

Brigitte Morin teaches classes in clinical health sciences and human anatomy and physiology.

Jill Olin is studying species- and food web-level responses to environmental stressors using combined dietary biomarker, ecological and modeling approaches.

Gord Paterson investigates how environmental pollutants can provide insight regarding how energy and nutrients flow through food webs and the potential consequences to ecosystems such as the Great Lakes.

Guiliang Tang has been working on setting up the MTU Blueberry Research Station (MTUBRS). He has propagated tens of thousands of blueberry seedlings of 16 different varieties to be planted at the Research Station.

Mark Tang is researching how can we inhibit cancerous tumor movement and invasion from one organ to another?

Xiaoqing Tang is researching pancreatic beta-cell growth to provide valuable therapeutic strategies for type 1 and type 2 diabetes.

Steve Techtmann is exploring how we can use bacteria in the Great Lakes to help clean up environmental contamination.

Ebenezer Tumban designs, develops and tests candidate vaccines against the HPV virus, Zika Virus and Chikungunya virus.

Thomas Werner studies fruit fly genetics to answer questions such as: How do animals get their diverse color pattern? How can eating deadly mushrooms be survived?

Traci Yu wants to understand the brain mechanisms underlying the therapeutic effects of Deep brain stimulation (DBS) for Parkinson's disease.

Please visit <https://www.mtu.edu/biological/people-groups/faculty-staff/> for more information

Faculty Promotions and Tenure

Congratulations to the following biological sciences faculty members who were promoted in the 2017-18 academic year:



Dr. John Durocher, Assistant Professor, was promoted to Associate Professor with tenure. John has done extensive work in the fields of applied human physiology and exercise physiology. Much of his research has involved the study of how the sympathetic division of the autonomic nervous system regulates arterial blood pressure at rest and during a variety of stressors. John's other passion relates to the specificity of exercise testing and prescription, especially with hockey players and runners.



Dr. Ebenezer Tumban, Assistant Professor, was promoted to Associate Professor with tenure. Dr. Tumban is a molecular virologist and vaccinologist; in the past, he conducted research studies aimed at understanding the molecular determinants of arboviruses (such as dengue and Langkat viruses) mode of transmission. He also researched and developed antigens that could be used to develop immunodiagnostic kits for diagnosing infectious agents. Most recently, Dr. Tumban's research has been focused on the development of next-generation vaccines against human papillomaviruses (HPVs)—the causative agents of some human cancers (cervical and anogenital cancers).

Faculty and Staff Changes



Dr. Trista Vick-Majors - Assistant Professor, Biological Sciences

Dr. Trista Vick-Majors has joined the Department of Biological Sciences as an assistant professor in fall, 2019. She grew up in Calhan, Colorado and completed her BA in Biology at Colorado College in 2003. Vick-Majors spent two years studying the microbial ecology of hot springs at the University of Nevada-Las Vegas and graduated with her MSc from Montana State University in 2010. Vick-Majors earned her PhD in Ecology and Environmental Sciences from Montana State University in 2016. Her current projects focus on the connections between microbial communities and the cycling of dissolved organic matter in boreal aquatic environments, nitrogen cycling in the oligotrophic North Pacific, and on microbial communities in alpine lakes.



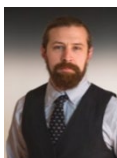
Raquel Heitor – Office Assistant, Biological Sciences

Raquel joined the Department of Biological Sciences in fall 2018 as the new office assistant. She graduated from Western Connecticut State University with a biology degree, with a focus on ecology. Before coming to Michigan Tech, she was an intern at the Beardsley Zoo in Bridgeport, Connecticut working with wide range of species from the rainforest.



Travis Wakeham – Academic Advisor, Biological Sciences

In July of 2019, Travis Wakeham accepted a new role in our department as the Academic Advisor. Travis has been with the department as our lab supervisor since December of 2016 and is one of our MTU Alumni as well. When we started looking for a new Academic Advisor we did not have to go far to find someone who could step into the role. We are very excited to have Travis on board in his new role!



