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Department of Civil and Environmental  
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2021

## 2021 Civil and Environmental Engineering Department News

Department of Civil and Environmental Engineering, Michigan Technological University

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# CEE

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ENVIRONMENTAL  
ENGINEERING

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Where Modeling Meets Observations

IMPROVING THE GREAT LAKES OPERATIONAL FORECAST SYSTEM



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SPRING 2021 DEPARTMENT NEWS



# Shared Successes



The year 2020 has provided a plethora of challenges. I know my personal challenges have been minimal compared to so many friends, colleagues, and family members. We have lost loved ones to COVID and natural disasters. Homes, our security, and our way of life has been burned down or washed away. Hearts ache as members of our communities struggle to have their voices and needs heard.

Rather than focusing on the negative, I want to remind us that positive can come from adversity and as spoken by

Ruth Bader Ginsburg, "So often in life, things that you regard as an impediment turn out to be great, good fortune." I think COVID has been an opportunity to usher in change, explore new research themes, and make advancements in teaching effectiveness. Within the newsletter, you will see for yourself how the members of the CEE community continue to thrive and adapt in pursuit of our research and educational missions. Of course our success is dependent on the success of partners, friends, and alumni. For all those who support the research and educational activities of our Department, thank you for your contributions.

While this document may be about our successes and sharing them with you, we hope you will share your successes and achievements with our Department so that we can share your impact in the world with others.

*Audra Morse*

Audra Morse, PhD, PE, BCEE, Professor & Department Chair

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## COVER ART: ENVIRONMENTAL GRAPHITI

In March 2020 the CEE Department joined the Great Lakes Research Center to host an art exhibit on campus called 'Environmental Graphiti.' Environmental Graphiti® is a venture that uses **ART** to dramatize the critical **SCIENCE** of **CLIMATE CHANGE** in an effort to expand public awareness of this urgent issue: Why is our climate changing? How is our planet impacted? Who is at risk? What can we do to address this critical challenge?

**ART** makes the **SCIENCE** more accessible. **SCIENCE** makes the **ART** more meaningful. Together they tell the story of **CLIMATE CHANGE** in a unique and powerful way. Due to campus closures in the Spring the exhibit became a virtual tour, highlighting a campus map that shows where the actual pieces of art are displayed.

**VIRTUAL TOUR:** [MAP.MTU.EDU/?ID=1308#!CE/47501?S/?CT/39008,36886](http://MAP.MTU.EDU/?ID=1308#!CE/47501?S/?CT/39008,36886)

## MISSION

The Department of Civil and Environmental Engineering provides an educational, professional, and intellectual experience that enables a diverse body of students, alumni, faculty, and staff to contribute to society through teaching, research, practice, and service.

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# Pipeline Partner Program

The CEE Department is pleased to announce a joint initiative between industry partners and the CEE Department to recruit and prepare students for careers in the civil and construction industry.

The Pipeline Partner Program is a hybrid scholarship and mentoring program—targeting civil engineering, geospatial engineering, and construction management students. The program encourages a high degree of interaction between the Program Partners and students through mentoring, career guidance, and internship and full-time employment opportunities.

Thanks to our current sponsors, Ajax Paving, Annlan Corporation, Dan's Excavating, Fieldstone Architecture & Engineering, Great Lakes Engineering Group, Jay Dee Contractors, JE Kloote Contracting, Inc., and Rowe Professional Services Company for supporting the industry.

*For more information about the Pipeline Partner Program, please check out the [program web page](#) or contact Marney Kloote ([mkloote@mtu.edu](mailto:mkloote@mtu.edu)) or Audra Morse ([anmorse@mtu.edu](mailto:anmorse@mtu.edu)).*



## VISION

The Department of Civil and Environmental Engineering will develop internationally prominent educational and research programs that will benefit all of its constituencies and, in doing so, will become an international Department of Choice.

## DIVERSITY

To further the Department's mission of teaching, research, and service, the Department strives to be diverse, inclusive, and respectful of all staff, faculty, and students in support of the University's Diversity Statement. The goal of this statement is to ensure everyone will be given equitable support, opportunity, and access to resources necessary to realize individual potential while contributing to the success of the Department.

## GUIDING PRINCIPLES

We will continually work to engage our students, faculty, and staff in the integration, creation, and dissemination of knowledge through teamwork, personalized instruction, research, and outreach. We will value diversity. We will measure our success by the success of our graduates and by the growth in the department's prestige.



