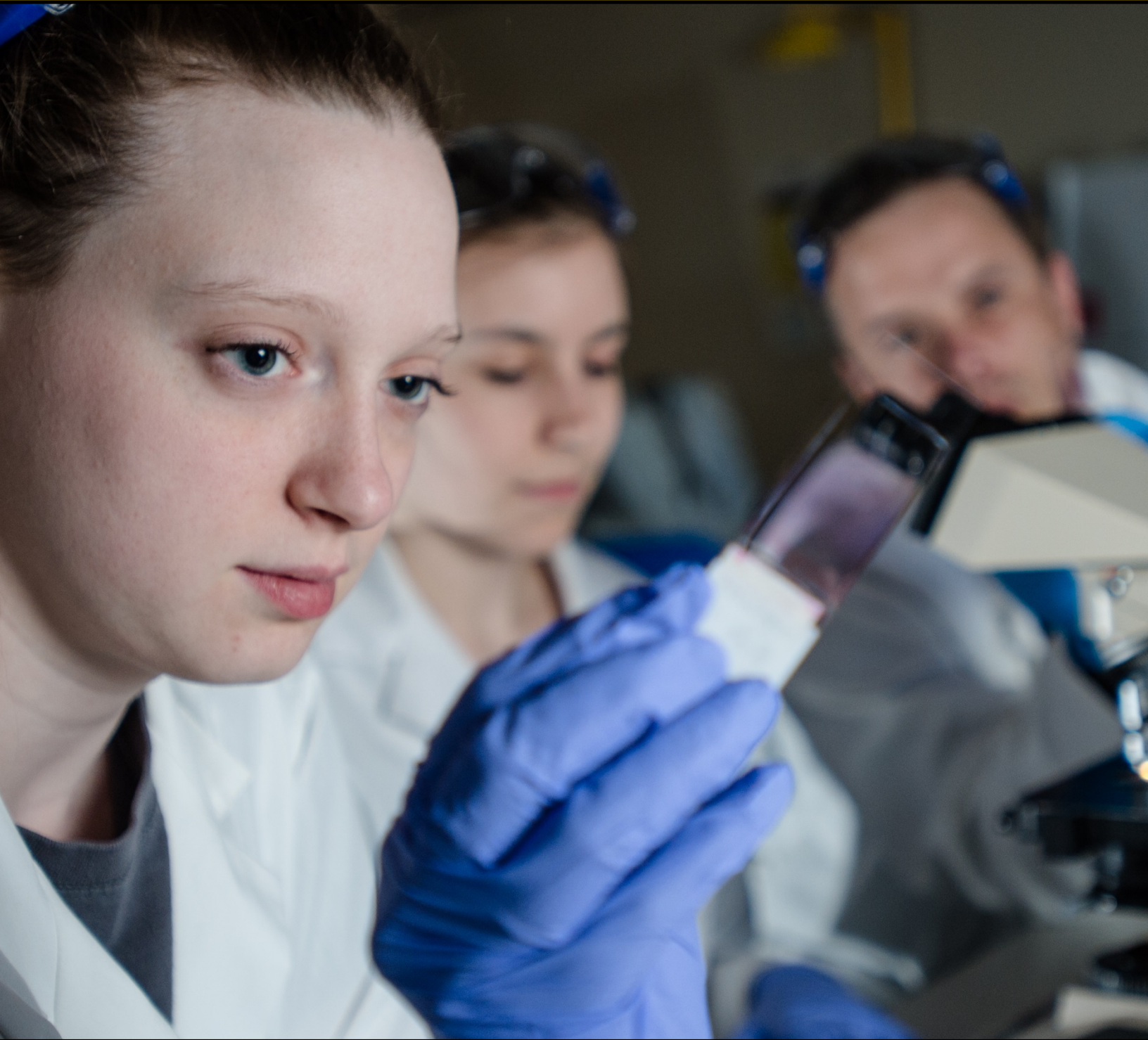




**Michigan
Technological
University**

DEPARTMENT OF BIOLOGICAL SCIENCES



In this issue

Program Updates
New Research Funding
Department News
Community Outreach

FALL 2017 NEWSLETTER

A Note from the Department Chair



Chandrashekhar Joshi,
Department Chair

Greetings from the Department of Biological Sciences at Michigan Tech!