John Romanowski Jr. – Lab Supervisor, Biological Sciences

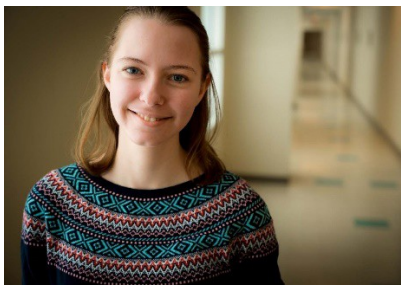
John Romanowski joined Biological Sciences in October, 2019. He graduated from Central Michigan University with a Master of Science in Biology. He has extensive background working in labs and before coming to Michigan Tech, he was a lab supervisor at Boston University.



Marc Madigan – Academic Advisor, Biological Sciences

In July of 2019, Marc Madigan accepted a new role as the Director of Financial Aid at Gogebic Community College in Ironwood, MI. An alumnus of Michigan Tech Biological Sciences, Marc served as the department's Academic Advisor for 2 ½ years. Even though he is leaving Michigan Tech, he insists that the Keweenaw will always be home, and that he will always remain a Husky at heart.

Undergraduate Student Spotlight: Tessa Steenwinkel



Within one year of undergraduate research at Michigan Tech, Tessa Steenwinkel went from assisting in Dr. Thomas Werner's genetics lab to co-authoring his book. She is majoring in Biochemistry and Molecular Biology-Biological Sciences with a minor in Pharmaceutical Chemistry. Originally from the Netherlands, Tessa has lived in the United States since she was 12 years old. Growing up with a brother who has Down Syndrome drew Tessa to science at a very young age. Her desire to explain to her peers why and how her brother was different led to a later interest in fertility and early development.

She met Dr. Werner as a high school student visiting Tech during Preview Day weekend. He opened up his genetics lab for tours, and Tessa knew then that she wanted to be a part of his research team.

She started in the fall of 2017 washing lab equipment, quickly transitioned to a research assistant, and then laboratory manager. Biologists use fruit flies to study wing spots, metabolism, and aging. This is important because the same genes and major metabolic pathways in fruit flies affect cancer and other diseases in humans. Dr. Werner's book was published in 2018 with an interesting new chapter. Tessa wrote a children's bedtime story about fruit flies that is now included at the end of the book. Now, rather than just being a scientific field guide, *Drosophilids of the Midwest and Northeast* includes a significant outreach component that hopefully speaks to young children and gets them excited about science and nature.

Tessa became the first recipient of the Soyering Foundation Scholarship last Spring. The scholarship is available exclusively to Pavlis Honors students expressing interest in research and innovation related to water quality management, renewable energy, or solutions to prevent and cure cancer. Tessa is a Pavlis Honors student in the Research Scholars pathway. Last summer, Tessa completed her immersion experience here at Tech on a research project that focused on the evolution of color patterns in animals.

This past fall, Tessa became the first undergrad in Dr. Werner's lab to start her own research. She was given the autonomy to develop and set up the project for this academic year herself. Earlier this year, Steenwinkel was honored as the Departmental Scholar in Biological Sciences, and was the recipient of the Provost's Award for Scholarship. She is also Michigan Technological University's 11th recipient of the prestigious Barry M. Goldwater Scholarship.

Her plans for the future include finishing her bachelor's degree in fall 2020 and earning an accelerated master's a year later. She plans on pursuing a PhD and eventually working in a laboratory conducting medical research.

Graduate Student Spotlight: Sarah LewAllen

Sarah LewAllen, a Biological Sciences Accelerated MS student from Rochester Hills, Michigan, had never been to the UP prior to her first Michigan Tech campus visit in the summer of 2013. "When I stepped on campus," she said, "I just had a feeling that Michigan Tech would be the place for me both academically and athletically. I loved the size of the school, the beautiful location, and the community that made Tech feel like my second home. I accepted an athletic scholarship from the women's basketball team before I even left campus – that's how sure I was I wanted to be here."

