

2019

ANNUAL REPORT

UW-MILWAUKEE  
RESEARCH FOUNDATION





## UWM Research Foundation's Board of Directors Welcome

The UWM Research Foundation is helping to create an environment that attracts, retains and supports the university's innovative researchers by building and delivering transformative programming, including the Catalyst Grant Program. Without the support of our gracious donors and numerous community partners, the discoveries that come out of UWM's research enterprise could not be possible.

On behalf of the UWMRF Board of Directors, we are pleased to share this update highlighting the achievements of the Research Foundation over the past year.

Gregg Tushaus  
Chair, Board of Directors

Jacquelyn Fredrick  
Vice Chair, Board of Directors



The University of Wisconsin-Milwaukee had another exciting year with tremendous successes in the areas of research and entrepreneurship, from the grand opening of the Lubar Entrepreneurship Center and UWM Welcome Center to growth in partnerships and programs.

UWM's classification for a second time as a "Research 1" university speaks to the quality of our faculty, staff, students and partners. The Carnegie Classification of Institutions of Higher Education's "R1" designation positions UWM among the top 3% of institutions of higher education nationwide.

The university continues to build on its past success in research, innovation, partnerships and entrepreneurship. Support for a new freshwater research vessel, our expanded work with the Northwestern Mutual Data Science Institute, advances in UWM's Connected Systems Institute, and the expansive array of research in the humanities, health, business, social work, arts and more will help elevate UWM's status as a well-respected research institution for years to come.

Thank you for the continued and unwavering support of UWM and the UWM Research Foundation.

Mark A. Mone  
Chancellor, University of Wisconsin-Milwaukee



## UWMRF: Who We Are

The UWMRF fosters research, innovation and entrepreneurship at UW-Milwaukee, complementing the discovery and education mission of the university by helping students and faculty translate their ideas into products, services and new companies. It also has built a portfolio of intellectual property with UWM researchers and has partnered with companies to bring those ideas to the marketplace.

Through its collaboration with the Lubar Entrepreneurship Center and the southeastern Wisconsin I-Corps program, sponsored by the National Science Foundation, the UWMRF offers entrepreneurial education for our innovation community.

Because mentoring is an essential part of the journey, the UWMRF this year launched the UWM ENGAGE program, offering our budding innovators access to expert advice and feedback from area entrepreneurs and business leaders. Innovators at any stage are encouraged to participate, including students, faculty, staff and UWM alumni. Contact UWMRF if you would like to support this important work.

