ACHIEVE

RESEARCH & GRANTS ACTIVITIES @ ROBERT MORRIS UNIVERSITY ● 10th Edition Volume 2 ● Spring 2025

Vice President's Message

The Research & Grants Administration (R&GA) is happy to share the Spring 2025 issue of the R&G Newsletter. We hope this newsletter will play an important role in showcasing research & grant activities at RMU.

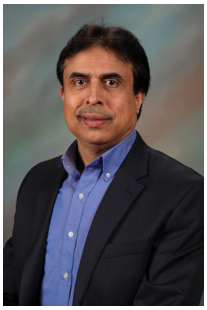
In this issue, we feature five (5) grant applications submitted by RMU faculty from August 2024 to January 2025. The summaries presented here are in the Principal Investigators' own words. Some of these applications have been awarded and others are pending. For this period, twelve (12) opportunities were discussed/explored and seven (7) proposals were submitted. Most grant proposals were written by our faculty and staff with support from Research & Grants Administration, and Financial Operations. As always, supporting institution data was provided by the Office of University Data and Analytics (UDA).

The Research & Grants Administration encourages all faculty and staff to pursue research and participate in various research & grants related activities. The R&GA is available to help you answer questions related to grant searching, writing, budgeting, and managing. Please contact us with your questions, comments, suggestions, and concerns.

Have a great Spring semester!

Sincerely,

Sushil Acharya
Vice President for Grants, Research, and Global Initiatives
Professor of Software Engineering



Grant Proposal Activities
August 2024 to January 2025

Grant Opportunities Explored | **Grant Proposals Submitted**

Head Injury Risk and Safety Assessment of Exoskeleton in Dynamic Environment

Grant Agency: **Office of Naval Research (ONR)**

The overall goal of this proposed collaborative project is to assess the effectiveness of lower limb exoskeletons in reducing the risk of injury to navy fast boat operators. In fast boat operation, there is repetitive loading on the body, which can lead to injury. Lower limb exoskeletons are designed to reduce the magnitude of loading in the lower limb joints, thereby reducing the risk of injury to these joints and reducing body fatigue. However, changes in the body dynamics from wearing an exoskeleton may exacerbate the risk of injury in other parts of the body, such as the brain. Our primary role in this project will be to assess the risk of brain injury when a lower limb exoskeleton is worn by fast boat operators. We will conduct computational simulations to assess this injury risk and provide guidance on the loading conditions that lead to the greatest risk of injury.

Rika Carlsen
Principal Investigator
Associate Professor of Mechanical and Biomedical Engineering
Director, Center for Outreach and Impact (COI)
Coordinator, Biomedical Engineering
School of Engineering and Science

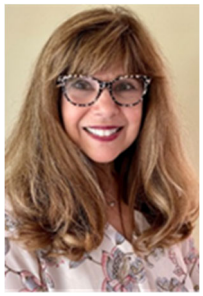
Accelerated Program for PK-12 Special Education Teacher Certification

Grant Agency: Pennsylvania Department of Education, Bureau of Special Education

There is currently a nationwide and statewide shortage of special education teachers. To address statewide shortages, the Pennsylvania Bureau of Special Education has launched a grant opportunity for Institutions of Higher Education to create accelerated programs enabling individuals with bachelor's degrees to earn PK-12 special education teaching certification. RMU's Education Department will coordinate and facilitate the grant, which aims to include course revisions, summer field experiences, mentoring, coaching, and student teaching opportunities. RMU plans to partner with the Watson Institute on this grant, collaborating with its staff and administration to select and train in-house mentors. Dr. Vicki Donne, recognized for her extensive expertise in both theoretical and practical aspects, and Dr. Patricia Kardambikis, noted for her administrative and professional development experience, will serve as RMU's initial faculty coaches. Additionally, RMU grant Principal Investigators will work with the Watson Institute faculty mentors to develop practical guides and toolkits for implementing DEI practices and strategies in the special education classroom. Resources will include lesson plans, assessment tools, and classroom management techniques tailored to meet diverse needs.