Through her coursework and her interest in human physiology, Sarah found a perfect fit conducting research in Dr. John Durocher's lab. "Mindfulness played an essential role in keeping me grounded through the rigors of college athletics and balancing life as a student-athlete, so when I hear about Dr. Durocher's work in mindfulness meditation and cardiovascular health I wanted to get involved," LewAllen said. "I started working in his lab as an undergraduate, and during that time he encouraged me to pursue an accelerated master's so I could continue working on research that I was interested in."

So, Sarah did just that. She began taking graduate-level courses in her senior year. She graduated with a double major in Medical Laboratory Sciences and Exercise Science in Spring 2019, and is on-track to graduate with an MS in Biological Sciences in Spring 2020.

Sarah's research is focused around two different but related projects. The first is the continuation of her URIP (undergraduate research internship program) study, "*Decentering, Acute Meditation, and Arterial Stiffness*," for which she earned funding from the Biological Sciences department and Portage Health Foundation. This project investigates the effects of a 1-hour acute meditation session on cardiovascular variables in both hypertensive and normotensive adults.

The second is a component of Dr. Durocher's NIH-funded "*Mindfulness and Neural Cardiovascular Control in Humans*" study. This project studies the efficacy of an 8-week mindfulness meditation protocol on improving blood pressure dipping patterns, arterial stiffness, and muscle sympathetic nerve activity (MSNA) in adults who have hypertension.

After graduation, she plans to complete her clinical practicum at a hospital and become an ASCP certified Medical Laboratory Scientist.

From there, she aims to become either a traveling Medical Lab Scientist or work in industry. Further down the road, a PhD might even be in the picture. "To me, that's the best part about going through the Master's program -- the breadth of opportunities and possibilities available to graduates because of the experiences offered at Michigan Tech."



Faculty Spotlight: Gord Paterson & Jill Olin



Gord Paterson and **Jill Olin** came to Michigan Tech's Biological Sciences department from the State University of New York system in January of 2017. Dr. Paterson is an Assistant Professor and ecotoxicologist who received his PhD from the University of Windsor's Great Lakes Institute for Environmental Research in Windsor, Ontario Canada. His research interests include the environmental fate and behavior of emerging pollutants such as nanoparticles and pharmaceuticals, in addition to understanding the importance of overwintering on the bioaccumulation of pollutants such as PCBs, DDT and mercury. "Winter is one of the most understudied periods of the year when it comes to understanding the environmental behavior of pollutants such as DDT and mercury in aquatic organisms and freshwater food webs," Paterson said. "Thus, Michigan Tech's location is perfect for this area of my research!"

As a member of Michigan Tech's Great Lakes Research Center, Dr. Paterson is excited to continue a research career focused on Great Lakes science. "All of my graduate, post-doctoral and faculty research has been exclusively within the Great Lakes basin and the ability to continue to do so among a group of similarly engaged faculty and research scientists is exciting to address and understand the various threats to these ecosystems".

Dr. Paterson also teaches courses in Biochemistry, Fish Biology and Environmental Toxicology. "Students are highly engaged in their coursework at Michigan Tech and I feel fortunate to be able to contribute to their education and develop my own pedagogical skills to become the best instructor I can be."

Dr. Jill Olin is a research scientist in the Great Lakes Research Center. She earned her PhD at the Great Lakes Institute for Environmental Research followed by post-doctoral positions at Louisiana State University and Stony Brook University. Dr. Olin is a food-web ecologist whose research includes the effects of stressor events such as the Deepwater Horizon oil spill in the Gulf of Mexico and Hurricane Sandy on the Eastern Seaboard. "Both the Deepwater Horizon and Hurricane Sandy events were significant stressors on the coastal

aquatic ecosystems in these affected areas and such major disruptions tend to reorganize food-webs by altering predator and prey abundances and feeding relationships. However, the magnitude of such responses is difficult to quantify using traditional field counts and animal sampling."