83

issued  
patents

47

license/option  
agreements

16

UWM  
startups

93

grants given

\$5  
MILLION

total amount  
awarded

\$20  
MILLION

follow-on  
investment

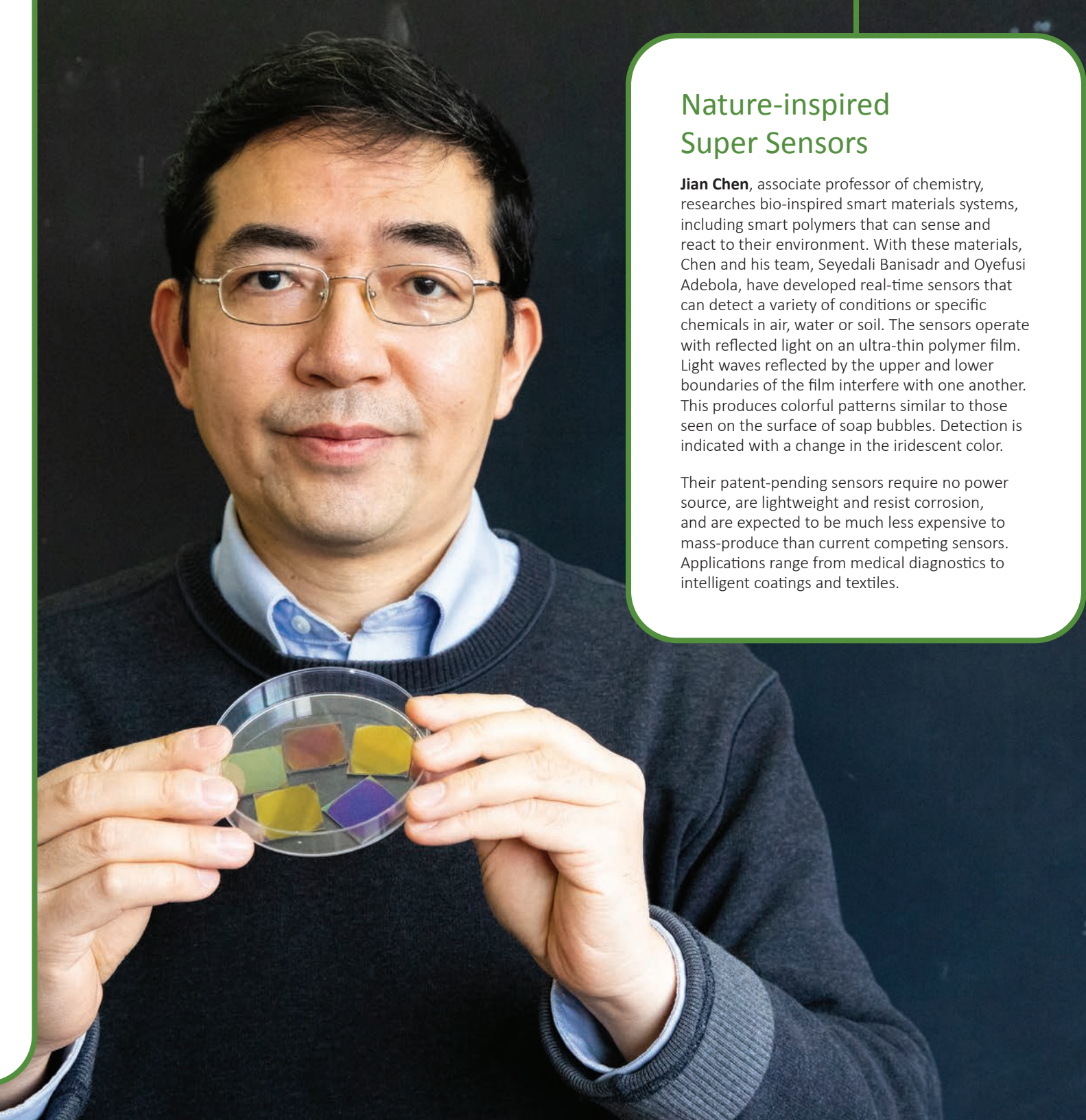
## Catalyst Grant Program

Of course, new ideas with commercial potential require seed funding, and the UWMRF's **Bradley Catalyst** and **Herzfeld Catalyst** grants provide that initial support. In 2019, the UWMRF completed its 12th year of the Catalyst Grant Program, supported by the Lynde and Harry Bradley Foundation, and the Richard and Ethel Herzfeld Foundation. Catalyst grants provide much-needed backing to bolster very early ideas. For more advanced projects, the grants can finance key proof-of-concept data or cover prototyping costs, steps needed to attract commercial partners. Below and on the next pages, you'll read about past Catalyst grant winners and their innovations.

## Longer Life for Li-ion Batteries

**Deyang Qu's** battery and water research has attracted nearly \$4 million in external grants from organizations such as the National Science Foundation, the U.S. Department of Energy and Johnson Controls (now Clarios). Qu and his research team have created a family of chemical additives that increase the life span of commercially available lithium-ion batteries. They've also developed a process for easily integrating the additives into existing manufacturing lines. Qu, who holds the Johnson Controls Endowed Professorship in Energy Storage, leads energy storage research at UWM.





## Nature-inspired Super Sensors

**Jian Chen**, associate professor of chemistry, researches bio-inspired smart materials systems, including smart polymers that can sense and react to their environment. With these materials, Chen and his team, Seyedali Banisadr and Oyefusi Adebola, have developed real-time sensors that can detect a variety of conditions or specific chemicals in air, water or soil. The sensors operate with reflected light on an ultra-thin polymer film. Light waves reflected by the upper and lower boundaries of the film interfere with one another. This produces colorful patterns similar to those seen on the surface of soap bubbles. Detection is indicated with a change in the iridescent color.

