GUIDING INNOVATION | FOSTERING PARTNERSHIPS

ON THE PROWL: THE RESEARCH REVIEW

July 2024

Newsletter Contents: 17th Annual **Catalyst Grant Winners**, UWM Professor Rani El Hajjar **seeking partnerships**, and UWMRF **spinout TCare** in the news.

UWM Scientists Receive $250,000 for Groundbreaking Research

THE **CATALYST GRANT PROGRAM** has provided $6 million in support for projects and produced measurable outcomes and transformational impact. This year we have selected 5 new projects, leading to a total of 114 funded projects which have yielded 66 issued patents, 50 patents pending, 30 license/option agreements, and more than $40.7 million in follow-on investments in these UWM technologies to date. This support has also helped in the launch of 18 UWM startup companies.

Thanks to Catalyst Grant Program Donors!

This year's Catalyst Grant Program is made possible through generous donations.

The **Lynde and Harry Bradley Foundation** has provided continued support for the program since 2007.

New this year, **Invenergy** supported an award specifically for clean energy research.

Past Catalyst donors include Clarios, GE Healthcare, the Richard and Ethel Herzfeld Foundation, and the Rockwell Automation Charitable Corporation.

Are you interested in supporting Catalyst Grants? contact Jessica Silvaggi, jessica@uwmrf.org.

Since the program's inception, Catalyst projects have earned close to a **seven-fold return** in follow on grants and investments. This year five exciting UWM projects will receive $50,000 each to kickstart research related to drug discovery, breast cancer treatment, solar energy, infrastructure safety, and cybersecurity.

The projects listed below will be led by a combination of new and seasoned faculty members and their graduate students.

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Using Advanced Computer Models to Find New Treatments for Skin Disease & Leukemia Dr. Arjun Saha, Dept. of Chemistry and Biochemistry

Dr. Saha's project aims to revolutionize the understanding and targeting of protein-protein interactions (PPIs) in diseases. By combining machine learning algorithms with quantum chemistry and molecular dynamics, this research seeks to design small molecules that can modulate PPIs, providing new avenues for drug discovery in cancer and neurodegenerative diseases

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Identifying Breast Cancer-Fighting Proteins from Healthy Cells Dr. Qingsu Cheng, Dept. of Biomedical Engineering

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Developing Low-Cost Materials for Better Solar Panels
Dr. Nikolai Kouklin, Dept. of Materials Science and Engineering; Dr. Konstantin Sobolev, Dept. of Civil and Environmental Engineering

This project focuses on developing zinc oxide phosphate films for use in solar cells and other optoelectronic devices. The researchers aim to overcome current material challenges in solar energy, offering a cost-effective and scalable alternative that enhances efficiency and environmental sustainability.

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Creating a Device to Safely Test Anchors in Concrete Structures Dr. Jian Zhao, Dept. of Civil and Environmental Engineering; Dr. Nathan Salowitz, Dept. of Mechanical Engineering

This research team proposes a "smart cap nut" to detect defects in adhesive anchors used in concrete structures. By generating and measuring micro vibrations, this device aims to improve safety and reliability in construction, addressing a critical need for nondestructive testing methods.

Improving Cybersecurity for Advanced Manufacturing Systems Dr. Zhen Zeng, Dept. of Computer Science

Dr. Zeng's team plans to create a large language model-assisted threat modeling system to enhance cybersecurity in complex advanced manufacturing systems. By automating repetitive tasks and integrating threat intelligence, this tool seeks to significantly reduce the time and effort required for threat modeling, improving the security posture of organizations.

These projects exemplify the University's commitment to fostering research that addresses critical challenges and drives innovation. The Catalyst Grant Awards will support these researchers in bringing their transformative ideas to fruition.

Panther Partner Spotlight

Rani ElHajjar - Pioneering Solutions in Composite Material Analysis

Tell us about your main area of expertise.

My recent areas of focus are in nondestructive full field analysis of strain and stress in polymer-based composite materials. These materials are becoming increasingly popular across various industries due to their lightweight nature, corrosion resistance, and cost-effective manufacturing. However, the complexity and variability in the manufacturing process of polymer composites can lead to reliability issues in the final structure compared to traditional materials like metals. Thus, there is a need to consider how the manufacturing interacts with the final structure's performance.

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My work also involves using advanced full field measurement techniques, which offer a comprehensive view of strain and stress distribution across the entire material. This approach helps identify discrepancies between expected and actual performance, guiding necessary adjustments in the manufacturing process or design to prevent failures.

What are some ways you and UWM can help companies?
I am often called upon to help companies manage the complexities of composite materials testing as they relate to production challenges. Many companies face difficulties in conducting specialized tests and navigating the extensive array of testing requirements, particularly if they have limited R&D capabilities.

At UWM, we provide access to specialized testing techniques and fixtures recommended by ASTM and ISO standards for comprehensive testing and characterization. We also have the unique capability to both make composites and subject them to rigorous destructive and non-destructive testing across various environmental conditions. This integrated approach allows us not only to help companies assess the performance and durability of their materials but also to optimize production processes and mitigate potential issues early on.

READ MORE

In the News

TCare, a UWMRF startup, originally founded by Dr. Rhonda Montgomery, Helen Bader School of social welfare was featured in Forbes magazine.

There are over 53 million unpaid family caregivers in the U.S., who face significant challenges balancing care duties with full-time jobs, often leading to burnout and negative health outcomes. The TCARE system, developed with input from the University of Wisconsin-Milwaukee, helps mitigate these issues by addressing the identity shifts caregivers experience, thus reducing burnout and promoting wellbeing.

High-Tech With A Human Touch: How AI Can Help Caregivers Reduce Stress (forbes.com)