By using biochemical and environmental markers or tracers such as fatty acids and stable isotopes, Dr. Olin's research can determine and demonstrate the responses of individual species and populations to such large-scale events and provide important information regarding species most at risk to changes in their environment. Dr. Olin also considers herself fortunate to conduct research on a variety of marine top predators, including bull sharks, skates and sawfish; "These species tend to be feared and misunderstood but have highly important roles in structuring marine food-webs. The more we can understand about their biology and ecology, the more we will be able to protect and conserve these animals."

Both Dr. Olin and Dr. Paterson are excited to be members of the Michigan Tech community and have adapted well to life in Michigan's UP. "In addition to winter activities such as fat-biking, snow-shoeing and skiing, we also love hiking, running, mountain biking and all of that the UP has to offer throughout the year!"



Nationally Accredited Medical Lab Science Program Serves Critical Need



It took four years and stacks of documentation, but Michigan Tech's Medical Laboratory Science program has earned first-time accreditation by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS).

Chandrashekhar Joshi, chair of Michigan Tech's Department of Biological Sciences—which houses the Medical Laboratory Science (MLS) program—said the effort was “enormous. We are extremely excited to see all this hard work, under the leadership of program director Karyn Fay, come to fruition.”

The need for medical laboratory scientists is enormous, particularly in rural areas. Fay called the situation “a crisis. If we can't graduate qualified people, hospitals are going to start hiring less-qualified people,” she warned.

Michigan Tech has taught medical laboratory science since 1941, originally as medical technology. It has evolved over the years to medical lab science, which is the major diagnostic arm of medicine. The question about accreditation arose when more and more hospitals—where MLS students must do a six to nine-month practicum after they earn their Bachelor of Science in Medical Laboratory Science—stopped supporting and started closing their accredited education programs. There are now only three hospitals in Michigan accredited to offer the MLS practicum, required before graduates can take national boards and get certified, Fay explained.

The five-year accreditation—the longest initial accreditation offered by NAACLS—enables the University to affiliate with hospitals throughout the Upper Peninsula, elsewhere in Michigan, Wisconsin, Minnesota and across the country. Already, Michigan Tech has affiliated with 11 new hospitals where MLS graduates can do their practicum.

“This allows us to grow our program,” Fay said. Tech's MLS program now has about 80 students who are spending three or four years in classes and labs on campus plus completing a practicum. There is such a demand for medical laboratory scientists that every graduate of the Michigan Tech program gets three or four job offers, often before they have even graduated, said Fay. They usually earn a starting salary of around \$50,000, and wages are going up as the need for qualified lab scientists increases. “There is such a shortage of workers that hospitals are eager to affiliate with us,” Fay said.

“We are lucky to have such amazing medical laboratory scientists and teachers running this program,” Joshi said.

Q&A with This Year's University-wide Teaching Award Winner Thomas Werner

Q: What does this award mean to you?

A: It is very heartwarming to get this recognition from the students; I think that it's like, yeah, those students actually seem to like me! When you teach and look out into the class, I often see the students have a good laugh each session for the first couple of weeks. And then, during the following weeks of the semester, it is harder to see the students enjoying the class because they wear out a bit and get very busy. You sometimes feel like you lost them. Or maybe I lost some steam, too. And then you find a letter in your mailbox that you are nominated for the teaching award. Thinking about the long winters here, I would call teaching a powerful antidepressant. I get an adrenaline kick when I go to class and interact with the students. That's definitely the highlight of my day.

Q: How would you describe your teaching style?

A: Relaxed. German. Well, maybe relaxed and German don't go together. It's very organized. I make good slides and post them before the semester begins. The

slides are beautiful with not too much text; put the text in the right size, have nice pictures. Good storytelling is key, and I try not to ramble or squish things in. Sixteen to 20 slides per class session are just about right. I teach immunology, genomics, genetics, and a genetic techniques lab. I tell about my own research when it fits and make it fun and lighthearted. I make it a goal that the students should have a good laugh at least once per class session, although it gets more difficult to accomplish the later it gets into the semester. I really enjoy and value teaching both within the classroom setting and in my research lab. One of my greatest points of pride is that during my nine years at Michigan Tech, I have mentored 103 undergraduate and five graduate students in my lab.