Their patent-pending sensors require no power source, are lightweight and resist corrosion, and are expected to be much less expensive to mass-produce than current competing sensors. Applications range from medical diagnostics to intelligent coatings and textiles.



## Safer Childbirth

Despite an increase in the amount of data in health care, practitioners still can't harness it to gain the "big picture" of a patient's condition. This information gap is one reason the U.S. needs new tools for ensuring positive pregnancy and delivery outcomes. **AkkeNeel Talsma**, the Walter Schroeder Chair and associate professor of nursing, is developing analytics software that will help to detect and avoid potential complications and readmissions of mothers and infants, thus leading to better outcomes for health care systems

Developed with Catalyst grant support, Talsma's Maternity Metrix Solution initially focuses on developing pilot projects with regional entities, including the Wisconsin Department of Health Services, which oversees the Medicaid recipients through BadgerCare. Talsma is currently founder and CEO of the startup Melius Outcomes, which markets a software tool for improving safety and efficiency in hospitals and surgery centers.

## Easier Crop Breeding

Sorghum has traditionally been used for livestock feed, but it's becoming more popular for human consumption because of its high nutritional content. **Dazhong (Dave) Zhao** has used his Catalyst grant to create a novel sorghum crop-breeding process in collaboration with the U.S. Department of Agriculture. The professor of biological sciences works on plant development using a variety of biological and genetic approaches. Zhao's patent-pending technology will substantially simplify sorghum breeding and make breeding hybrids faster and less expensive. He also has invented a method of controlling plant breeding by developing female sterile plants.



450+

participants

23

companies formed

\$6.5+ MILLION

funds raised

## The National Science Foundation's Innovation Corps (I-Corps)

I-Corps accelerates the transfer of academic research into the marketplace by instructing faculty and graduate students to identify markets for their lab discoveries and form startups. UWM and the UWMRF have partnered to deliver this program to UWM and other institutions in southeastern Wisconsin over the last five years. I-Corps teams that complete the training also have included undergraduates and alumni. Two teams are featured here.

### Better than Bicycling

Many older adults report that they are uncomfortable riding a bicycle. **Andrew Dressel** (second from right), a lecturer in mechanical and civil engineering, and his team of students have developed a recumbent tricycle with features that make cycling safer and easier.

An ergonomic design gives the rider the ability to control the tilt, improve their visibility, and keep their balance while getting on and off. The trike can lean into turns, just like a bicycle, which enables it to go around corners without rolling over. Last year, Dressel's team took the southeastern Wisconsin I-Corps training and also earned the "Innovation Award" at ASME's Human Powered Vehicle Challenge. The UWMRF is looking for partnerships with interested bike companies.



### Managing Medical Tubing

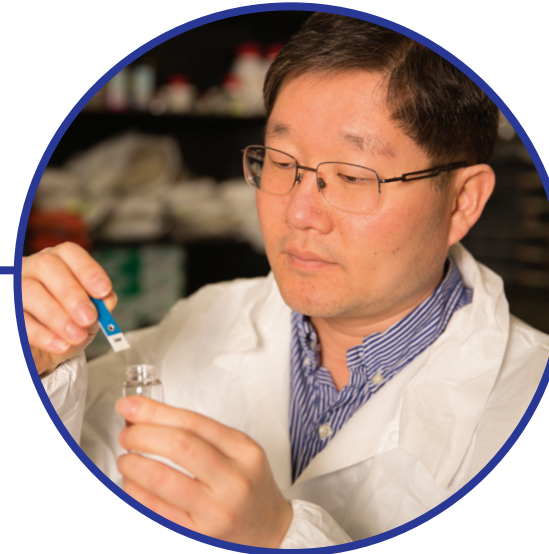
UWM doctoral student **Lindsey Roddy** (center) came up with a unique organizer of medical tubing that solves the problem of vital medical lines being mistakenly pulled out when patients move or are moved. After participating in the Startup Challenge, Roddy formed RoddyMedical LLC with **Kyle Jansson** (left), director of the Prototyping Center at UWM's Innovation Campus. The team completed the southeastern Wisconsin I-Corps training and is currently negotiating a license agreement with the UWMRF. They recently received backing from the Wisconsin CTC Ideadvance Seed Fund and are applying for federal STTR funding.