# Civil and Environmental Engineering Professional Advisory Committee

*The Civil and Environmental Engineering Professional Advisory Committee (CEEPAC) meets semiannually to consult on ideas and visions that continue to keep our programs in tune with the long-term needs of the civil and environmental engineering employment sectors.*



## NEW CEEPAC MEMBERS

### BARON COLBERT

**Dr. Baron Colbert**, a civil engineering graduate of Michigan Tech, is currently a Senior Engineer with Alta Vista Solutions, headquartered in Oakland, Calif. Colbert supports client objectives and initiatives with his strong interpersonal management and communication skills. With a thorough background in asphalt mix testing and asphalt materials, he has managed mobile testing laboratories.

Colbert has experience performing various lab tests including, aggregate testing, asphalt mixture performance tests, Superpave asphalt mixture design tests, and asphalt binder grade testing.

He has provided technical expertise and recommendations in support of multiple states and the Federal Highway Administration initiatives for the improvement of project delivery including, specifications, program risk and opportunity assessments, and providing recommendations for resolving roadway materials related issues.

### ROSS HUBBARD

As a Senior Environmental Engineer at one of the largest petrochemical facilities in the Midwest, **Ross Hubbard** is keenly aware of what is needed for effective and compliant environmental operations.

He currently leads air permitting and compliance, leak detection and repair, and chemical management for a large olefins plant and six polyethylene plants. Ross also takes a strong role in supporting his company beyond his site—through peer audits of other facilities and leading or supporting company-wide teams on compliance and new rule evaluation.

He takes an active role in emerging issue industry groups, including a past role on the executive board for the Illinois Environmental Regulatory Group. Hubbard joined LyondellBasell in 2015 after 14 successful years with one of the largest private companies in America. With over 20 years of experience, he is well versed and passionate in petrochemical environmental compliance.

### BRETT STANTON

**Brett Stanton** joined the Asphalt Pavement Association of Michigan (APAM) as the new Executive Director on April 27, 2020, after having worked in the paving industry for over 20 years.

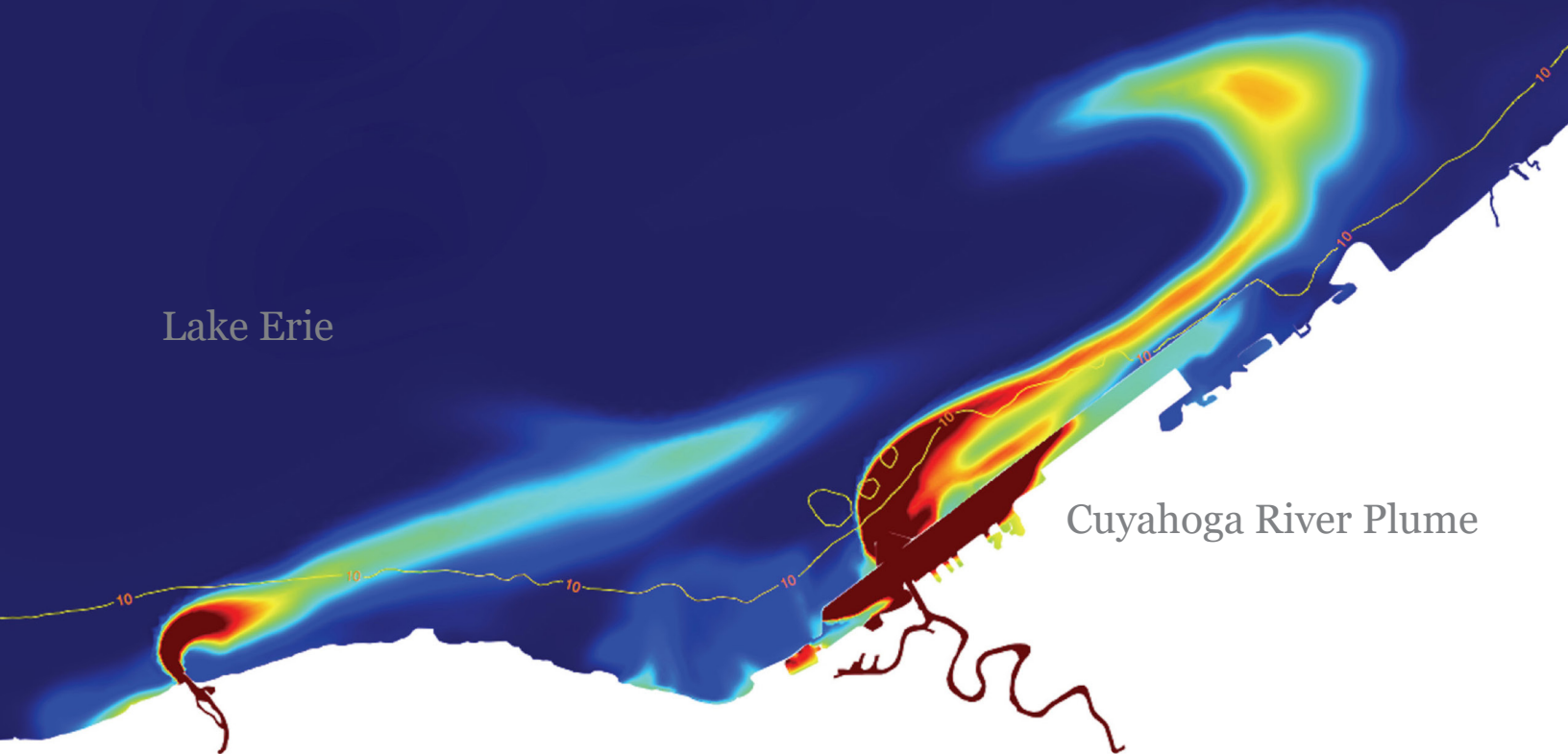
Before joining APAM, he worked for a horizontal construction science and technology startup where he was responsible for operations as well as supplying technical support to the additive and consulting divisions of the business. Prior to that, he worked for two different Midwest paver-producers for nearly 15 years in total.

