

# CEGE

CIVIL, ENVIRONMENTAL,  
AND GEOSPATIAL  
ENGINEERING

GRADUATE



**MICHIGAN TECH:**

Your Future  
Begins Here.



Great university.  
Great department.  
Great career.

Let's look at  
the facts:

#3

ENVIRONMENTAL ENGINEERING  
PROGRAM IN THE NATION

(CollegeFactual.com)

#4

CIVIL ENGINEERING MS PROGRAM  
IN THE NATION (Intelligent.com)

\$5.6M

CEGE DEPT EXTERNAL  
SPONSORED FUNDING

100%

CEGE DEPT CAREER PLACEMENT

75%

OF OUR RESEARCH-BASED GRAD  
STUDENTS ARE SUPPORTED  
FOR THEIR TUITION AND LIVING  
EXPENSES WITH INTERNAL FUNDS



Michigan  
Technological  
University



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An aerial photograph of the Michigan Technological University campus, showing various red brick and modern buildings, green trees, and a large body of water (Lake Huron) in the background under a sunset sky. A white speech bubble is overlaid on the left side of the image.

*"My experience at Michigan Tech went above and beyond. The organizations allowed me to make friends that became family. The academics showed me what I am capable of and prepared me for the world I'm about to face. The community tied it all together."*

**ALEXANDRA COSTANZO, MS  
CIVIL ENGINEERING**





# CIVIL ENGINEERS ADVANCE & EXPERIENCE



**CONSTRUCTION ENG  
& MANAGEMENT**



**TRANSPORTATION**



**WATER RESOURCES**



**GEOTECHNICAL**



**STRUCTURAL**



**CIVIL ENG MATERIALS**

## MASTER'S DEGREE

The master's degree offers many paths, including course work or research based, as well as an online option focused on structures. All pathways require a minimum of 30 credits with varying course work, research, and report credits based on the selected path.

» [MTU.EDU/CEGE/GRADUATE/CIVIL/MS](https://www.mtu.edu/cege/graduate/civil/ms)

**\$72,000**

**MS AVERAGE SALARY**<sup>1</sup>

<sup>1</sup> PAYSACLE.COM

## PHD DEGREE

Work with renowned faculty members changing the environment around us. Think about long-term sustainability through project designs that are cost effective and adaptive in one of our eight state-of-the-art research facilities, including our petrography laboratory for material characterization. Additional Department lab space supports structural testing, concrete mixing and testing, asphalt testing, binder characterization, hydrodynamic and scour studies, complex data visualization, and rail planning.

» [MTU.EDU/CEGE/GRADUATE/CIVIL/PHD](https://www.mtu.edu/cege/graduate/civil/phd)

**\$107,000**

**PHD AVERAGE SALARY**<sup>1</sup>





## Tackle challenges facing our society

through an education created with a balance of theory and practice at a program ranked by US News & World Report. Students enrolled in our graduate program make significant contributions through research while learning in a four-to-one student-to-faculty setting.



# ENVIRONMENTAL ENGINEERS DIVERSIFY & FACILITATE



AIR QUALITY



ATMOSPHERIC SCIENCES



DRINKING & WASTEWATER  
TREATMENT



ENV MICROBIOLOGY  
& CHEMISTRY



GROUNDWATER  
& SUBSURFACE  
REMEDIATION



HYDROLOGY &  
WATER RESOURCES



SURFACE WATER  
QUALITY



POLLUTION  
PREVENTION

## MASTER'S DEGREE

In the pursuit of advanced environmental engineering and engineering science studies, the master's degree offers many paths, including course work or research based options. All pathways require a minimum of 30 credits with varying course work, research, and report credits based on the selected path.

» [MTU.EDU/CEGE/GRADUATE/ENVIRONMENTAL/MS](https://mtu.edu/cege/graduate/environmental/ms)

**\$70,000**

MS AVERAGE SALARY<sub>1</sub>

## PHD DEGREE

Work alongside expert faculty in environmental engineering, solving today's problems to prepare to solve tomorrow's. Investigate challenges with our faculty, while collaborating with departments across campus to build a complete picture and experience the problems first-hand, tackling research problems from Florida to Alaska and from Central America to Greenland.