Mary Hansen
Principal Investigator
University Professor of Education
Coordinator, Accreditation and Partnerships
Coordinator, Post Baccalaureate
School of Education and Social Sciences

Vicki Donne
Co-Principal Investigator
University Professor of Education
School of Education and Social Sciences



Patty Kardambikis
Co-Principal Investigator
Assistant Professor of Education
Coordinator, Principal Certification
School of Education and Social Sciences

Language Models for Veteran Suicide Prevention (LM4VSP)

Grant Agency: Department of Defense, Small Business Innovation Research

Veterans are disproportionately affected by mental health challenges, with suicide rates far exceeding those of the general population. Many face long delays—sometimes months—before they can access mental health care, exacerbating feelings of isolation and despair. These delays are particularly dangerous during nighttime hours when clinical support is often unavailable.

To address this urgent need, the LM4VSP Clinical Co-Pilot utilizes state-of-the-art artificial intelligence, specifically advanced language models, to provide around-the-clock support to veterans and their caregivers. This small business grant is a collaborative effort with Rocío Pérez and Gustavo Zeine of Veertuous LLC, building on the company's innovative The MindShift Experience© technology. The LM4VSP Clinical Co-Pilot acts as a conversational assistant, capable of identifying early signs of mental distress, offering immediate interventions, and guiding veterans toward appropriate resources.

What sets this solution apart is its ability to work in real time, reducing the wait for professional help. This model will be developed using experts in mental health and Veterans affairs and consider the diversity of needs in the population. The system uses language that resonates with Veterans' unique experiences, fostering trust and engagement. By operating in real time and integrating seamlessly into existing healthcare systems, the LM4VSP Clinical Co-Pilot ensures caregivers are equipped with timely insights to provide effective support. Combining cutting-edge AI technology with the innovative foundations of The MindShift Experience©, this project aims to save lives, reduce treatment delays, and bring hope to those who have served their country.

David Wheeler
Principal Investigator
Associate Professor of Psychology
School of Health Professions

Computational Modeling of Blast Induced Traumatic Brain Injury in an Animal Model

Grant Agency: Office of Naval Research

Blast-induced traumatic brain injury (bTBI) is a growing concern for the military. Repeated low-level blast exposure has been shown to lead to persistent neuropsychiatric symptoms in some service members. While the exact cause of these symptoms is not yet well understood, there is increasing evidence that blast exposure may cause structural changes to the brain tissue at the cellular and sub-cellular level. Current non-invasive diagnostic tools cannot detect these microstructural changes to the brain, making it a challenge to assess the relationship between blast exposure levels and the risk of injury. Therefore, alternative approaches are needed to gain further insight into the progression of bTBI. One such approach is through the use of animal models, which allows blast exposure levels to be highly controlled and correlated directly to histopathological assessments of injury. In this proposed study, we aim to develop a computational porcine blast injury model. High fidelity finite element models of the porcine head will be constructed and validated against experimental blast data. The models will be used to quantify the extent and location of blast-induced injury in the porcine brain, which will be confirmed through histopathological examination of blast-exposed brains. The validated computational model will be used to investigate the mechanisms of primary blast injury and to determine the cumulative blast dose-response relationship for bTBI.

Rika Carlsen
Principal Investigator
Associate Professor of Mechanical and Biomedical Engineering
Director, Center for Outreach and Impact (COI)
Coordinator, Biomedical Engineering
School of Engineering and Science

Investigating the Comparability of 3D Printing to Injection Molding for Laser Weldability of Plastics

Grant Agency: Pennsylvania Department of Community and Economic Development (DCED) Pennsylvania Manufacturing Fellow Initiative (PMFI)

This proposal seeks to continue a collaborative effort between RMU and MECCO to enhance the process of using lasers to weld plastics for manufacturing applications. This funding would support student labor for research and also the design and purchase of custom molds for RMU's new injection molding machine. The funding would also support a comparison of 3D printed parts to injection molded parts for weldability to demonstrate the utility of 3D printing for prototyping processes and tooling. This collaboration won a Carnegie Science award in 2022 for Exemplary Educational/Corporate Collaboration.

Ben Campbell
Principal Investigator
Professor of Engineering
Coordinator, University Honors Program
Coordinator, Academic Outreach and Impact
School of Engineering and Science

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