At each entity, he was charged with various responsibilities including overseeing special projects ranging from performance-based specification implementation to management of the operations for an asphalt additive business. Additionally, he was tasked with leading both a technical services and a civil engineering department responsible for supporting many different asphalt plants, paving operations, asphalt terminals, and civil construction projects across several different states.

### CEEPAC Civil & Environmental Engineering Professional Advisory Committee

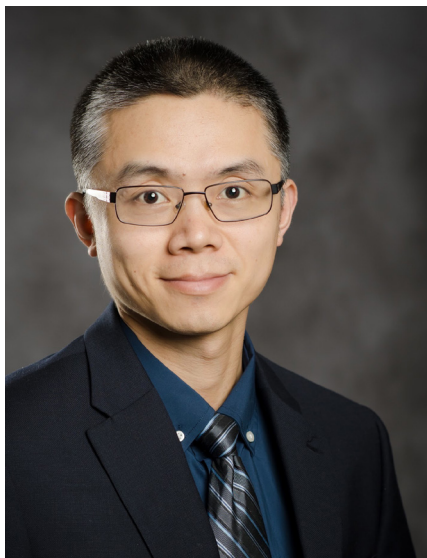
Michelle Banonis, Esq.	California Department of Water Resources
Ronald Cavallaro, PE	OHM Advisors
Baron Colbert, PhD	Alta Vista Solutions
Dennis Decator, PE, PMP	DTE Energy
Ross Hubbard	Flint Hills Resources, LLC
James Keighley	The Kraft Heinz Company (retired)
Sean Kelley, PE, MBA	Mannik Smith Group, Inc
Leslie Nelson, PE	GZA GeoEnvironmental Inc.
Ingrid Sandberg, PE	Shannon & Wilson
Teresa Schissler-Boichot, PE	Boichot Consulting
Brett Stanton, PE	Asphalt Pavement Association of Michigan
Kim Zimmer, PE	Michigan Department of Transportation

*CEEPAC members represent the different specialty areas as well as the various employment sectors including consulting firms, corporations, and local and state government.*



# Where Modeling Meets Observations

## IMPROVING THE GREAT LAKES OPERATIONAL FORECAST SYSTEM



**Pengfei Xue**, associate professor in the Department of Civil and Environmental Engineering and joint appointee at Argonne National Laboratory, has been immersed in studying all five of the Great Lakes since joining Michigan Tech seven years ago. His interdisciplinary research program has gained national and international recognition.

Though the Great Lakes are called lakes, because of their sheer size they are truly inland seas. They affect regional weather patterns, provide drinking water to millions of people, and drive the economies of several states.

Forecasting the water levels, temperatures, and currents of the lakes is highly important because of the myriad ways lake conditions affect

commerce, recreation, and community well-being. These forecasts comprise the Great Lakes Operational Forecast System (GLOFS), an automated model-based prediction system operated by the National Oceanic and Atmospheric Administration (NOAA).