» [MTU.EDU/CEGE/GRADUATE/ENVIRONMENTAL/PHD](https://mtu.edu/cege/graduate/environmental/phd)

**\$83,000**

PHD AVERAGE SALARY<sub>1</sub>

1. PAYSACLE.COM



## RESEARCH-INTENSIVE INTERDISCIPLINARY STUDIES

Through access to world-class facilities, including the Great Lakes Research Center and the research vessel, the Agassiz, students work in more than 43,000 square feet of research and teaching laboratories and can learn from the largest freshwater laboratory in the world—Lake Superior.

Graduate students use top-of-the-line facilities for research related to drinking water and wastewater treatment, organic and inorganic contaminant characterization, air and water quality monitoring, and sediment analysis.



## Develop a deeper understanding

of how we impact the natural environment and learn how to engineer systems to sustainably protect human health and ecosystems. Work with faculty across departments and in research institutions through interdisciplinary research projects. The Department boasts more than \$5.6 million in research funds each year from state and federal agencies, foundations, and industry.



# GEOSPATIAL TECHNOLOGISTS DISCOVER & CLASSIFY



**SURVEYING**



**GEODESY**



**CARTOGRAPHY**



**PHOTOGRAMMETRY**



**GEOGRAPHIC  
INFORMATION SYSTEMS**

## MASTER'S DEGREE

Whether in person or online, the Integrated Geospatial Technology master's degree prepares students for work in the field with existing industry tools, as well as the skills to develop the geospatial technologies of the future. A minimum of 30 credits is required with varying course work, research, and report credits based on the selected path.

» [MTU.EDU/GEOSPATIAL-TECHNOLOGY/OPTIONS](https://mtu.edu/geospatial-technology/options)

**\$99,500**

MS AVERAGE SALARY<sub>1</sub>

1 PAYSACLE.COM



*"Being an online student was difficult but rewarding. The courses were in depth and informative for this growing field. I graduated in 2 years and easily transitioned into the industry, where I make 3D maps for mines and landfills using drones and a LiDAR scanner to gather data.*

*This program accelerated my career and set me up for many paths and promotions."*

**ERIN JEAN, MS, INTEGRATED GEOSPATIAL  
TECHNOLOGY '18**



**EUGENE LEVIN, CP**  
**GEOSPATIAL PROGRAM  
DIRECTOR**

906.487.2446  
[elevin@mtu.edu](mailto:elevin@mtu.edu)  
Dow 819





## Link data to a specific location

By gaining hands-on knowledge of remote sensing technologies, harvesting terabytes of data and building an understanding of the software that compiles the raw information. Work with experienced faculty and industry-standard equipment to prepare for a career in a high growth industry with positions in petroleum exploration, forestry, agriculture, intelligence, internet marketing and public utilities.





# ONLINE MASTER DEGREES ACCREDITED & CONVENIENT

Study on your schedule and graduate in as few as 5 semesters!

APPLY → [MTU.EDU/ONLINE/APPLY](https://mtu.edu/online/apply) QUESTIONS → [CIVILONLINE@MTU.EDU](mailto:civilonline@mtu.edu)

## **MS IN CIVIL ENG: STRUCTURAL**

Learn to lead advanced civil and structural engineering projects following standards for design, build, and analysis. Through our online program, you'll learn advanced design techniques, explore structural dynamics, process building codes, and examine build materials. Learn from industry professionals and advance your career.

**MTU.EDU/CEGE/  
GRADUATE/CIVIL/MS/  
ONLINE/STRUCTURAL**

## **MS IN CIVIL ENG: WATER RESOURCES**

Expand your skill set in water resource engineering by designing, planning, and managing advanced water resource projects. Explore modeling and design techniques for hydraulics and hydrology focused on water supply, stormwater management, ecosystem restoration, flood risk reduction, and climate change adaptation to prepare for the future.