## Addressing Women and Aging

**Karyn Frick**, professor of psychology, is using her Catalyst grant to develop new drugs aimed at protecting women from negative health effects that occur with the loss of estrogen during menopause. These include memory loss, depression, anxiety and hot flashes.

The project is a collaboration among Frick and researchers from Marquette University and Concordia University. After participating in the southeastern Wisconsin I-Corps program, the team members formed the startup Estrigenix Therapeutics and are negotiating a license option agreement with the universities. They already have attracted \$902,000 in grant funding from the National Institutes of Health to investigate the effect of their compounds on estrogen receptors in the human body. Now, they are pursuing federal SBIR funding.



## Pollution Detectors

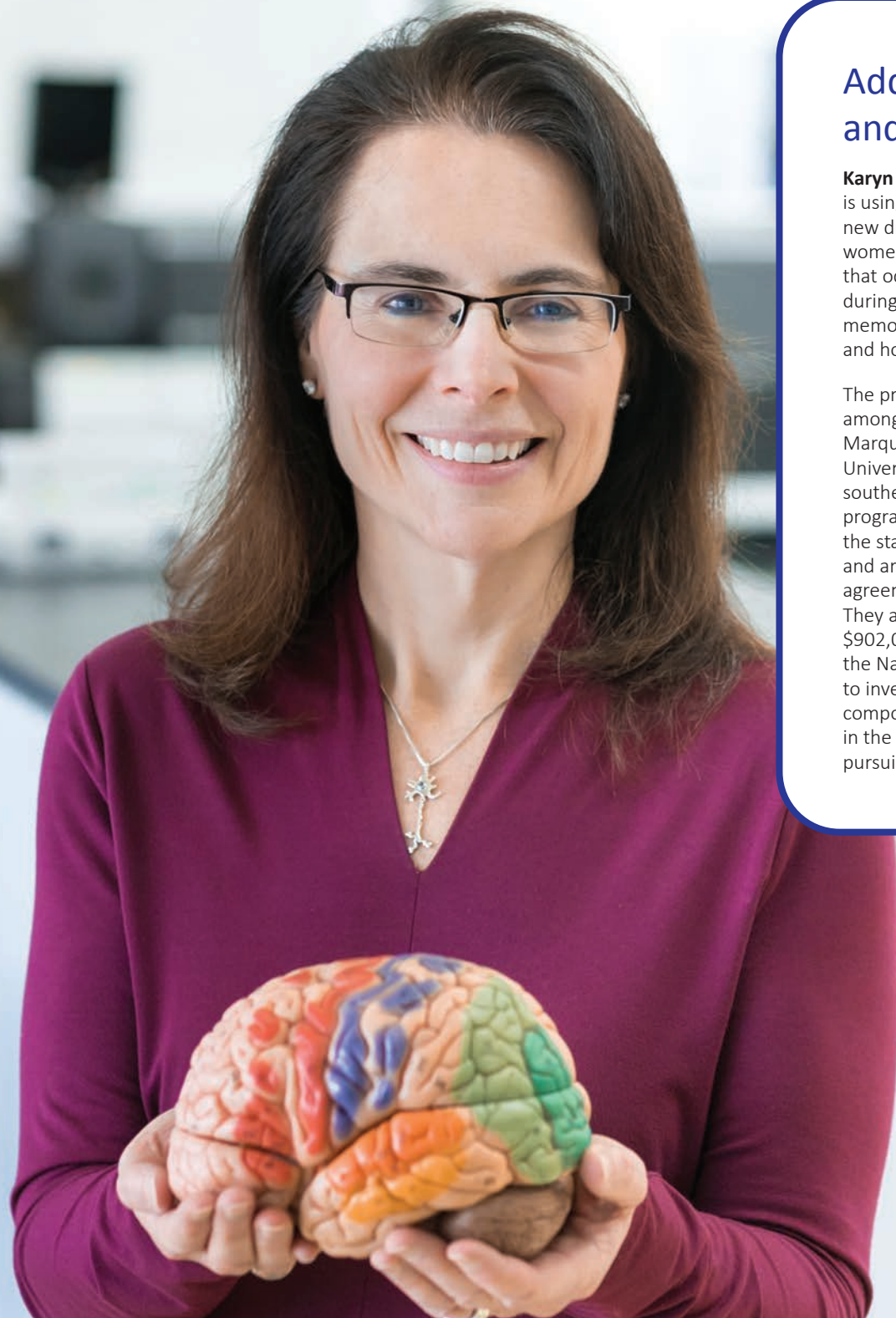
Even in trace concentrations, heavy metals present in air, food and water can accumulate in the body and pose a major threat to human health. Phosphates from fertilizer use and agricultural runoff are another common water contaminant and the cause of harmful algae blooms that foul bodies of water.