### **BUILDING A BETTER GREAT LAKES FORECASTING SYSTEM**

*“Water levels are used by power authorities, wave and currents conditions are used by the U.S. Coast Guard for search and rescue missions, and temperature profiles have been used by recreational boaters and fishermen,”* he said. *“The information has also been used to predict harmful algal blooms as well as hypoxia (low dissolved oxygen) conditions in the Great Lakes.”*



*“Xue’s research contribution and collaboration with NOAA scientists advance our overall understanding of the complicated dynamic system in the Great Lakes as well as accelerate NOAA’s pace to develop, improve, and transition the next-generation Great Lakes Operational Forecasting System to operations.”* Philip Chu, Supervisory Physical Scientist, NOAA

Xue noted that a typical operational forecast system should include three components: modeling, an observation network, and data analysis.

*“The Great Lakes region has relatively dense and long-term observational data, but how do we use the data to improve forecasting?”* Xue posed.

*“These data have been used for model initialization and verification, but there can be a much stronger linkage between in-the-field observations and numerical modeling. Blending observational data into the model can improve short-term forecasting. This technique, called data assimilation, is one of the most effective approaches for statistically combining observational data and model dynamics to provide the best estimate of the Great Lakes system state.”*

#### **WHAT IS DATA ASSIMILATION?**

To explain data assimilation, Xue gave the example of taking the temperature of a lake. A computer model might predict the temperature at a site in the lake is 68 degrees Fahrenheit (20 degrees Celsius). But a physical measurement at the site shows the temperature is 70 degrees Fahrenheit (21.1 degrees Celsius).

*“All models contain some uncertainties and the observation also has noise, which can be large or small in fieldwork, depending on different cases,”* Xue said.

*“Which should you believe? Your best bet is something in between. When we quantify the model and the observation uncertainties by assessing their historical performances, we can quantitatively combine the observational data and the numerical model results with different weights and give a more accurate estimate.”*

Computer modeling is much more complicated than this example, Xue noted. One key advantage of a model, especially in a large and complex environment like the Great Lakes, is that it can produce continuous fields in 3D space, predicting—at any time and any place—temperature, water levels, and currents. On the other hand, in situ observations provide “ground truth,” but are often limited in time and space.

#### **MORE THAN A MODEL**

Another limit of in-the-field observations is the sheer cost of doing them. Observational data is inherently more accurate than a model alone, and ground truthing the output of a model is necessary. By feeding observational data into a model, then using the model to predict better locations for future in situ data collection, Xue’s work helps the GLOFS modeling improve and helps scientists choose research sites effectively. Xue’s preliminary results show data assimilation is able to reduce sampling efforts and increases forecasting accuracy by optimizing sampling locations.

*“Professor Xue’s contribution aligns perfectly with NOAA and NOAA’s Great Lakes Environmental Research Laboratory (GLERL), short-term goal and long-term mission on building an integrated environmental modeling system and a weather-ready nation, healthy oceans and coasts,”* said Philip Chu, supervisory physical scientist of the integrated physical and ecological modeling and forecasting branch of NOAA’s GLERL.

*“His research contribution and collaboration with NOAA scientists advance our overall understanding of*

*the complicated dynamic system in the Great Lakes as well as accelerate NOAA’s pace to develop, improve, and transition the next-generation Great Lakes Operational Forecasting System to operations.”*

Xue’s work utilizes Superior, a high-performance computing infrastructure at Michigan Tech, to build high-fidelity models. Model results are being used to build a long-term, data assimilative temperature database for Lake Erie for use by resource managers and researchers in the Great Lakes community. Xue’s project will also apply machine learning to further enhance model performance and adaptive in situ sampling, with the goal to extend the method to all five Great Lakes.

*“We want to demonstrate the potential of this approach. Lake Erie has experienced substantial environmental issues for decades and has been studied more comprehensively, and people realize better the modeling deficiencies,”* Xue said.

*“The thermal structure and circulation of Lake Erie greatly impact harmful algal blooms and hypoxia events. Our plan is to gradually expand and build a fully operational forecast system with data assimilation capabilities to improve short-term forecasting accuracy and refine the observing work.”*

#### **GRANTS AND FUNDING**

Xue has received new funding to expand the project, by the Great Lakes Restoration Initiative, through the University of Michigan Cooperative Institute for Great Lakes Research (CIGLR) cooperative agreement with NOAA.

# Wastewater Treatment to Eliminate Pathogens

INCLUDING SARS-COV-2



**Dr. Jennifer Becker**, associate professor of civil and environmental engineering, is leading coronavirus research and surveillance in human waste for the Western Upper Peninsula. When the virus that causes COVID-19 finds its way into wastewater, what happens to it? Environmental engineers will track the coronavirus in wastewater and biosolids to find out.