Q: What's next for you?

A: I leave for Singapore soon for a one-year sabbatical studying butterfly genetics. As a child, I started collecting butterflies when I was 10 years old, and that's why I became a biologist. I got tenure last year and though I'm not going to change my lab into studying butterflies right now, I really

wanted to visit a lab where everything is set up for butterfly genetics. Antonia Monteiro at the National University of Singapore studies the color patterns of butterflies. She is figuring out the genetic pathways sculpting butterfly pigmentation. I am going to visit her and work on this.



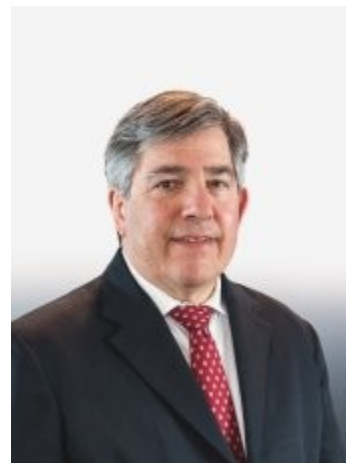
David Frendewey inducted into the CSA Academy of Distinguished Alumni

Dr. David Frendewey is Executive Director of Discovery and Screening at Regeneron Pharmaceuticals in Tarrytown, New York. Dave earned his BS in Biological Sciences at Michigan Tech in 1976. He completed his PhD in Biochemistry in 1980 at the University of Wyoming. Following postdoctoral training at Yale University and at the German Cancer Research Centre in Heidelberg, Dave took faculty positions at Cold Spring Harbor Laboratory on Long Island the New York University School of Medicine. He joined Regeneron in 1998.

Dr. Frendewey's academic research concerned the synthesis and function of RNA, DNA's chemical cousin. Some highlights include the discovery of the spliceosome, the macromolecular complex that edits cellular information as it flows from DNA through RNA to protein, and the identification and characterization of the Dicer enzyme family, central players in the biological process of RNA interference.

At Regeneron, Dave has worked on developing new technologies for the manipulation of genes. Between 2006 and 2011 Dave ran Regeneron's production efforts for the U.S. National Institutes of Health's Knockout Mouse Project. He also participated in the development of Regeneron's novel VelocImmune mouse for the natural production of human therapeutic antibodies, the engine of Regeneron's drug development pipeline. Dave has recently taken on the supervision of research groups investigating neurodegenerative diseases and hearing loss.

Dr. Frendewey has over 80 publications in the scientific and patent literature, including articles in *Science*, *Cell*, and the *Proceedings of the National Academy of Sciences* and 32 granted U.S. patents. He resides in Manhattan with his wife and fellow scientist Dr. Pamela Cowin, Professor of Cell Biology at the NYU School of Medicine.



Karl and Christine LaPeer – 2019 Humanitarian Award Winners

Karl and Christine (Blood) LaPeer were selected by the Alumni Board of Directors as recipients of a 2019 Humanitarian Award. They are 1985 Michigan Tech graduates, Karl with a Mechanical Engineering degree, and Christine with a Medical Technology degree. During his time at Tech, Karl vividly remembers the second day of classes as his most memorable, saying "I met my future bride (now wife of 32 years) on the second day of classes in a calculus class, I would have to say that was the best thing that ever happened to me at MTU."



Between 2013 and 2014, the LaPeers and their children, working through the Angel House initiative, funded the building of three Angel House Orphanages (25 children each) and two freshwater wells in India. In May 2013 Karl, Chris, and their daughter Elayna dedicated an orphanage; in December 2013 an orphanage and village well was dedicated by their daughter Heather; and in December of 2014 an orphanage and village well were dedicated by their son Nate.

The LaPeers served as part of the 1Nation1Day (1N1D) 2015 mission outreach in the Dominican Republic as part of a team of over 2,000 foreign aid workers providing pairs of shoes to children, distributing meals, training business leaders, and providing clean water. During this time Chris also worked in medical clinics around the country, while Karl and their daughter Elayna led the campaign's University Forum program where 5,600 university students were empowered in 38 forums led by 33 business leaders from around the world.