**Woo-Jin Chang**, engineering associate professor, has created unique sensors that address both of these problems. Chang has worked with the UWM Water Equipment and Policy Center to develop cost-effective sensors that can be disposable or deployed for long-term monitoring. They offer an improvement over current detection devices that are expensive, bulky and require professional operators.

Chang has completed both the southeastern Wisconsin I-Corps program and the national I-Corps, and is optimizing his sensors with a 2019 Catalyst grant.

## High-tech Concrete

**Konstantin Sobolev**, professor of civil and environmental engineering as well as the self-proclaimed “Godfather of Concrete” at UWM, is a prolific inventor and industry collaborator who focuses on concrete and asphalt materials, sensors and coatings. As associate director of UWM’s Center for Byproducts Utilization, he conducts studies on high-performance cement composites, the use of nanomaterials in construction, and waste in concrete materials. Sobolev has two startup companies: Alfacrete, which is commercializing a concrete coating that repels water and ice formation, and a concrete-related consulting startup called Concretology.



3,600+

participants  
in pop-up  
workshops (2018-19)

121

student  
enterprises (since 2012)

445

ideas submitted  
through Startup  
Challenge (since 2012)

## Lubar Entrepreneurship Center

The Lubar Entrepreneurship Center and UWM Welcome Center opened its doors on May 8, 2019, celebrating with more than 500 guests. The new building is a hub for student activities, whether it's connecting through LEC programming or meeting with entrepreneur-thought leaders from across the region.

This investment in UWM's entrepreneurial community was made possible thanks to the generous contributions of the Lubar family and other supporters, including the Kellner Foundation; Jerry Jenduska; Avi Shaked and Babs Waldman; American Family Insurance; We Energies; and Bud and Sue Selig.



At left, Sheldon and Marianne Lubar celebrated the grand opening. Above, the LEC is where UWM thinkers and makers join forces with business and the community to transform the economy. The facility includes an innovation studio and rooms for flexible instruction, co-working and collaboration, and community gatherings.

## LEC Programming

The Lubar Entrepreneurship Center (LEC) is devising an array of programs that cuts across disciplines and includes both the commercial and nonprofit sectors. In addition to hosting two speaker series, “Social Good Morning” and “Diverse Ideas,” the LEC is also the site for the southeastern Wisconsin I-Corps program. The LEC leads workshops for freshmen enrolled in UWM’s Honors College, hosts a campuswide ideas incubator called the Startup Challenge, and presents an annual UWM Innovators Expo, along with other pop-up workshops and lectures that attract people from campus and the community.