It gives me great pleasure in sharing this bi-annual report of various ongoing activities and accomplishments by our faculty, staff and students during 2015-2017. We are having a fabulous time here and the department is flourishing in every possible direction. I want to highlight two major features: We now have an all-time high graduate enrollment of 52 students and we have brought in an all-time high research funding of more than \$9 million in the last four years. This boost in research has resulted in an increase in the number of peer-reviewed publications, the number of students graduating, and the number of undergraduate students who worked in research laboratories to receive hands-on training in innovative research. We are performing research in three areas: health sciences, ecological sciences and molecular biosciences. Our faculty and students are tackling exciting research problems to resolve many real-life problems.

We would love to hear from you. Please call my office at 906-487-2738 or email me at cpjoshi@mtu.edu to let us know how you are doing. Please feel free to stop by Dow 740. We would be happy to show you our research labs and newly upgraded teaching labs. The campus and overall surroundings are beautiful in early autumn so come back to the Keweenaw soon!

Shekhar Joshi

Biological Sciences Program Enrollment and Updates

Bioinformatics - In Spring 2017, faculty from the biological sciences, computer science, forestry, and mathematics departments came together to form an interdisciplinary committee with the goal of re-invigorating the bioinformatics major. With an emphasis on regional partnerships and coursework designed to bring students to the cutting edge of biology and computer science research, Michigan Tech is excited by the promise of our new-and-improved bioinformatics program.



Biochemistry and Molecular Biology - Since the Biochemistry and Molecular Biology – Biology Focus major opened in 2006 with single digit enrollment – just five students in Fall 2007 – the program has grown slowly but steadily, with 33 students enrolled in Spring 2017. In the same semester, 15 students were enrolled in the Biochemistry and Molecular Biology – Chemistry Focus major, bringing the total number of Biochemistry students on campus to 48. Changes to the curriculum, including the addition of a statistics course and the addition of several exciting new biology electives, ensure that graduates of the program are ready for a career in industrial laboratory work or for graduate school.

Medical Laboratory Science - The Biology Department's Medical Lab Science program is currently seeking accreditation through the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). The program currently holds "Serious Applicant Status" in the NAACLS accreditation process, which means our students may begin practicums at affiliate hospitals through our university-based program. The department anticipates full accreditation in Spring of 2018 following a successful site visit from NAACLS. The program is already seeing the benefits of seeking accreditation. Since Fall 2016, the number of students out on a practicum has doubled as a result of our accreditation status. MLS currently has 65 enrolled students, with an additional seven recent graduates placed in hospitals throughout the U.P., Lower Michigan, and Wisconsin.

Biology: General Concentration - The General Biology concentration allows students interested in biology to choose courses from the incredibly diverse areas of study that fall within the field of biology. Although the growth of the ecology concentration, Medical Lab Science, and Biochemistry and Molecular Biology majors have drawn a number of students to other areas of study, many are still best served by the broad, all-inclusive curriculum offered by the General Biology concentration.

Biology: Ecology Concentration - The ecology concentration is ideal for students who want to approach biology from an ecological perspective. Features of the curriculum include partnership with the forestry department and a selection of organismal/environmental biology related courses at the higher levels. Interest in ecology has been growing over the past several years, and we expect the trend to continue going forward as we prepare to offer a new, dedicated Ecology major in Fall '18.

Biology: Pre-Professional Concentration - The pre-professional concentration remains the most popular option for all biology students, with 90 students enrolled for the Fall 2017 semester – the most we've had since Fall 2014. Feedback from our successfully-placed alumni and healthcare professionals plays an important role in the continuously evolving curriculum of the major. Just last year, we began offering human pathophysiology in response to suggestions from our graduates and contacts at medical schools. Rigorous, up-to-date coursework, collaboration with community partners, and strong placement rates all contribute to making the pre-professional concentration the best option at Michigan Tech for students seeking to go into graduate-level healthcare programs.