In Nicaragua in 2017 (1N1D) Karl and Chris were part of a team of 2,800 foreign aid workers in which 8,941 people were treated for free at eight medical clinics, 270,000 meals were distributed, 438 small homes were built, 1,220 business leaders were trained, 16,000 people were provided with clean water, over 100,000 primary school students were given hope in school assemblies, 6,111 women were empowered at conferences, and 3,600 attended pastor conferences. Karl and Chris also headed the 1Nation1Day team in the department (state) of Boaco.



Student Awards

Summer Undergraduate Research Fellowships

Congratulations to the following Biological Sciences students who received Summer Undergraduate Research Fellowships in 2019:

Renn Schipper, Biological Sciences

Variation in Biological Processes Along the Pilgrim River Continuum
Advisor: Amy Marcarelli, Biological Sciences

Tessa Steenwinkel, Biochemistry & Molecular Biology

The Influence of a Healthy Diet on the Fecundity and Longevity of Diverse *Drosophila* Species
Advisor: Thomas Werner, Biological Sciences

Grant Thivierge, Biological Sciences

The Effects of Upper and Lower Body Resistance Exercise on the Pulse Wave Velocity and Tilt Table Test Performance
Advisor: John Durocher, Biological Sciences

World Water Day Poster Competition Winners

World Water Day 2019 was celebrated at Michigan Tech during March 20-26. The celebration included a poster session, keynote lecture, art show and panel discussion related to the U.N. World Water Day theme, "Leaving No One Behind—Human Rights: Near & Far." Congratulations to the winners of our World Water Day Poster Competition!

Original Research Awards

1st Place: Erin Eberhard, Biological Sciences

Spatial Heterogeneity of Nitrogen Fixation and Denitrification across a Wetland-Stream-Lake Interface
Advisor: Amy Marcarelli, Biological Sciences

2nd Place: Elisabeth Stimmel, Forest Ecology & Management

The Effects of Microtopography and a Simulated Emerald Ash Borer infestation on Woody Regeneration in Black Ash Wetlands
Advisor: Fengjing Liu, SFRES

3rd Place: Laura Schaerer, Biological Sciences

The Microbial Communities of Bilge Water, Boat Surfaces and External Port Water: a Global Comparison
Advisor: Stephen Techtmann, Biological Sciences



Songer Research Award for Human Health Research

Matthew Songer, (Biological Sciences '79) and Laura Songer (Biological Sciences '80) have generously donated funds to the College of Sciences and Arts (CSA) to support a research project competition for undergraduate and graduate students. Remembering their own eagerness to engage in research during their undergraduate years, the Songers established these awards to stimulate and encourage opportunities for original research by current Michigan Tech students. The College is extremely grateful for the Songers' continuing interest in, and support of, Michigan Tech's programs in human health and medicine. This is the third year of the competition.

Students may propose an innovative medically-oriented research project in any area of human health. The best projects will demonstrate the potential to have broad impact on improving human life. The winners this year are:

Graduate Student Category (\$6,000 each)

- Jessica Bruning: Advisor: Chen (KIP)
- Hannah Cunningham: Advisor: Jason Carter (KIP)

Undergraduate Student Category (\$4,000 each)

- Andrew Cooper: Advisor: Marina Tanasova (Chemistry)
- Tessa Steenwinkel: Advisor: Thomas Werner (Biological Sciences)

2018-19 Biological Sciences Scholarship Winners

Cornish-Kimball Endowed Scholarship

- Ellen Burns, Medical Laboratory Science, Class of '19
- Amanda Mickelson, Medical Laboratory Science, Class of '20
- Jarett McLanahan, Medical Laboratory Science, Class of '19

Jack Holland Scholarship

- Dani Christianson, Medical Laboratory Science, Class of '22
- Rebecca Markham, Medical Laboratory Science, Class of '22

Kathryn Cramer Scholarship

- Hannah Riggs, Medical Laboratory Science, Class of '21

Medical Endowed Scholarship

- Jamie Brisson, Medical Laboratory Science, Class of '20
- Molly McKenzie, Biological Sciences, Pre-Professional, Class of '22
- Autumn Tallman, Medical Laboratory Science, Class of '20

Soldman 4+1 Scholarship

- Becca Riffe, Medical Laboratory Science, Class of '19

Tech Is Scholarship

- Maddy Estowski, Medical Laboratory Science, Class of '19

New Research Funding

Faculty achieved a record-high new funding of >\$12 million in last six years as PIs, Co-PIs, or senior personnel.