## Startup Challenge

The Startup Challenge allows people to learn from the experience of launching an enterprise and links them with courses to help develop and prototype their ideas along the way. This co-curricular program mirrors real-world settings where teams earn resources through their commitment to the process. More than 120 teams have completed the Startup Challenge, now in its eighth year, and 21 teams have launched companies. **Kali Knutson** (left), who earned a bachelor’s degree in communications last year, and her business partner, **Miluzka McCarthy** (right), began their journey with a luxury camping business idea. Over time, they modified their plans and launched DoCo Disco, a “silent disco” where customers wear headphones tuned to various music channels for a unique entertainment experience.

## Community Partnerships

The LEC’s reach is not limited to campus. It’s a resource for the entire community. The LEC has developed outreach programs that engage local schools and school systems, creating a pipeline of entrepreneurial talent. The Shorewood Schools K-12 Fellows Program, for example, aims to help high school and middle school teachers redesign their classes that teach “design thinking,” techniques for generating new ideas based on basic problem-solving. Through a partnership with the Kern Institute at the Medical College of Wisconsin, the LEC is helping those who teach the next generation of doctors to rethink medical education, using some of these same techniques.





## Leadership

LEC team members leverage their diverse backgrounds and their own entrepreneurial experiences to offer high-quality programming for students and useful resources to faculty across disciplines at UWM. This wide array of perspectives, combined with the insights of visiting entrepreneurs, bring news ways of thinking to those on and off campus.



**Nicole Powley**, Program Manager, promotes entrepreneurial and innovative thinking across campus and all disciplines by running programs, facilitating workshops and meeting with students.



Professor **Nathaniel Stern** brings his unique background that blends art and engineering to his role as Director of the Startup Challenge. In addition to teaching, he has consulted on projects at many large Milwaukee companies.



**Ilya Avdeev**, an associate professor of mechanical engineering, is the LEC Director of Innovation and a leader of the core team that operates the NSF I-Corps program in Southeast Wisconsin.



**Loren Peterson** is the LEC's Entrepreneur-in-Residence who works with faculty and researchers to launch startups. He has played a significant role in the success of UWM faculty startups Pantherics Inc. and SafeLi, LLC.



**Mark Fairbanks** joined the LEC as the Social Innovation Entrepreneur-in-Residence in 2018. He is the cofounder and executive director of the nonprofit Islands of Brilliance. Fairbanks oversees a new program, Social Good Company.



**Mutope Johnson**, who earned his master's degree in art from UWM, is the Entrepreneurial Teaching Fellow who assists with Startup Challenge programming.



The UWM Research Foundation staff includes (from left) Brian Thompson, Jessica Silvaggi, Smruti Patil, Erin Puro and Sarah Gribble.

## Board of Directors

- Gregg Tushaus, Chair – President, Emergifi and CIO, Corporate Central Credit Union
- Jacquelyn Fredrick, Vice Chair – CEO and President, Versiti, Inc. (retired)
- John Torinus, Treasurer – Chairman, Serigraph Inc.
- Sujeet Chand, Secretary – Senior Vice President, CTO, Rockwell Automation, Inc.
- Mike Anderes, Board Member – President, Inception Health & Chief Innovation and Digital Officer for Froedtert & The Medical College of Wisconsin
- Christina Fiasca, Immediate Past Chair – Vice President Product Finance, Northwestern Mutual (retired)
- David Gilbert, Ex-Officio Director – President, UWM Foundation, Inc.
- Joseph Kerschner, Board Member – Dean & Executive Vice President, Medical College of Wisconsin
- Michael Orgeman, Board Member – Attorney/Shareholder, Lichtsinn & Haensel, s.c.
- Craig Rigby, Board Member – Vice President of Technology, Clarios

## Thank You



The UWM Research Foundation is honored to contribute to UWM's culture of discovery, innovation and entrepreneurship. We are deeply grateful to the researchers, partners and supporters who make this important and transformative work possible.

Brian Thompson  
UWM Research Foundation President



The UWMRF team strives to better support our innovators at UWM and is working on new ways to provide mentorship, funding and streamlined licensing avenues for UWM startup companies and outside partners. We greatly appreciate the opportunity to work with our faculty, students and staff from every department to help bring their new ideas to the marketplace.

Jessica Silvaggi  
Director of Technology Commercialization