Biology: Secondary Education Concentration - The secondary education concentration offers the biology curriculum of the general option, with education courses leading to a teaching certification taking the place of free electives. This flexibility makes the secondary education concentration a great option for future scientists or science educators.



Summer in Cyprus - A New Option for Biology Students

This year Michigan Tech began offering a new study abroad option for students in the Biology pre-professional and general concentrations. Pre-health students participating in the program travel to the University of Nicosia (UNIC) Medical School in Nicosia, Cyprus, where they take courses in human anatomy & physiology and learn about the European healthcare system. One of the unique benefits of the program is that the students learn with human cadavers in the anatomy labs!

Cyprus offers visiting students a fascinating mix of ancient, medieval, and modern history, some of the best beaches in the world, and world-class educational facilities. The Department of Biological Sciences and Michigan Tech hope to expand study abroad opportunities for our students to include our current lineup of summer courses alongside full fall and spring semesters with options for all biology majors.



Graduate Program Enrollment

Four years ago, we had about 30 students in our graduate program with 15 students each in our MS and PhD programs. In Fall 2016, we had 46 students with 27 in PhD programs and 19 in MS programs. During the last two years, 13 students received MS degrees and nine students received PhD degrees. In addition to PhD in biological sciences, many of our students also participate in interdisciplinary PhD in Biochemistry and Molecular Biology (IBMB).

New Graduate Program offered in Collaboration with Shenzhen University, China

Michigan Tech and Shenzhen University (SZU), China have recently entered in an educational collaboration agreement. Undergraduate students in biological sciences who have completed their three years of classes at SZU spend one semester at Michigan Tech and transfer 12 credits back to complete their BS degree at SZU. Then, they stay at Michigan Tech to complete their MS degree with 30 credits. We are already working with interested students and the first exchange student is already onboard.



New MS "Plan C" Option

Many international students have started using our new MS "Plan C" coursework-only option to familiarize themselves with higher-level graduate classes in molecular biology and microbiology. In Fall 2017, we expect up to six new MS "Plan C" students. This is a great opportunity for them to ensure that they will be able to handle a graduate program in the US that will provide firm basis for their higher education.

Accelerated Master's in Biological Sciences Option

Michigan Tech's new accelerated master's degree in Biological Sciences option allows highly motivated undergraduate students to earn both a Bachelor of Science and a Master of Science in just five years of full-time study. Taking advantage of Michigan Tech's Senior Rule, students can take up to six credits towards a graduate program prior to finishing their BS requirements. The accelerated MS program also allows six credits to be double-counted towards both degrees. Taken together, accelerated MS students can complete up to 12 of the required 24-30 graduate credits before completing their undergraduate studies. Accelerated MS students are encouraged to begin conducting research with a graduate advisor early on – no later than senior year – in order to expedite degree completion. Accelerated MS applicants must have at least a 3.0 GPA to be eligible for the program; however, applicants are not required to take the GRE or any other entrance exam.

For more information about graduate studies in biology at Michigan Tech, contact **Rupali Datta**, Director of the Graduate Program at rupdatta@mtu.edu

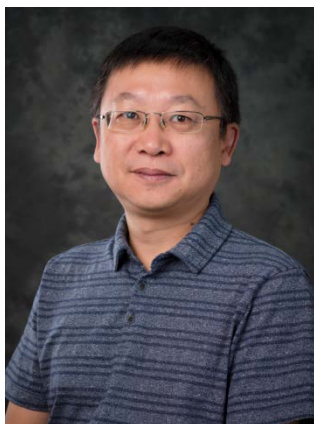


New Faculty

Stephen Techtmann - Dr. Techtmann joined the Department of Biological Sciences as an assistant professor in 2015. He comes to Michigan Tech from the University of Tennessee, where he was a postdoctoral research associate. Techtmann earned a PhD in Molecular and Cell Biology from the University of Maryland, Baltimore, in 2009. His research is focused on how complex microbial communities can cooperate to perform functions of industrial interest, to understand how these microbial communities respond to anthropogenic activity and environmental change.