New funding in the 2018-19 year includes the following:

- **Dr. Chunxiu (Traci) Yu** received a NIH R03 grant worth \$150,000 for two years to work on a project titled "*Functional dissection of pallidal circuits in therapeutic deep brain stimulation.*"
- **Dr. Guiliang Tang** raised ~\$16,000 through crowdfunding efforts for a project studying genetic improvements of blueberries.
- PhD student **Christopher Adams** received a fellowship from the DeVlieg Foundation, providing full support for Summer 2019 to continue his research on life history variation in trout populations.
- **Dr. Gord Paterson** is the principal investigator on a project that has received a \$61,950 research and development contract with the Great Lakes Fishery Commission. The two-year project is titled "*Predicting Contaminant Transfer Following Re-Establishment of Controlled Connectivity in the Boardman River.*"
- The Vice President for Research Office awarded **Dr. John Durocher** the Century II Campaign Endowed Equipment Fund (C2E2) awards at the recommendation of the C2E2 Committee for the purchase of Ambulatory Blood Pressure Monitors.

College of Engineering Cross-Cutting Initiative: Stage 2 Seed Grants Awarded

Michigan Tech's College of Engineering awarded ten Stage 1 seed grants in October 2019. In November, the college received 15 Stage 2 proposals which were reviewed by a group of six faculty members representing interdisciplinary research across campus. Three Stage 2 recipient teams included Biological Sciences faculty:

- Say NO to viruses! Team led by Megan Frost, Caryn Heldt and **Ebenezer Tumban**
- Advances in Zinc Based Stent Research Team led by Jarek Drelich, **Traci Yu** and Jeremy Goldman
- Transdisciplinary Approach to Sustainable Remediation Technologies for PFAS-Contaminated Water and Soil Team led by Andre R. Da Costa, Pradeep Agrawal, Michael Mullins, Tony Rogers, Judith Perlinger, **Rupali Datta**, **Stephen Techtmann** and Richelle Winkler

Giving Opportunities

The Department of Biological Sciences is dedicated to providing students with the greatest possible opportunity to succeed. However, we cannot provide the best education for our students without the best faculty, staff, equipment, facilities, and scholarship opportunities. Your generosity helps us make our goal of providing the best possible undergraduate and graduate experiences a reality.

You can find more information at mtu.edu/biological/giving, or contact the department chair at cpjoshi@mtu.edu.

Thank you for your support!

You could help us with these eight Initiatives!

Biological Sciences Learning Center: This dedicated Center helps ~1,500 freshman and sophomore students every year in getting adjusted to college life by helping with their homework, clarifying biological sciences concepts or providing some outlet to express themselves. We hire 6-10 coaches every year and this has been a phenomenal help in improving student satisfaction and retention.

Bioathlon: Every May for the past 30 years, we invite about 12-15 high schools to participate in a day-long competition in solving four problems related to biological sciences.

Undergraduate Student Scholarships: We would like to create one hundred scholarships, each worth \$1,000 for students specializing in pre-health, ecology, BMB and Bioinformatics majors.

Medical Lab Sciences: We recently earned NAACLS accreditation for our MLS program. Students in the MLS program are required to complete a six to twelve month long clinical practicum at an affiliated hospital. We currently have no fellowships to cover these expenses for this number of students. We would like to create about 20 fellowships.

Graduate Student Fellowships: Getting a PhD requires a lot of hard work and dedication. It is even harder when you have to support yourself financially throughout the process. Fellowships would allow students to focus on their studies and allow students who may not have been able to afford it to come and get their degree.

