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7-2018

## July and August 2018 news items

Office of Vice President for Research

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# July and August 2018 archived news items

## Multimillion-dollar research center addresses construction challenges

CONTACT: JEANNE BARON  
JULY 17, 2018 | WMU NEWS

KALAMAZOO, Mich.—An interdisciplinary group of Western Michigan University researchers is busily studying new and creative ways to build better in an age of climate change and other global challenges facing the construction industry.

Their activities are being funded by grants from **WMU's Georgeau Construction Research Center**, which was established in 2016 through a **\$5 million gift** from Phil Georgeau of Kalamazoo and his late wife, Betty.

The couple funded the center to not only advance the construction industry through innovative research, but also to create better, stronger, safer, sustainable and more resilient construction systems and materials. Housed in Floyd Hall and administered by the College of Engineering and Applied Sciences, the center already has **awarded \$350,000 in grants** to seven projects being conducted by faculty members at the University.

In addition, construction has begun on a \$1 million lab that will open this fall in the College of Engineering and Applied Sciences annex near the Kalamazoo/Battle Creek International Airport. The state-of-the-art laboratory facility will allow researchers to evaluate roofing system designs under extreme wind loads as well as study the properties of large-scale structural elements and samples under different loading conditions, including seismic loads.

### NEED FOR CHANGE

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According to government figures, the construction industry contributed more than \$1 trillion to America's gross domestic product and employed some 7 million people in 2017.



Dr. Osama Abudayyeh

**Dr. Osama Abudayyeh**, chair of the Department of Civil and Construction Engineering and founding director of the Georgeau Center, notes that it's important for this industry to remain competitive, given its huge impact on the U.S. economy.

"We're facing a host of challenges, from evolving regulatory requirements, population increases and energy shortages to air quality issues, a rising ambient temperature and more violent weather," Abudayyeh explains. "Engineers and architects have been forced to rethink traditional building codes and construction practices. It's not only sensible to change how we do things, it's become mandatory."

With that reality in mind, the Georgeau Center aims to:

- Advance the construction body of knowledge through innovative research.
- Distill research results into best practices that can be implemented by industry.
- Educate the next generation of construction researchers by engaging undergraduate and graduate students alike in the center's research.
- Transfer technology to industry through product development as well as publications, workshops and other knowledge dissemination.

"We need to adapt our materials and construction practices to new realities and we need to provide higher levels of training for construction professionals," Abudayyeh says. "The cutting-edge, forward-thinking research and training we're doing at the Georgeau Center will accomplish both."

## PHIL AND BETTY GEORGEAU

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Phil Georgeau earned a bachelor degree in chemistry from WMU. He went on to found Chem Link, a company based in Schoolcraft that manufactures adhesive, sealant and coating products for the construction industry that employed 104 people at the time Phil and Betty sold it in 2016.

The couple also gifted \$250,000 in 2016 to the WMU Office for Sustainability to boost its studies in environmental and renewable building materials issues that impact the Earth's survivability.

In addition, the Georgeau family established a \$500,000 endowed scholarship in Betty's name to support undergraduate students pursuing engineering degrees in programs offered through the College of Engineering and Applied Sciences at WMU. Betty was a registered nurse who worked locally at Bronson Methodist Hospital for many years as well as spent 14 years with the American Red Cross.

## EXAMPLES OF CENTER RESEARCH

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Dr. Upul Attanayake



Dr. William Liou



Dr. Xiaoyun Shao

This spring, the Georgeau Center awarded continuation grants to principal investigators at WMU that build on eclectic work that the center first funded in 2017.

- **Dr. Upul Attanayake**, associate professor of civil and construction engineering, and Dr. William Liou, professor of mechanical and aerospace engineering, received \$50,000 to further Attanayake's recent evaluation of roof systems and materials for improving structural resilience in damaging winds such as tornados and hurricanes. That research has identified the need to develop numerical simulation expertise to assess the performance of roofing and structural systems. The continuation project includes designing a mobile outdoor experiment facility to evaluate sensors and validate numerical simulation models. It also will be used for STEM—science, technology, engineering and math—education and other outreach activities.
- **Dr. William Liou** has built a predictive tool to simulate incidents of fire and smoke events and predict the location and likely growth of fire and smoke in smart buildings. The second phase of his research involves developing two datasets for predicting fire spread in smart buildings and then using those datasets to design an artificial intelligence-based algorithm for big data analytics for fire safety in these buildings. The nearly half million structure fires in the U.S. each year cause 17,000 injuries and deaths, and \$10 billion in property losses.
- **Dr. Xiaoyun Shao**, associate professor of civil and construction engineering, has been studying an innovative application of construction adhesives to enhance the resilience of wood-frame buildings. With her latest grant, Shao will investigate additional novel approaches to dramatically enhance the resilience of wood-frame buildings using construction adhesives to improve strength and stiffness. Damage to those structures from earthquakes, hurricanes and other natural hazards leads to tremendous economic loss and emotional distress in North America, where wood-frame construction is predominantly used.