Unlike many viruses, SARS-CoV-2, which causes the disease COVID-19, is not eliminated in the human gastrointestinal tract. So, when a person infected with the virus – whether they have noticeable symptoms or not – has a bowel movement, the live virus in their feces enters the wastewater stream. Researchers at Michigan Tech want to

track the fate of SARS-CoV-2 based on **past work monitoring and treating other viruses, bacteria, and parasitic worms** in the solids produced during wastewater treatment.

## BEYOND COVID-19

As important as it is to treat wastewater for viruses like SARS-CoV-2, there are other ongoing wastewater concerns that deserve increased attention. Removing parasitic worms from wastewater would improve the lives of more than a billion people around the world. **Read more on [mtu.edu/unscripted](https://mtu.edu/unscripted).**

*“We’re not just interested in seeing if the virus is in the wastewater—it undoubtedly will be. We want to know what happens to the virus in wastewater and biosolids,”* said Becker.

Biosolids are produced during wastewater treatment and then further processed to greatly reduce the numbers of any disease-causing organisms they might contain. After this process, biosolids are often spread on land to improve soil quality and plant growth. The current production methods are very effective at reducing even the hardiest disease-causing organisms historically found in wastewater. However, the SARS-CoV-2 virus clearly doesn’t always behave in expected ways.

*“We want to make sure the SARS-CoV-2 virus particles are no longer infectious when we spread biosolids,”* Becker said. *“If any of the virus particles stay in the wastewater stream during treatment, what happens when wastewater is discharged to the environment? We know almost nothing about the answer to this question right now.”*

Becker works with **Eric Seagren**, professor of civil and environmental engineering; Ebenezer Tubman, associate professor of biological sciences; and **Daisuke Minakata**, associate professor of civil and environmental engineering. The team received seed funding from Michigan Tech’s College of Engineering to put together a research proposal to track SARS-CoV-2 in wastewater in partnership with local wastewater treatment facilities, including the Portage Lake Water & Sewer Authority in Houghton. The research and surveillance program has also been recently boosted by funding through the Western Upper Peninsula Health Department and the Michigan Department of Environment, Great Lakes, and Energy (EGLE).

The tests used to look for the virus in wastewater samples are similar to **clinical tests used on people**. A positive wastewater test could be used by



municipal wastewater managers as an early monitoring tool in communities that have not yet seen other evidence of the virus.

*"People can be asymptomatic but are shedding the virus in their stool," Becker said. "For several years, Dr. Seagren and I have been doing research looking at the fate of pathogens in wastewater treatment biosolids."*

Becker believes the research team will find coronavirus particles in the biosolids, but that the virus will be inactivated and unable to cause disease a relatively short time after being spread in the environment.

To test this theory, the research team has proposed spiking biosolids with another virus that shares many properties with SARS-CoV-2, but does not cause serious illness in humans. By exposing the biosolids to different combinations of temperature, sunlight, and moisture, and by measuring the levels of this other virus in the biosolids over time, the researchers should be able to predict the survival of the coronavirus under a wide range of conditions.



## NEXT STEPS

Although EPA standards for wastewater and biosolids treatment are rigorous and the measures for managing biosolids land application are protective of human health, the Michigan Tech research team does not want to take for granted that conventional wastewater treatment systems are removing SARS-CoV-2. "We want to verify that the human coronavirus is being adequately inactivated," Becker said.

Since the Michigan Tech researchers proposed their research plan, scientists at Michigan State University and other research institutions have begun discussing the development of a network of labs that could monitor for the virus throughout Michigan. A lab in the Upper Peninsula at Michigan Tech would be especially helpful for detecting the virus in UP communities.

*"We all think of food and water as being essential to life. They are, but waste is also a critical part of life," Becker said. "All organisms generate it, and it's something people don't really want to deal with. However, we all produce waste, and we have to manage it appropriately to protect public health and the quality of our environment. This is one of the key responsibilities of environmental engineers, and it's really essential to sustaining livable communities."*

## BECKER ELECTED CHAIR OF AEESP FOUNDATION

**Dr. Jennifer Becker** was elected Chair of the Association of Environmental Engineering and Science Professors Foundation (AEESP Foundation). Becker was elected to the AEESP Foundation Board of Directors in 2019, beginning her three-year term as Chair in January 2020.

With over 800 members, AEESP is an international organization made up of mostly environmental engineering and science professors. The AEESP Foundation supports and encourages environmental engineering and science education, outreach, and research by sponsoring a distinguished lecturer series, awarding K-12 educational and outreach grants, and administering award programs for professors and students.