**MTU.EDU/CEGE/  
GRADUATE/CIVIL/MS/  
ONLINE/WATER-RESOURCES**

## **MS IN INTEGRATED GEOSPATIAL TECHNOLOGY**

Discover your sense of space through a degree in integrated geospatial technology by working with industry standard remote sensing technologies, harvesting data, and understanding industry software. Prepare for a career in a high growth industry—from forestry and petroleum exploration to internet mapping and public utilities.

**MTU.EDU/ONLINE/DEGREES/  
GRADUATE/INTEGRATED-  
GEOSPATIAL-TECHNOLOGY**



## HOW TO APPLY

Fill out a free online application as a prospective graduate student. Choose the online graduate program application. You must hold a bachelor's degree to apply. You will be mailed a letter within 5-10 business days following your application to Michigan Tech with account information to finish uploading the necessary application documents.

→ [MTU.EDU/ONLINE/APPLY](https://mtu.edu/online/apply)



*"I was searching for an online grad program that would allow me to continue working at an engineering firm in Minneapolis. Michigan Tech had everything I was looking for in an online master's program. I'm being taught by world class industry professionals and exceptional professors. They genuinely care for their students and their field of work."*

**SEAN GULBRANSON, MS STUDENT, CIVIL ENGINEERING WITH A STRUCTURES EMPHASIS**



# CERTIFICATE PROGRAMS FURTHER & ENHANCE

Stack 3 for a complete Master's degree or earn them individually to enhance your career or meet licensing requirements.



**CERTIFICATES AVAILABLE ONLINE  
IN ADDITION TO ON CAMPUS**



**MTU.EDU/GRADSCHOOL/  
PROGRAMS/CERTIFICATES**

## STRUCTURES CERTIFICATES

### Advanced Analysis

Conceptualize and analyze large and complex structures by building skillsets in determining static and dynamic load impacts, including deformation effects, post-yield behaviors, and non-standard geometries.

### Building Design

Focus on a single structural material or develop skills in multiple material specialties by enhancing skillsets in advanced connections, complex structures, and system-level building design for building structures.

### Hazard Analysis

Determine risks associated with environmental loads to structures under static and dynamic loads from wind and earthquake ground motion with a focus on deformation, post-yield behavior, and non-standard geometries.

### Timber Building Design

Design timber structures using a comprehensive knowledge base of timber structures from the component and system level with a focus on connection design, arches and tapered beams, modeling, and loading.

### Bridge Analysis & Design

Expand experiences in the design and analysis of bridge structures utilizing advanced structural analysis tools and techniques to determine static and dynamic load conditions, following AASHTO LRFD Design Specifications.



## WATER RESOURCES CERTIFICATES

### Sustainable Water Resources Systems

Manage water-related problems at local, regional, and international levels through a focus on water resource management, policy, and natural sciences on board the Agassiz or via a virtual research center.

### Water Resources Modeling

Improve modeling skills using large data and computer programming to visualize, interpret, and communicate results in a data-driven world for natural and engineered hydraulic and hydrologic systems.

### Resilient Water Infrastructure

Restore nature's water resources to a more natural state by adapting treatment aspects of water related infrastructure, including dams, embankments, diversions, levees, water distribution systems, and sewer systems.

## ENVIRONMENTAL CERTIFICATES

### Sustainability

Engage in training to understand, explore, apply and further develop sustainability education through industrial ecology, environmental assessment, and social science to invest in sustainable futures.

### Water, Sanitation, Hygiene (WASH Eng.)

Engage with communities in sustainable decision making practices to select, design, and implement technologies for the protection of public health in developing world and disaster relief settings.

## TRANSPORTATION CERTIFICATE

### Sustainable Pavement Design & Construction

Reduce environmental impacts and improve long-term performance, access, and socioeconomic equity through optimized sustainability, life cycle assessments, and cost analysis put in place in project procurement and construction.