Summer Graduate Student Scholarships: We get limited number of GTA fellowships (only 9) from the graduate school but these graduate students do not get any summer support when they could be highly productive. Instead, they have to find some summer employment to support themselves. We would like to create twenty scholarships of \$10,000 each that would cover their tuition and stipends during summer months.

Endowed Professors in Biological Sciences: Our professors are doing world-class research as evidenced by their service to their profession and 86% of our faculty members are funded by external grants. However, currently we do not have any endowed professorships that could regularly support their research. They could support undergraduate or graduate students getting hands-on experience in their labs and pay for upgrading their research facilities.

Undergraduate Research Laboratories: Every year, we spend about \$50,000 for upgrading our teaching labs but in order to regularly update undergraduate labs, we need to update equipment such as microscopes with adapters for cell phones, PCR machines, and multichannel automatic pipettes. We also need to cover the cost of renting research vehicles and boats.

30th Annual Bioathlon!

In an age of limited resources, high school students need to be aware that the answers to many of society's problems will require biological or technological solutions. To stimulate an interest in biology careers, the Department of Biological Sciences at Michigan Technological University sponsors a single-day, hands-on, problem solving competition known as the Bioathlon.

High schools are invited to enter a team of four students to compete in this fun-filled day of biological sciences competition. Each school may enter only one team. Each team will work on the same set of four problems relating to biology, although the sequence will vary. For our 30th Annual Event this past May, we had 13 schools competing for the top prize!

2019 Project Topics

Through these projects, students must demonstrate organizational skills, knowledge of facts and concepts, laboratory skills, and creativity.

Dissection: Students will dissect a preserved vertebrate animal and identify a list of organs and other anatomical structures. Students will not have access to dissection guides. Their identifications will have to base on their memory and knowledge of comparative anatomy. All tools and personal protective equipment will be provided. Students will be graded on the quality of their dissections and number of correct identifications.

Medical Laboratory Science: Medical laboratory scientists seek to improve and extend life by acting as diagnostic specialist. They serve as key members of the medical team by detecting disease through a variety of analyses of tissues and body fluids. This activity will have students completing a series of case studies. Standard operating procedures will be provided to students to complete common laboratory procedures in hematology, urinalysis, clinical chemistry, and medical bacteriology in order to answer the cases.

Field Ecology: During a brief field trip, students will search for some common organisms. This search will require general knowledge of ecology including identification of common plants and animals and familiarity with their obvious external structures. Based on their findings, students will separate their specimens into trophic levels. Students may not use guidebooks, notes or any electronic devices while out in the field. Students should be prepared to go outside in all weather conditions.

Forensic Science: There's been a crime and students will have to apply their knowledge of biology to help solve the case! Students will be given standard operating procedures to help examine a variety of evidence, which will include: latent fingerprints, blood, hair, DNA, and other surprises. All tools and personal protective equipment will be provided.

2019 Winners

1st Place: Calumet High School 2nd Place: Negaunee High School 3rd Place: Houghton High School

H-STEM Building Project

Michigan Technological University Board of Trustees approved expenditures to complete planning and design for what is currently being referred to as the H-STEM Engineering and Health Technologies Complex (or H-STEM Complex). Expenditures for planning and design are not to exceed \$3.1 million.

In late 2018, the Michigan Legislature granted planning authorization for the H-STEM Complex, a \$44.7 million capital outlay project that will comprise to-be-constructed shared and flexible lab spaces co-located with renovated classrooms and learning spaces in the Chemical Sciences and Engineering Building. The project request included a proposed \$29.7 million in State support, with \$15 million in matching funds.

Please visit the following site for the most recent information on this project

<https://www.mtu.edu/h-stem/>



Biological Sciences by the numbers (2018-19)

20		Biological Sciences Faculty
5		Biological Sciences Staff
57		Undergraduate Students that graduated this year
14		Graduate Students that graduated
221		Undergraduate Students currently enrolled
44		Graduate Students currently enrolled
66		Our Faculty submitted 66 proposals and got 16 new awards

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