Becker has a distinguished record of service to the environmental engineering community. She served as a member of the U.S. Environmental Protection Agency Science Advisory Board's Environmental Engineering Committee from 2016 until the committee was retired in 2018. She was also elected by her peers to the AEESP Board of Directors in 2010. While on the AEESP Board of Directors, Becker held several AEESP officer positions, including President of AEESP (2013-2014).





**BUILT WORLD**  
ENTERPRISE





# Built World Enterprise— National Academies Award

The Enterprise Program at Michigan Tech gives students of any major the opportunity to work in teams on real projects, with real clients, in an environment that is more like a business than a classroom. Michigan Tech created this innovative approach to education in 1999 and currently has 25 Enterprise teams that work to invent products, provide services, and pioneer solutions. About 15 percent of Michigan Tech's undergraduate students participate in the Enterprise Program through guidance and coaching from faculty members.

In July the **Built World Enterprise**, housed in the Department of Civil and Environmental Engineering, was recognized by earning first place in the 2020 Transportation Research Board's Airport Cooperative Research Program

(ACRP) **student design competition**. The team's winning submission in the *Runway Safety/Runway Incursions/Runway Excursions* design category was "**Runway Intersection Marking**."

The Built World Enterprise was launched in 2018 and addresses challenges typically solved by civil and environmental engineers, including designing infrastructure and solving waste management problems. The team's advisor is the Department of Civil and Environmental Engineering Chair **Audra Morse**. Morse said, "The win was a strong start for the new Enterprise team and for the University."

The selection was made from 63 entries by a panel of industry, FAA, and academic experts. In making the announcement, the ACRP said

*"The students' innovative design brought many technologies together in an affordable system for mid-size and general aviation airports."*

*"All Built World teams strove to create realistic design alternatives to address airport issues; however, this team excelled in understanding the true root causes of runway incursions. The winning team members, **Lindsey Anderson, Skylar Callis, and Kaitlyn Wehner**, moved beyond purely technical to incorporate human factors into their design, which is why I believe their design was so well received. Thanks to **Bill Sproule, Kelly Steelman, and Brett Hamlin** for assisting the team on their win. They could not have done it without their help,"* said Dr. Audra Morse, Michigan Tech Professor and Department Chair.



## ENTERPRISE TEAM TAKES SECOND

Additionally, another Michigan Tech Built World Enterprise team received a second-place award in the *Airport Environmental Interactions Challenge*. A list of all winners can be seen on the [ACRP website](#).

First-place teams received their awards and presented their work virtually at the Keck Center of the National Academies of Sciences, Engineering, and Medicine in Washington, DC, October 19, 2020. The students will also present their designs at the **Airport Consultant Council's** Airport Technical Workshop as a keynote presentation.

The Transportation Research Board is a program unit of the National Academies of Sciences, Engineering, and Medicine—private, nonprofit institutions that provide independent, objective analysis and advice to the nation to solve complex problems and inform public policy decisions related to science, technology, and medicine



STUDENTS PARTICIPATING IN MICHIGAN TECH SCIENCE OUTREACH EVENT AT BELLE ISLE AQUARIUM IN DETROIT.

## STEM Outreach in CEE

Outreach and involvement with the public continues to be a core value for the Department of Civil and Environmental Engineering. Some outreach is with a professional network such as the County Engineers Conference through our Center for Technology and Training.

At other times, outreach is with members of our communities to build understanding about complex problems such as global water issues and climate change through our research efforts. However, one of the most important areas of outreach that civil, environmental, and geospatial engineers do is to increase interest in Science, Technology, Engineering, and Math (STEM) career paths of K-12 students.

The Department expanded on our Summer Youth Programming in 2019 and we are looking forward to initiating a Geospatial Engineering Summer Youth Program in 2021, sponsored by Atwell Group.

The Atwell gift will provide tuition assistance for the Geospatial Engineering Summer Youth Program. The Summer Youth Programs are an amazing way to initiate students to the Michigan Tech campus while they gain insights into engineering and other STEM fields.

Consider passing on this opportunity to the young people in your sphere of influence: information on Summer Youth Programs is available here: <https://www.mtu.edu/syp/application-process/forms/>

Even more critical outreach comes from developing initial interest in STEM pathways at an earlier developmental age. The K-8 Family Engineering, after-school science and engineering programs, and the Lake Superior Water Festival are examples of outreach that can spark an interest in STEM.