## IGT CERTIFICATES

### Geospatial Data Science & Technology

Enhance the future of autonomous navigation, smart cities, and Internet of Things through the use of computing tool sets and programming environments for understanding and operating geospatial big data mining technologies.

### Advanced Photogrammetry & Mapping with UAS (Unmanned Aerial Systems)

Use geospatial data processing technologies with photogrammetric modeling, simulation, calibration, and assessment—creating real-world maps using UAV and satellite imagery.



# RESEARCH OPPORTUNITIES REAL WORLD EXPERIENCES

**\$500,000** OVER 5 YEARS

## Training Future Engineers for Connected & Autonomous Vehicles

**PI:** Kuilin Zhang

**Sponsor:** National Science Foundation

Smart traffic is more than self-driving cars. The research from Zhang's team focuses on improving automated driving decisions using predictive, real-time feedback within and between vehicles.

» [MTU.EDU/NEWS/CAREERZHANG](http://MTU.EDU/NEWS/CAREERZHANG)

*"Here at Michigan Tech, we're training future transportation engineers and, to prepare them for our roads, we need a new approach to studying traffic."*

**KUILIN ZHANG**

**\$327,927** OVER 4 YEARS

## NASA Funding on Lake-Effect Snowstorm Models

**PI:** Pengfei Xue

**Sponsor:** NASA

The representation of key three-dimensional lake processes and lake-atmosphere interconnections will be enhanced by developing a coupled lake-atmosphere-land model through a two-way coupling of the NASA-Unified Weather Research and Forecasting Model (NU-WRF) to a three-dimensional hydrodynamic model.

» [BLOGS.MTU.EDU/ENGINEERING/2017/08/29/NASA-FUNDING-ON-LAKE-EFFECT-SNOWSTORM-MODELS](http://BLOGS.MTU.EDU/ENGINEERING/2017/08/29/NASA-FUNDING-ON-LAKE-EFFECT-SNOWSTORM-MODELS)

*"One of the important concepts in climate change, in addition to knowing the warming trend, is understanding that extreme events may become more severe."*

**PENGFEI XUE**



# FUNDING

\$443,928

## Using New Rubber Technology to Construct High Volume Road

**PI:** Zhanping You

**Sponsor:** Road Commission of Kalamazoo County & DEQ

The presence of ground tire rubber in asphalt limits the number of tires that go to a landfill. Researchers at Michigan Tech have found an additional use in a chip seal application that has been found to increase durability, reduce reflective cracking, increase skid resistance, and reduce ride noise. Graduate students on You's research team traveled to Kalamazoo to watch the installation process.

» [BLOGS.MTU.EDU/CEE/2018/12/06/ZHANPING-YOU-ON-GROUND-TIRE-RUBBER-FOR-CHIP-SEALS](https://blogs.mtu.edu/cee/2018/12/06/zhanping-you-on-ground-tire-rubber-for-chip-seals)

*"Ground tire rubber (GTR) has generally not been used much in chip seals and the products that are being used for this project are being used for the first time in the U.S."*

ZHANPING YOU

### DEPARTMENTAL

Many of our graduate students are funded through positions as Graduate Teaching Assistants or Graduate Research Assistants through grants, contracts, or internally funded research projects. There is not a formal application for graduate support; all graduate students are considered for Departmental funding in the form of Graduate Teaching Assistantships (GTA) based on their application and/or research and academic record. Students selected for these types of funding opportunities will be notified in the early spring for the upcoming academic year. Graduate Research Assistantships (GRA) are awarded by individual faculty members. It is recommended that students seeking this type of support contact faculty in their area of interest to see if there are any funding opportunities available.

### EXTERNAL

If additional funding or support is needed, the Graduate School maintains a list of internal and external fellowship options. Support amounts, requirements, and application deadlines are available here:

**FELLOWSHIP** → [MTU.EDU/GRADSCHOOL/FINANCIAL/FELLOWSHIP](https://mtu.edu/gradschool/financial/fellowship)

### QUESTIONS?

Reach out to the Graduate Program Assistant:  
906-487-2474 | [amkerane@mtu.edu](mailto:amkerane@mtu.edu)

**LEARN MORE** → [MTU.EDU/ENGINEERING/GRADUATE/FUNDING](https://mtu.edu/engineering/graduate/funding)



# APPLY TODAY RESEARCH & INNOVATE

The first step toward your degree is by completing a (free!) application online.

