



University  
of Windsor

# Research Stimulus Fund Report 2019-20

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Office of the Vice-President, Research and Innovation

## Executive Summary

The University of Windsor's Strategic Research Plan sets the direction of the University of Windsor's research and scholarship enterprise and aspires to "create a more research-intensive university with graduate programs that build on academic and professional strengths" (Thinking forward...Taking Action, 2012). The Research Stimulus Funds (RSF) was established in 2013/14 with the intention that the RSF will aid in building the University's research enterprise. Under the purview of the Vice-President, Research and Innovation (VPRI), the RSF provides annual funding of \$500,000, which is allocated among the Faculties. Now in its seventh year, these funds have been utilized to build upon research strengths, promote future research collaborations, and enhance graduate training and experiential learning. The aggregate RSF funding for each of the individual Faculties is based on the three-year average of Tri-Council (NSERC, SSHRC and CIHR) funding dollars as calculated and reported by the Tri-agency Institutional Programs Secretariat (TIPS).

Each of the Faculties distributed its allocated funding to individuals or groups of researchers whose projects or activities were selected by the Dean in consultation with the VPRI, a summary of which is outlined in this report. The RSF funds supported a diverse variety of research projects and activities, including the purchase of research infrastructure and equipment within the Faculties. The Faculty of Engineering used funds in support of scholarship funding. Through the allotted research stimulus funds, the Faculty of Science and the Faculty of Engineering were able to fund several collaborative infrastructure grants, in addition to supporting other new collaborative research activities, such as the acquisition of advanced technologies. The Faculty of Arts, Humanities and Social Sciences (FAHSS) also utilized funds to support several collaborative research grants, as well as providing contributions that supported externally funded research collaborations. Descriptions of each of the individual awards and funded activities/purchases are detailed in this report.

## RSF-Funded Projects and Activities

### Education

The Faculty of Education supported the Research Stimulus Fund Grant (RSFG) by providing principal investigators with funding that will lead to submissions for larger grant proposals to external granting agencies.

**Dr. Clinton Beckford** received \$3,000 for the project titled "*Girls'/Women Education and Empowerment Project: Resources and Programs for Girls and Female Teachers in Tanzania*" as part of the 2020 Faculty of Education RSF grants. In Tanzania, girls face many barriers to education. Intergenerational poverty is a major deterrent to education, and lack of education is a major cause of poverty. Uneducated or undereducated girls become illiterate women and parents unable to support their children, and the cycle continues. When families face poverty, girls are the first to be taken out of school. This project will develop culturally contextualized educational resources, activities and pedagogies for secondary school girls and female teachers in Tanzania with an eye to their relevance for other countries in the East African Union.

**Dr. Finney Cherian** received \$3,000 for the project titled "*Wisdom of Practice: Teacher Candidates Developing Professional Competencies Through Reflection*" as part of the 2020 Faculty of Education RSF grants. The goal of the project is to examine how theory-practice relationships are conceptualized in the University of Windsor's Bachelor of Education Two-Year Program. The study will teach reflective practice in order to deepen the pedagogy of teachers-in-training through their use of Scholarly Personal Narratives (SPNs) for the purpose of developing their instructional competencies, Ethical Self-Governance, and Community Engagement.

**Dr. Priscila Correa** received \$3,000 for the project titled "*Promoting Mathematical Proficiency by means of the Assessment of Students' Mathematical Work based on Strands of Mathematical Proficiency*" as part of the 2020 Faculty of Education RSF grants. This research project aims to investigate how Kilpatrick et al. Model of mathematical proficiency can be used to assess students' mathematical work, promote awareness of students' learning processes, and inform teacher practices towards students' mathematical proficiencies. The research question is formulated as: In what ways does an assessment based on strands of mathematical proficiency result in a holistic understanding of students' learning process, and ultimately lead to the development of students' mathematical proficiency?

**Dr. Chris Greig** was awarded \$3,000 as part of the 2020 Faculty of Education RSF grants for the project titled "*Addressing Gender Based Violence: Exploring Teacher Candidates' Knowledge, Attitudes and Beliefs about Gender-Based Sexual Violence*". In Canada, gender-based and sexual violence are serious issues within and outside of the school environment. These forms of violence are deeply rooted in various forms of systemic oppression, especially gender inequality. Of importance is the need for teachers to develop threshold knowledge around gender equality in general, and gender violence. However, little research has been conducted on teacher threshold knowledge when it comes to gender-based violence. Drawing from feminist theory, this small-scale study attempts to fill this gap.