Xiaohu Tang – Dr. Tang joined the Department of Biological Sciences as an assistant professor in 2016. He received his doctorate in Life Science from The Weizmann Institute of Science, Israel, in 2006. His research interests are to identify metabolic alterations in cancer and other diseases, to understand how those alterations interfere with normal cellular function and lead to or promote disease progression, and to develop nutrition interventions and new therapies to prevent and treat cancer and other diseases.



Gordon Paterson - Dr. Paterson joined the Department of Biological Sciences as an assistant professor in January of 2017. He comes to Michigan Tech from the State University of New York, where he was an assistant professor. Paterson earned a PhD in Biology from the University of Windsor in 2006. Paterson's research focuses on the effects of environmental stressors and anthropogenic activities on the bioaccumulation of toxins and exposure of aquatic organisms to legacy and emerging environmental pollutants.



New Staff

Tori Connors, *Departmental Coordinator*

Tori Connors joined the Department of Biological Sciences in December 2016. She has worked at Michigan Tech for the past 10 years, most recently in Mathematical Sciences and The Waino Wahtera Center for Student Success. She graduated from Michigan Tech with a BS in Social Sciences - History in 2015.



Kelsey Johnson, *MLS Practicum Coordinator*

Kelsey Johnson earned her BS in Clinical Laboratory Science from Northern Michigan University in 2013 and her MBA from Michigan Tech in 2016. She worked as a Medical Technologist at Keweenaw Aspirus Hospital and UP Health Systems-Portage. After two years assisting the Medical Laboratory Science program in the accreditation process, she joined the department full-time in 2017.



Marc Madigan, *Academic Advisor*

Marc Madigan graduated from Michigan Tech with a BS in Biological Sciences in 2011 and received his MAE from Northern Michigan University in 2016. He worked for Gogebic Community College, Keweenaw Bay Ojibwa Community College, and Minnesota State Community & Technical College in various roles before returning to Michigan Tech as an Academic Advisor in December 2016.



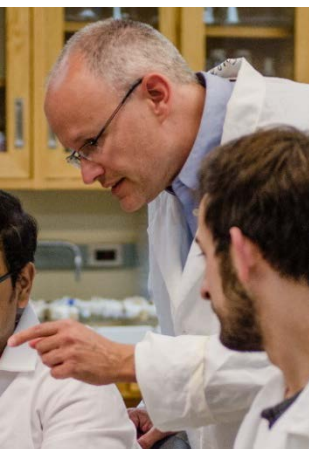
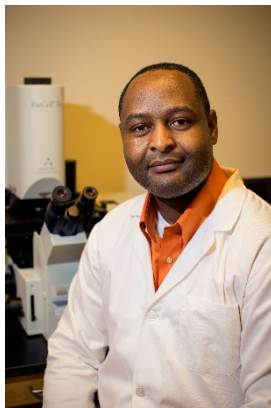
Travis Wakeham, *Laboratory Supervisor*

Travis Wakeham became our new Laboratory Supervisor in December 2016. He completed his BS and is currently pursuing an MS in Biological Sciences at Michigan Tech, along with a certificate in STEM education. Travis is a native Yooper and is excited to be able to stay at his alma mater in his new position!



New Research Funding

Ebenezer Tumban earned a \$457,197 research and development grant from the U.S. Department of Health and Human Services-National Institutes of Health (NIH) for a project titled "Development of a Multi-epitope L2 Bacteriophage VLPs Vaccine to Enhance Protection Against Oral HPV Infections in HIV Patients." The Tumban lab is engaged in production of vaccines against human papilloma viruses-the causative agents of some human cancers. In this project, he will explore novel strategies to increase immune responses against HPV infections, using platforms such as bacteriophage virus-like particles (VLPs).



Thomas Werner was awarded a \$436,031 research and development grant from the U.S. Department of Health and Human Services – National Institutes of Health (NIH). The project is "The Role of Toolkit Gene in Generating Complex Color Pattern in *Drosophila*." Elucidating the pigmentation pathways in a fruit fly species will help understanding how cancer-inducing pathways are regulated and how they have evolved.