→ [MTU.EDU/GRADSCHOOL/PROSPECTIVE/APPLY-NOW](https://mtu.edu/gradschool/prospective/apply-now)

## HOW TO APPLY

In addition to the application, you must submit (online) a statement of purpose and a personal statement, as well as certified copies of your college transcripts. You will also need to submit your GRE score. International applicants must provide proof of English proficiency through TOEFL scores. The official scores should be sent directly to the Graduate School using the code: 1464. We also require two letters of recommendation.

**REQUIREMENTS → [MTU.EDU/GRADSCHOOL/PROSPECTIVE/APPLY-NOW/REQUIREMENTS](https://mtu.edu/gradschool/prospective/apply-now/requirements)**

Your application will be reviewed based on your past academic performance, work experience, test scores (GRE and TOEFL), statement of purpose, and reference letters. We recommend a minimum 3.0 out of 4.0 GPA and if applicable a TOEFL score of 600 to help ensure success in our programs.

**FAQS → [MTU.EDU/GRADSCHOOL/PROSPECTIVE/APPLY-NOW/FAQ](https://mtu.edu/gradschool/prospective/apply-now/faq)**

## APPLICATION DEADLINES

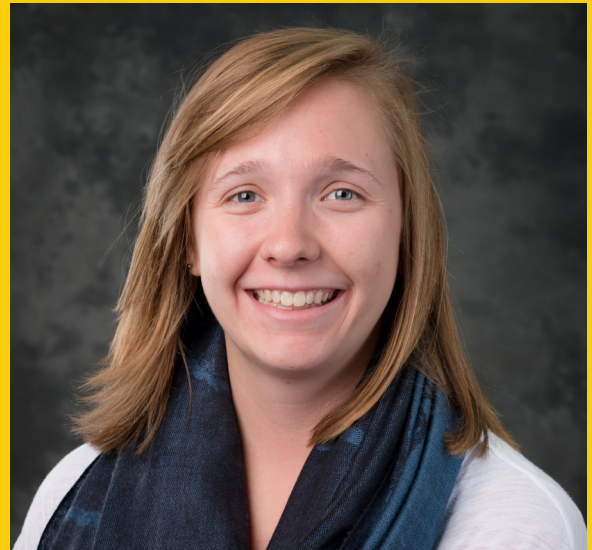
Recommended deadlines for completing your application are as follows:

- Fall Semester: January 15 (for full financial aid consideration)
- Spring Semester: October 1
- Summer Semester: February 15

Application to the graduate program automatically results in consideration for graduate teaching and research assistantships. We also encourage students to apply for outside scholarships, fellowships, need-based loans, and grants. It will take approximately four weeks for us to process your application once all required materials are received.

**STATUS CHECK → [MYMICHIGANTECH.MTU.EDU](https://my.michigantech.mtu.edu)**





*"I graduated from Michigan Tech in 2016 with a bachelor's in environmental engineering and completed my master's through the accelerated master's program in 2017. The whole Department was incredible and I always felt the faculty and staff were truly there to help me succeed. The accelerated program was especially valuable for me, as I was able to work with professors to create custom classes to focus on subjects I was hoping to explore in my career—subsurface remediation. The University was truly my home for 5 years, and while I was heartbroken to leave it, when I did I was more than prepared to launch into a successful career as an environmental engineer thanks to Michigan Tech."*

**KRISTEN JUNG, MS, ENVIRONMENTAL ENGINEERING**



# GRADUATE LEARNING HANDS-ON EXPERIENCE

Combine education and service with program offerings to gain field and research experience to share skills and talents across the country.

## VISTA & AMERICORPS

Civil & Environmental Engineering graduate students have the opportunity to work with teams across the country to support government agencies and private sector businesses, serving others and gaining valuable career experiences in the field.