**Learn more** about the [Georgeau Construction Research Center](#) online.

# Chemistry Professor Wins NSF Grant to Study Bioinspired, Selective Anion Incarceration by Nanojar

Contact: [Diana Berkshire Hearit](#)

July 31, 2018

Kalamazoo, Mich.—A Western Michigan University researcher has been awarded a \$376,411 grant from the National Science Foundation to further develop his work with anions, specifically to develop highly efficient and selective anion extracting agents in order to remove anions from contaminated water.

The grant was awarded to [Dr. Gellert Mezei](#), associate professor of chemistry, who has been studying negatively charged ions, also known as anions, for well over a decade. Expanding on a 2014 National Science Foundation grant, Mezei's team has shown that his novel class of anion extracting agents, also known as nanojars, can reduce levels of arsenic and chromate from water to those acceptable to the Environmental Protection Agency.

Anions, ubiquitous in nature, often are found in water, in the human body and the surrounding environment. However, anions in the form of sulfates, nitrates, phosphates and chlorides can be extremely damaging in bodies of water and can contaminate lakes, rivers and streams, leading to excessive growth of algae and lake eutrophication. Mezei hopes, by using the liquid-liquid extraction agents (nanojars), to extract the problematic anions from polluted water.

“This project aims at elucidating the molecular basis of anion binding by nanojars,” says Mezei. “The detailed knowledge gained about selective anion binding by nanojars will be exploited for designing appropriate organic ligands for increased selectivity.”

“This award will fund both graduate and undergraduate student research,” says Mezei, “and will allow us to synthesize novel organic molecules which will enhance the selectivity of nanojars for particular anions.”

Dr. Mezei has been awarded two U.S. patents for his nanojar technology. The first patent protects the method of making nanojars and extracting anions from liquids. The second patent awarded in July 2018 protects the commercially valuable forms of the nanojars.

Mezei was selected in 2017 for an Emerging Scholar Award, an award that recognizes the accomplishments of WMU faculty members who are among the rising stars in U.S. higher education.

A faculty member since 2007, Mezei has mentored and supervised numerous graduate and undergraduate students and worked with the American Chemical Society's Project SEED for economically disadvantaged high school students. He also has assisted with the Science Olympiad, organized activities for "Chemistry Day at the Museum" in Kalamazoo and participated in WMU student orientation and advising events. He has been an active member of the American Chemical Society since 2000.

His other awards at WMU include the 2012 Arts and Sciences Teaching and Research Award; 2012 and 2016 Discovery and Dissemination Awards; 2008, 2010 and 2017 Faculty Research and Creative Activities Awards; and a 2010 Impacting Communities by Advancing Chemistry Award.

## Resource Network



### COLLABORATE WITH US

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The WMU Resource Network facilitates industry collaboration, technology commercialization, professional development programs and recruiting opportunities.

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**Research**

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**Grants and Contracts to Join Office of the VP for Research | Aug. 13**

WMU seeks to provide the best organization and systems to advance their discovery driven mission and promote excellence in research.

## NSF 2026 Idea Machine @ WMU!

### CALLING ALL WESTERN MICHIGAN BIG THINKERS!

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The National Science Foundation and Western Michigan University are giving students, faculty and other current learners (14+ enrolled in an accredited Michigan school) the opportunity to submit the next Big Idea.

The NSF encourages out-of-the-box thinkers to propose and submit innovative science, technology, engineering and math (STEM-related) ideas that relate to questions that cross traditional boundaries to influence future NSF research.

Thirty participants will advance in the global challenge and have the opportunity to win various scholarship amounts toward research and/or education.

Every innovative idea out of WMU, chosen by NSF, will receive \$1,000 to work with faculty and staff to further develop their research proposals. [2026 NSF Idea Machine](#) finalists have the opportunity to earn \$26,000 in scholarships and/or research stipends.