Joan Chadde, Director of the Center for Science and Environmental Outreach in the Department, has been working on this very thing for more than 20 years. Her programming reaches students from Calumet to Detroit.

The Alternative Spring Break in Detroit is part of our outreach efforts through funding obtained from General Motors and mobilized the Michigan Tech National Society of Black Engineers (NSBE) student chapter to participate with the trip. This past spring was the ninth she has organized.



Six members of Michigan Tech's student NSBE chapter Pre-College Initiative reached a total of 500 students during their ninth annual Alternative Spring Break in Detroit from March 9-11, 2020. The students visited six middle and high schools in Detroit to encourage students to consider college and a STEM career.

During the school day, the Michigan Tech students made classroom presentations to middle and high school students inspiring them to continue their education after high school by attending a college or community college and ultimately choosing a STEM career path. After the school day ended, the NSBE students conducted K-8 Family Engineering events at two K-8 schools for students and their families and at a Boys & Girls Club in downstate Highland Park.

*"Going downstate to the Detroit area to talk to kids about engineering was a wonderful experience. Interacting with the kids and hearing their wonderfully complex questions like, 'Can fish suffocate in chocolate milk?,' was the highlight of my year,"* said Meghan Tidwell, second year civil engineering student.

The goal of the NSBE classroom presentations and Family Engineering events are to engage, inspire, and encourage diverse students to learn about and consider careers in engineering and science through hands-on activities and by providing 'hometown' role models, as most of the participating NSBE students are from the Detroit area. These programs are designed to address our country's need for an increased number and greater diversity of students skilled in STEM.



## TEACHER OF THE YEAR

In the spring of 2020, **Joan Chadde** received the prestigious 2020 Informal Science Teacher of the Year Award from the **Michigan Science Teachers Association** (MSTA). Chadde accepted the award at the MSTAs annual conference held March 6-7, 2020 in Lansing. She was selected because of her unique and extraordinary accomplishments, active leadership, scholarly contributions, and direct and substantial contributions to the improvement of non-school based science education over a significant period of time.

Chadde, who retired from her full-time position at Michigan Tech in May, was also selected for the **2020 University Diversity Award**. Although she has officially retired, she will continue to assist with outreach for at least a couple more years.

*"We are so lucky to have Joan Schumaker-Chadde, a passionate and successful STEM outreach professional. By 2019, her programs had reached more than 10,000 K-12 students, teachers, and community members per year,"* said Audrey Mayer, Michigan Tech Interim Vice President for Diversity and Inclusion.



JOAN CHADDE AND THE 13 HIGH SCHOOL STEM INTERNS (2019) FROM ACROSS MICHIGAN CELEBRATE AFTER THEIR LAST-DAY PRESENTATIONS DESCRIBING THEIR RESEARCH AND CAMPUS EXPERIENCES.



# Rail Transportation Program Wins National Honor

The Rail Transportation Program (RTP) at Michigan Tech has received a prestigious grant from the National Railroad Construction and Maintenance Association (NRC). Each year the NRC accepts applications for the NRC Education Grant Program from colleges and universities with rail education programs.

In addition to Michigan Tech's RTP, the University of Illinois at Urbana-Champaign's Rail Transportation and Engineering Center received a NRC Education Grant.

*"This year, we had a record number of applications for the 2019 NRC Education Grant Program. All submissions were from top-tier rail programs which made the committee's job very difficult in deciding our winners," said Daniel Stout, vice president of STX Railroad Construction Services, and the chairman of the NRC Education Committee.*

*"I am looking forward to having our co-winners, Michigan Tech and University of Illinois at Urbana-Champaign, join us*

*in discussing their respective programs and how they plan to utilize the grant funds at the 2020 NRC Conference in San Diego."*

Rail education at Michigan Tech includes coursework and related rail transportation minor, field trips, research projects, internships, scholarships and hands-on opportunities. The RTP is active in pre-university education sponsoring a Rail and Intermodal program through Michigan Tech's Summer Youth Programs (SYP).

RTP Director Pasi Lautala (CEE), said the grant funds will be used for enhancing the educational resources available for the Rail Program. These include the construction of a track section on campus and the development of various demonstration tools related to railroad signals. The grant will also support the activities of the Railroad Engineering and Activities Club (REAC) and the Summer Youth Program. We have made a few adjustments to our original educational plans due to the current restrictions.