Xiaoqing Tang received a \$421,652 grant from the US Department of Health and Human Services - National Institutes of Health (NIH) for a three-year research project entitled "Role of miR-483 in Pancreatic Alpha and Beta Cells." MicroRNAs are small non-coding RNAs that negatively regulate expression of target genes. Dr. Tang will explore the roles of one type of microRNA in the production of pancreatic alpha and beta cells. She also received a \$75,000 research contract from the U.S. Highbush Blueberry Council for the project "Blueberry Protects Pancreatic Beta-Cells." Blueberries are known to provide some protection against diabetes. The Tang lab will explore the protective effects of blueberries on the health of insulin producing pancreatic beta cells.



Robert Stottlemeyer, head of the North Watershed Studies research group, has received \$85,001 in a research and development agreement with the U.S. Department of Interior—U.S. Fish and Wildlife Service. The two-year project is titled "Climate Altered Terrestrial Carbon and Nutrient Flux to the Aquatic Foodweb from Increased Depth of Soil Ice Thaw, Selawik and Fish Rivers, Selawik National Wildlife Refuge, Alaska."

Stephen Techtmann (pictured pg. 4) won a Defense Advanced Research Projects Agency (DARPA) Young Faculty Award to study microbial biosignatures that identify what waters they traverse. He received an \$883,735 grant from the U.S. Department of the Interior for his project, entitled "Bilge Water Microbiomes as Biosignatures of Maritime Provenance." The overall goal of this project is to find a better way of monitoring maritime movement of ships using microbiological and genomic methods for studying microbes growing in bilge water.

New Research Equipment

Whole Slide Scanner - With the help of C2E2 funding and contributions from many other departments and researchers, **Xiaoqing Tang** recently purchased a \$56,000 whole slide scanner from Leica Microsystems. This automated microscope will provide digital archiving and quantitative analysis of histological, immunohistochemical and immunofluorescence staining of tissue sections and tissue microarrays. It will be used for analyzing physiological and pathological images from various organisms including animals, plants and microbes. Use of this equipment will broadly benefit the entire campus.

Dedicated Bioinformatics Computer and Server - **Stephen Techtmann** has procured a new server/computer specifically for projects in bioinformatics. It is currently used for genome assembly and annotation of microbial genomes. Genome assembly is the process of stitching short DNA reads into longer stretches of DNA, and hopefully into large chromosomes. Annotation is assigning functional categories to predicted genes in the assembled genomes. This machine will allow researchers to process large sequencing data files that are too complex for a personal computer to manage.

Summer Undergraduate Research Fellowships

In the past year, two biology students completed Summer Undergraduate Research Fellowships (SURFs). Here's what they had to say about their projects:

Jacob Schoenborn (Faculty Advisor: Dr. Xiaoqing Tang) - "[My] project looks at how simple foods can impact the health of your pancreas which plays a vital role in Type 2 diabetes. What we've found so far is that [the organic compounds in blueberries] will protect your pancreas from the damage diabetes causes to it."

Paige Webb (Faculty Advisor: Dr. Stephen Techtmann) - "My project is about understanding tubercle microbial communities and their impact on Great Lake structures. I'm looking at what sequence of events lead to colonization by iron oxidizing bacteria and the microbial community that allows tubercles to grow. Tubercles are corrosive products and deposits that are covering certain areas on steel structures that lead to localized corrosion, and many have been found in the Lake Superior region."

Faculty Promotions and Tenure

Congratulations to the following biology department members who were promoted recently:

- **Brigitte Morin** was promoted to senior lecturer
- **Xiaoqing Tang** was promoted to associate professor with tenure
- **Guiliang Tang** was promoted to full professor

Brigitte Morin - Finalist for 2017 Distinguished Teaching Award

Brigitte Morin, senior lecturer in the Department of Biological Sciences, was a finalist for the 2017 Distinguished Teaching Award. Congratulations Brigitte!

Facilities Upgrades

In the last two years, the Department of Biological Sciences invested more than \$100,000 in upgrades to our teaching and research labs. Here are some of the highlights:

- In the Summer of 2016, we completely remodeled our Anatomy & Physiology teaching labs.
- The department procured new centrifuges and heating baths for our Medical Laboratory Science teaching labs.
- We equipped our general biology and microbiology labs with new microscopes that have the ability to connect with the classroom projectors and take screen captures.
- We acquired a new Laminar Flow Hood, thermal cyclers, incubator shakers, and other tools for the biochemistry and molecular biology labs.
- Two new automated castle autoclaves on the fifth floor of the DOW building serve our teaching and research labs.
- DOW 708 is currently undergoing renovations. The space will be used to create a high-end computing lab, with computers equipped with programs and statistical packages to support our research labs.