All entries must be submitted through both the official NSF Idea Machine process and sent to [ovpr-marketing@wmich.edu](mailto:ovpr-marketing@wmich.edu) to be considered for qualification.

### INSTRUCTIONS AND GUIDELINES FOR COMPETITION

[Downloadable instructions and guidelines](#)



### [Downloadable flyer](#)

The [NSF 2026 Idea Machine](#) is a competition to help set the U.S. agenda for fundamental research in science and engineering. Participants can earn prizes and receive public recognition by suggesting the pressing research questions that need to be answered in the coming decade, the next set of “Big Ideas” for future investment by the National Science Foundation (NSF). It's an opportunity for researchers, the public and other interested stakeholders to contribute to NSF's mission to support basic research and enable new discoveries that drive the U.S. economy, enhance national security and advance knowledge to sustain the country's global leadership in science and engineering.

Since Broncos have a lot of great big ideas, we would like to challenge our community to participate in this unique opportunity.

The NSF Idea Machine is open to anyone over 14 years of age. WMU would like to sponsor a competition to get the biggest boldest Bronco ideas into the Idea Machine. The competition is very simple.

1. **ELIGIBILITY:** A current Bronco student, staff or faculty member or teams. A potential future WMU student ages 14 and up in the state of Michigan (defined as enrolled in an accredited high school or community college).
2. The applicant gets their idea ready and submits to NSF via the official process by 11:59 p.m. EST on October 26, 2018.
3. The same entry to WMU must consist of a PDF file emailed to [ovpr-marketing@wmich.edu](mailto:ovpr-marketing@wmich.edu) no later than noon October 30, 2018 with the following:
  - a. The email from NSF showing "Congratulations! Your proposal has been received and submitted for the NSF 2026 Idea Machine."
  - b. Your submission which is obtained by using the download entry button after you have hit submit on the NSF Idea Machine web site.
  - c. A list of all team members by name and the email address, affiliation and phone number of the team leader.
4. The initial review process will be the NSF Idea Machine competition.
5. At the completion of the NSF review, a Blue-Ribbon panel of science and engineering experts from WMU faculty, alums and local companies will judge the entries.

6. All team winners will split the prizes from WMU as described below at the discretion of the identified

Team Leader.

7. Staff winners who receive a research grant must work under a WMU faculty member unless they

already have Principle Investigator status at WMU or are eligible for this status at WMU.

Prizes will be given out as follows:

STEP 1: NSF competition:

NSF STAGE 1: Any idea submitted to NSF AND WMU which is selected to be one of the approximately 30 representative entries selected by NSF entries and invited to submit video pitches, will receive support from OVPR to prepare their entry. These entries will automatically be one of the winners of the WMU internal competition.

NSF STAGE 2: Any idea, which makes it to the round of 12 ideas for a virtual interview, will receive support from OVPR to prepare their entry. They will also receive a prize of \$1,000 in the form of a scholarship for a high school student or undergraduate, a research stipend support for a WMU graduate student or research funding for faculty or staff to match the NSF award.

NSF STAGE 3: Any idea selected as a winning entry (2-4 expected from NSF) will receive an additional prize of \$26,000 (scholarship for a high school student or undergraduate, research stipend support for a WMU graduate student or a research grant for faculty or staff) to match the NSF award.

Should any idea submitted to WMU be placed by recommendation of NSF into a formal collaboration among the authors of multiple original, essentially identical entries, the WMU contest participants will receive a prize equal to their contribution to the collaboration among the authors / team leaders of the multiple original entries as defined by NSF.

STEP 2: WMU internal competition:

WMU will award up to four WMU internal competition prizes chosen by the WMU Blue-Ribbon panel. This is inclusive of any winners in the STEP1 NSF competition.

For exceptional ideas submitted to the NSF Idea Machine: For high school or community college students: the winner will receive a \$1000 scholarship for their first year in attendance at WMU.

For WMU undergraduate or graduate students: the winner will receive a \$1000 fellowship to do

a paid research fellowship at WMU with the advisor of their choice by mutual agreement. For WMU faculty or staff: the winner will receive a grant of \$1,000 for their research. In addition, if more than four applicants are NSF winners, all will receive the \$1000 prize, and the top four ideas will receive the research award. Should the winner choose to work on their idea at WMU, an additional \$5000 research award will be provided. These funds can pay for a stipend for a student winner (high school, undergraduate, community college or graduate student) to work with a WMU faculty advisor of their choice by mutual agreement, or provide a faculty or staff winner with \$5000 to pay a student (undergraduate or graduate student) to work with them on their idea.