Through the VISTA and AmeriCorps programs, students serve six month or one year assignments in the field, followed by a semester or two on campus to complete their master's degree. When on campus, students pay a reduced tuition rate and while serving on the ground with VISTA or AmeriCorps, the practicum credits are fully funded by the Graduate School.

**LEARN MORE → [MTU.EDU/GRADSCHOOL/PROGRAMS/DEGREES/AMERICORPS](https://mtu.edu/gradschool/programs/degrees/AMERICORPS)**

## PEACE CORPS COVERDELL FELLOWS PROGRAM

We find that many returning Peace Corp Volunteers want to both further their educational experiences and serve their communities. Through the Peace Corps Coverdell Fellows Program, students can do just that, by completing their master's degree and helping under-served communities across the United States.

By working as a Peace Corps Coverdell Fellow, our students receive a tuition scholarship of 33 percent and have the opportunity to develop and manage projects, adapt new cultures, understand how to work with limited resources, and breakdown communication barriers due to language.

**LEARN MORE → [MTU.EDU/GRADSCHOOL/PROGRAMS/DEGREES/COVERDELL](https://mtu.edu/gradschool/programs/degrees/COVERDELL)**





*"Michigan Tech and the Civil & Engineering Department have been great. The faculty members are knowledgeable and the students are all committed. Working with my advisor, Alex Mayer, on my PhD in water resources engineering has been valuable and has served as an opportunity for me to continue my research, while also spending time in my home country to watch my daughter grow."*