Biology Learning Center Update

This year the Biological Sciences Learning Center (BLC) got a facelift - literally! Brigitte Morin (pictured), senior lecturer in Medical Laboratory Science, stepped in as the new BLC director, and comfy couches and free coffee set a new tone for the space.



The goal to make the BLC a warm, inviting spot for students to find success was also

furthered by the hiring of new coaches with diverse backgrounds including biomedical engineering, ecology, and pre-health. This past year saw the graduation of six seniors, leaving behind nine new and experienced coaches who are excited to work with our undergraduates this fall and next spring. Coaches are excited for their chance to work with the BL1010 - General Biology I students so they can help set the groundwork for many first year students (as well as others) to deepen their passion for biology. Initiatives moving into the 2017-18 school year include pre-professional school entrance exam study session, anatomy "art nights" and study groups for the diverse courses the students are taking. Both coaches and instructors are looking forward to a strong start of the new school year.

Jim Spain Heritage Atrium Inauguration

Thanks to a generous gift from Dr. Jim Spain and Ms. Patricia Spain, the newly renovated DOW seventh floor atrium was opened to students on September 1, 2016. Students can now enjoy the view of the Portage Canal and listen to the relaxing sound of the waterfall. Dr. Spain was the very first head of the department when it was founded in 1962.

Pre-College Outreach

28th Annual Bioathlon - The Bioathlon is our largest outreach event each year. Teams from 12 Upper Peninsula high schools participated in the day long competition this year. The winning team was A.D. Johnston High School in Bessemer. Second place went to Marquette, and third place to Calumet.



All teams tackled these same four problems: dissection of a bull frog, microbe analysis, ecology field identification, and basic medical laboratory techniques.

(Continued pg. 7)

Fay wins 2016 Distinguished Teaching Award

Karyn Fay is the child of teachers. So it wasn't surprising that after several successful years in the medical profession she herself turned to the classroom at Michigan Technological University. Fay's passion for teaching has resulted in the University's highest teaching honor. Dean Bruce Seely of the College Sciences and Arts emphasizes Fay's broader program director role as well. "Karyn brings an amazing level of teaching commitment to the Department of Biological Sciences MLS program," he says. "Her efforts are not limited to the classes she offers, but are equally apparent in her advising and overall direction of the program as she helps students through their clinical activities, practicums and internship."



Fay was inducted into the Academy of Teaching Excellence in 2005 and is currently focused on pursuing accreditation of the MLS program through the National Accreditation Agency of Clinical Laboratory Scientists. She says she tries to instill in her students two basic tenets—mutual respect and communication. "I am truly humbled to be receiving this award because my students, each and every one, have my utmost respect, and to think they respect me in kind means the world to me."

Read the full story at
<http://www.mtu.edu/news/stories/2016/may/fay-receives-distinguished-teaching-award.html>

Pre-College Outreach (cont'd)

High School Visits - During the spring semester, local high school classes are invited to visit our campus. Visits include attending our anatomy & physiology lecture, hands-on activities with current college students, lunch at Wadsworth Hall, and meeting with our faculty to discuss careers. This past year, more than 150 high school students, from six different schools were able to visit the campus.



HOSA Regional Competition - This year we traveled to the regional Health Occupations Students of America (HOSA) Regional Competition at Marquette High School. Afterwards, we invited local HOSA students to come to our lab to learn more about opportunities in medical laboratory science.

Summer Youth Programs - Throughout July, more than 100 middle and high school students from around the world live on campus for a week at a time and explore a topic in biology! We offer classes in forensic science, medical physiology, medical laboratory science, microbiology, and even genetic modification & biotechnology. Find more info at <https://www.syp.mtu.edu/>.