#### Eligibility:

All current faculty, staff and students (undergraduates or graduate students) at WMU must be at the University in their role at the time of award for either step of the competition. The WMU internal competition undergraduate research award can be used for the summer after graduation.

Should an undergraduate student graduate prior to completion of the award, the award can be used towards graduate school if the student is accepted into a WMU program.

Future Broncos applying (age 14 and up and enrolled in an accredited high school or community college at time of submission) must reside in the State of Michigan at the time of submission to the WMU internal competition and must be enrolled in an accredited high school or community college.

All [NSF eligibility requirements](#) must be met: see the NSF web site for details but key rules are copied below from the NSF web site:

- All contestants (including individual entrants and all team members) must be at least 14 years of age on September 1, 2018
- U.S. citizens or permanent residents, or residing legally in the U.S. on September 1, 2018.
- Only one entry per individual or team is permitted.
- A contestant may submit an entry as an individual or as a member of a team, but not both.
- A contestant may only be on at most one team.
- Entries may be submitted by individuals or by teams comprised of up to five individuals, one of whom must be designated as the team leader. For team submissions, the team leader will be responsible for determining the division of any prize money.

- The judges' decisions cannot be appealed.

DISCLAIMERS: WMU may modify or cancel the review process should an insufficient number of entries be received. Should more than four entries to WMU be selected in the NSF competition (Step 1), no additional prizes will be awarded in the Step 2 WMU competition.

## Undergraduate Research and Creative Scholarship Excellence Award

Western Michigan University recognizes the contribution of hands-on research and creative scholarship performed by undergraduate students in the education process and the advancement of our discovery mission. The WMU Undergraduate Research and Creative Scholarship Excellence Award will support WMU undergraduate students to pursue projects with faculty members on campus. Students may participate in research during the fall, spring or summer sessions.

### OVERVIEW

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*The goals of the award are:*

- To provide WMU undergraduate students with an opportunity to have a mentored research or creative scholarship-related experience under the mentorship of one of WMU's tenured or tenure track faculty. Students can apply for a \$750 award for a semester, or a \$375 award for each of one or two summer sessions. These funds can be used for a stipend for the student, travel or research related costs such as supplies.
- To provide WMU tenured or tenure track faculty who are actively funded or seeking external funding the opportunity to work with and mentor an undergraduate student in a project related to their expertise.

*For a faculty member to serve as a mentor they must meet one of the following criteria:*

1. Be a tenure-track Assistant Professor in their first three years of appointment when the student applies for the award. The award must be completed before the faculty member completes their fourth year of appointment.
2. Currently support undergraduate or graduate students on any externally funded research program of at least \$5,000 in total direct costs. The faculty mentor must have current active external funding at the

time of the project that pays the student. Since students may not know who is currently funded, it is expected that the mentors will recruit students for their projects.

3. Tenured or tenure track faculty who demonstrate that they are **actively seeking** external funding. Submit at least one external grant or contract of at least \$5,000 total direct costs with full facilities and administrative costs appropriate for the type of sponsor and work in the past year and whose budgets for external funding include support of students.

Faculty in categories 1 and 2 can request up to \$200 for supplies with justification to support the student. Students may apply for the award independent of a faculty member-requesting the additional funding but must have a letter indicating that their advisor can support them in their research.

*Additional policies and procedures:*

- Applicants cannot be awarded the research award in the same semester as their college or the Lee Honors College award.
- Faculty cannot sponsor more than two applications per cycle.
- Students who apply for the award with a faculty mentor who had two students receive funding for one of the application cycles will be given a lower priority in the following review cycle.
- Students cannot receive more than two awards in their time at WMU. A second award will only be considered for students who have demonstrated satisfactory program performance and priority will be given to students who have applied for external funding (travel award, fellowship).
- This is a competitive program and not all students are likely to be funded.

**APPLY**

Application deadline Oct. 1, 2019 for spring semester and summer I support, and noon on **March 11, 2019** for work to be completed during the summer II session or the fall semester.

[Downloadable version](#)

## PREVIOUS WINNERS

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View a list of students who have benefited from this award: [previous Undergraduate Research Excellence Awardees](#).