*"We are extremely excited that the NRC recognizes the value of academic programs in securing talent for the future generation of railroaders."*

PASI LAUTALA

*"The vision of our program is 'to develop leaders and technologies for 21st-century rail transportation,' and this grant will allow us to make improvements that we have considered for several years. We are humbled by NRC's selection and are looking forward to working more closely with NRC in improving railroad engineering education in the US," Lautala says.*





# Giving Back Around the Globe

MICHAEL PADDOCK '87 '88, 2020 HUMANITARIAN AWARD



MIKE PADDOCK  
AND HIS WIFE  
CATHY WITH  
MENTOR MIKE  
SHAWCROSS

Michael Paddock has used his degrees from Michigan Tech to make an impact both at home and abroad. After years of volunteering with Engineers Without Borders USA (EWB-USA) while holding a demanding full-time position, the 55-year-old Paddock now volunteers full-time conducting engineering work, currently serving as a Senior Technical Advisor for COVID-19 to the United Nations Development Program.

After graduating with BS in Surveying ('87) and Civil Engineering ('88), Paddock took a position with CH2M HILL in Milwaukee managing transportation megaprojects. Examples include the Zoo Interchange reconstruction, the Mitchell Interchange reconstruction, and the Marquette Interchange reconstruction. These three Milwaukee projects totaled \$5 billion and were delivered on time and on budget.

Paddock credits his college experience for preparing him. "Michigan Tech gave me all the tools I needed to succeed. Not only the technical tools, but the work ethic, business perspective, and importance of working with people as a team," he says.

It was a near-death experience with cancer that propelled Paddock into his volunteer work. "I learned 'never do tomorrow what you can do today.' That has given me the opportunity to mentor hundreds of students on over 100 projects that have been built on five continents around the world."

Much of his volunteer service has come with EWB-USA, particularly in Guatemala, having developed the initial strategic plan and leading the startup operations. The office now manages 65 projects per year.

Over two decades, Paddock has mentored students at Michigan Tech and several other colleges around the country. The projects have included schools, potable water supply, wastewater treatment, flood control, and pedestrian and vehicle bridges.

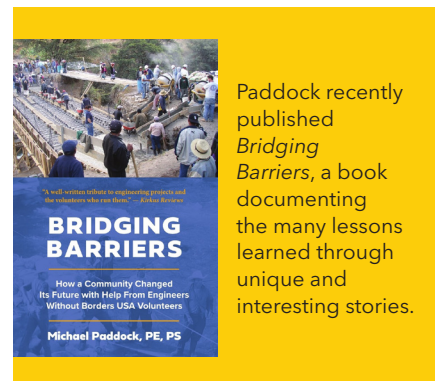
Paddock co-founded EWB-USA's Engineering Service Corp that uses the organization's most experienced members to provide pro-bono engineering services around the globe. He has also been part of eight disaster response teams for hurricane, drought, earthquake, and volcanic events.

In 2009, he was honored with the EWB-USA Founders Award, as the Outstanding Member of the Year. Paddock also garnered many other awards for his full-time work, including Wisconsin Engineer of the Year in 2006 and the State of Wisconsin Governor's Award, which was bestowed for his work on the Marquette Interchange.

"I believe there's an obligation to 'pay forward' what your mentors have shared with you to the next generation of engineers," Paddock says.

Paddock and his wife, Cathy, further put this philosophy into practice by sponsoring an \$80,000 scholarship fund in the Civil and Environmental Engineering Department, which will provide \$5,000 renewable scholarships for four students. Their generous gift to the Department will also sponsor the CEE Student Success Center, providing student coach funding, as well as student organization travel and leadership opportunities.

Because of his efforts improving the lives of people around the globe, Paddock was honored by the Michigan Tech Alumni Board with the 2020 Humanitarian Award.





# Lifetime Donations

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*“The **John A. Alholm Scholarship** means a lot to me because it alleviates the pressure and stress of financial concerns, allowing me to focus on my academics. This means I have more time to dedicate toward my education, which helps me get closer to achieving my professional and academic goals. I hope to receive my Bachelor’s Degree in Civil Engineering in 2021 and then follow it with a Masters in Civil Engineering-Structures in 2022.”*

Alec Weitermann, Civil Engineering Senior, Steel Bridge Team



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**Diane '81 and Craig '80 Holmes**, both graduates in civil engineering, recently settled on a specific way to give to Michigan Tech after realizing the original plans for their trust were difficult to implement.

They chose to make Michigan Tech the beneficiary of their primary residence through a Lady Bird deed. Their substantial gift will primarily support scholarships within the Civil and Environmental Engineering Department. Other parts of their gift will benefit the University's Husky Emergency Assistance Fund and our Department's involvement in intercollegiate competitions, such as Concrete Canoe.



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