Goodbyes

In Fall 2015, Associate Professor **Ramakrishna Wusirika** joined the Centre of Plant Sciences in Central University, Bathinda, India. He joined the biological sciences department at Michigan Tech in 2003. He published many papers each year and advised several graduate students. Rama was also very active on the service front. He will continue to serve as an adjunct faculty in our department.

Stacy Cotey served as the academic advisor for Biological Sciences for more than eight years. In Fall 2016, she accepted a similar position in Michigan Tech's School of Forest Resources and Environmental Sciences. We wish her all the best!

Jeff Lewin, a long-time member of the Department of Biological Sciences recently took a new role as Michigan Tech's Chemical Safety Officer. Jeff was associated with our department for more than 25 years as a graduate research assistant, faculty assistant, laboratory associate, laboratory supervisor, chemical hygiene officer, safety liaison and equipment coordinator. He was very important for the well-being of this department.

Patty Asselin retired in Fall 2016 after 28 years of service as department coordinator in the Biological Sciences department. She was instrumental in maintaining institutional memory of what happened and when. She also cared for all students and even cooked for them. They always talked to her about their life and dreams. Patty was very good at multitasking and had time for social work in addition to her regular duties. She is currently enjoying her retired life.

Professor **Nancy Auer** retired at the end of spring 2017 after 33 years of service. She is well known for her research on the restoration of iconic Great Lakes species such as Lake Sturgeon and Arctic Grayling. Her book on larval fishes of the Great Lakes remains the standard reference, and her recent book "The Great Lake Sturgeon," co-edited with Dave Dempsey, was recognized as a Michigan Notable Book. She will continue to serve as emeritus research professor in our department.



Pictured left to right: Ramakrishna Wusirika, Stacy Cotey, Jeff Lewin, Patty Asselin, and Nancy Auer

Obituary - Ron Gratz

It is with profound sadness that we inform you that Emeritus Professor **Ron Gratz** passed away recently. Dr. Gratz joined Michigan Tech in 1978 after completing his doctorate in zoology from the University of Oklahoma. His area of research was animal and respiratory physiology. He taught anatomy and physiology, cardiopulmonary physiology, and introduction to pre-health professions during his time at Michigan Tech. He also served as the advisor for pre-health students for more than 30 years and established the Peace Corps Masters International Program in the biological sciences department.



After his retirement in 2011, he often visited the department. We will miss his cheerful presence at various departmental gatherings.

You can find Dr. Gratz's full obituary at <http://memorialchapel.net/tribute/details/1192/Ronald-Gratz/obituary.html>



2016-17 Biology Department Scholarship Winners

Congratulations to the following Biology Department Scholarship Award winners for 2016-17:

Lillian MacFarland Baklaraz Endowed Scholarship	Stephanie Bean <i>Biological Sciences, Pre-Professional Concentration, Class of '18</i>
Kathy Jean Jensen Scholarship	Leah Kimminau <i>Biological Sciences, Pre-Professional Concentration, Class of '18</i>
	Anna Caramella <i>Biological Sciences, Pre-Professional Concentration, Class of '19</i>
Medical Endowed Scholarship	Greg Kaurala <i>Biological Sciences, Pre-Professional Concentration, Class of '19</i>
	Chase McNamara <i>Biological Sciences, Pre-Professional Concentration, Class of '18</i>
	Lynea Hautamaki <i>Medical Laboratory Science, Class of '20</i>
Jack Holland Scholarship	Autumn Tallman <i>Medical Laboratory Science, Class of '20</i>
Tech Is Scholarship	Melanie Batchelor <i>Medical Laboratory Science, Class of '18</i>
Soldan 4+1 Scholarship	Katie Schjoth <i>Medical Laboratory Science, Class of '17</i>
Kathryn Cramer Scholarship	Zoe Sutton <i>Medical Laboratory Science, Class of '17</i>

Michigan Technological University is an equal opportunity educational institution/equal opportunity employer, which includes providing equal opportunity for protected veterans and individuals with disabilities.

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, and facilities. Your generosity helps us make our goal of providing the best undergraduate and graduate experiences a reality.

You can find more information at <http://www.mtu.edu/biological/departments/giving/>, or contact the Biology Department Chair at cpjoshi@mtu.edu.

Thank you for your support.



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