**SERGIO MIGUEL LOPEZ RAMIREZ, PHD STUDENT, WATER RESOURCES ENGINEERING**



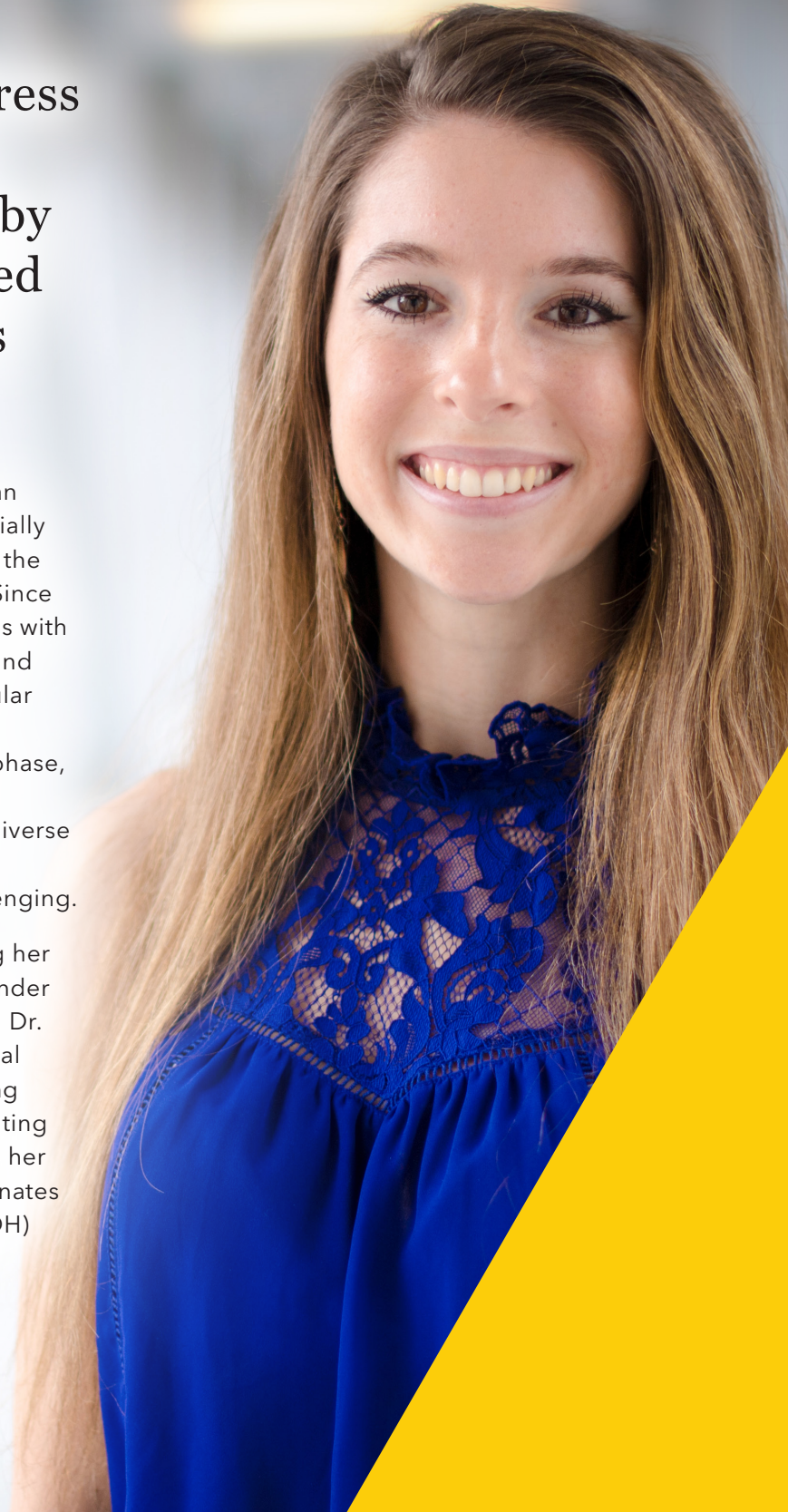
# MICHIGAN TECH GRADS

## A CUT ABOVE THE REST

Rose Turner aims to address emerging contaminants issues of PFASs in water by developing novel advanced remediation technologies and predictive tools.

Per- and polyfluoroalkyl substances (PFASs) are an emerging group of contaminants that are potentially carcinogenic to humans and have been found in the environment and various commercial products. Since the late 1940s, over 4000 different types of PFASs with diverse functional groups have been produced and used globally. While technologies such as granular activated carbon and ion exchange are currently being used to remove PFASs from the aqueous phase, there is a need for effective aqueous destruction technologies. The large number of structurally diverse PFAS chemicals makes their prioritization for the development of remediation technologies challenging.

Rose is a current MTU graduate student pursuing her master's degree in environmental engineering under Dr. Daisuke Minakata. She actively participates in Dr. Minakata's outreach activities to local and regional high school students which involve demonstrating hands-on laboratory-based experiences highlighting the micropollutant issues in water. In addition to her graduate research and course work, Rose coordinates the MTU Sustainability Demonstration House (SDH) project and is involved in various sustainability initiatives on campus.







## Housing

Michigan Tech maintains three residence halls and several apartment facilities. For specific room layouts in each hall, as well as the amenities in each, visit [mtu.edu/housing](https://mtu.edu/housing)

Many graduate students choose to live in Daniell Heights Apartments, which offer one, two, or three bedrooms options. These units all include cable, internet, heat, and electricity with common laundry spaces in each building: [mtu.edu/housing/options/graduate/daniell-heights](https://mtu.edu/housing/options/graduate/daniell-heights)

Students living in Daniell Heights Apartments are not required to have a meal plan, but it is an available option should you be interested: [mtu.edu/dining](https://mtu.edu/dining)

All vehicles parked on campus are required to have a parking permit. These can be purchased through transportation services: [mtu.edu/transportation/registration](https://mtu.edu/transportation/registration)

**QUESTIONS → [HOUSING@MTU.EDU](mailto:HOUSING@MTU.EDU) OR 906-487-2682**

**FAQS → [MTU.EDU/HOUSING/FAQS](https://mtu.edu/housing/faqs)**

**OFF-CAMPUS HOUSING → [USG.MTU.EDU/USG/HOUSING](https://usg.mtu.edu/usg/housing)**





Michigan Technological University  
Civil, Environmental, and  
Geospatial Engineering



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