**Dr. Lindsey Jaber** was granted \$3,000 for the project entitled "*Measuring Social Inclusion: An Investigation into the Relationship Between Students' Attitudes toward Bullying and Attitudes toward Disability*" as part of the 2020 Faculty of Education RSF grants. The overall goal of this quantitative

study is to examine the relationship between attitudes towards disability and attitudes towards bullying amongst school-aged students.

**Dr. Lana Parker** received \$3,000 for her project "*Stories as a Pedagogical Tool for Developing Critical Media Literacy*" as part of the 2019-20 Faculty of Education RSF grants. The purpose of this research is to examine the effectiveness of short stories as a pedagogical intervention to enhance critical thinking skills. It is significant in seeking to strengthen critical media literacy at a time of extensive (dis)information.

**Drs. Geri Salinitri and Andrew Allen** were provided with \$3,000 for the project entitled "*Building the Mathematical Competency of Elementary Pre-Service Teachers*" as part of the 2020 Faculty of Education RSF grants. This project will study the impact of additional differentiated programming in relation to increasing the mathematical competency of elementary pre-service teachers, in order to answer the following questions: A) What anxiety do elementary pre-service teachers experience when faced with the knowledge they must pass a mathematics proficiency test in order to become a certified teacher?; and B) How does a summer series which explains the concepts and curriculum in an inquiry-based differentiated approach impact the development of competency in pre-service teachers?

**Dr. Clayton Smith's** project "*Towards an Open Classroom: The Effectiveness of OER on Student Affordability and Interdisciplinary Learning in a Higher Education Classroom*" was awarded \$3,000 as part of the 2020 Faculty of Education RSF grants. Open Educational Resources (OERs) have been shown to benefit student learning within an interdisciplinary framework while also achieving student affordability and increased student retention. The research centers on the use of Open Education Resources (OER) to fulfill the university's moral and ethical duty to provide advanced knowledge to students without financially burdening them. This research will result in thoughtful and engaging learning.

**Dr. Bonnie Stewart** received \$3,000 as part of the 2020 Faculty of Education RSF grants for the project "*A Cookie for the Teacher: Educators' Data Literacies and Practices*". This project seeks to explore how educators navigate the increasingly complex world of educational technology and the datafication that accompanies it. In an era of 'smart' surveillant devices and platforms, questions of how educators engage with data are urgent, yet research into educators' data literacies and practices remain minimal.

**Dr. Christine Vanderkooy** was provided with \$3,000 as part of the 2020 Faculty of Education RSF grants for the project titled "*Another Pair of Shus: Solo Piano CD design, manufacture and distribution*". The goal of this project is to record, produce, and release a second solo CD, *Another Pair of Shus*, featuring two more significant works from the romantic piano literature, Schubert's *Drei Klavierstücke D 946*, and Schumann's *Kinderszene, op. 15*.

**Dr. Shijing Xu** was awarded \$3,000 for the project "*An International and Comparative Study of Primary School Teacher Education Models: Generalist Teachers vs. Specialist Teachers in Primary Schools*" as part of the 2020 Faculty of Education RSF grants. The Canadian primary school system adopts a model of generalist teachers while Chinese primary school system adopts the model of specialist teachers. This study is to understand the pros and cons of generalist and specialist teaching models with a hope of reciprocal learning between two by educators and policymakers from both sides.

**Dr. George Zhou** received \$3,000 for the project titled "*Conceptual Change 1982-2017: An Update and Implications for Science Education*" as part of the 2020 Faculty of Education RSF grants. The proposal aims to examine the psychological plausibility of current conceptual change framework and discussing its implications for science education and curriculum design.

**Dr. Zuochen Zhang's** project "*Experiences in an Online Master's program: Perspectives of Instructors and Students*" was awarded \$3,000 as part of the 2020 Faculty of Education RSF grants. The proposed research on the newly launched online M.Ed program aims to make contributions to the domain of online learning and teaching, as well as the improvement of the program itself.

## Engineering

The Faculty of Engineering continues to provide support for the NSERC/Ford Industrial Research Chair in Clean Combustion Engine Innovations. The Faculty also supports collaborative research by providing scholarship funding, student exchange opportunities, infrastructure development and the acquisition of advanced technologies. These initiatives provide enriched opportunities for researchers and enhance training and internship opportunities for students.

**Dr. Ram Balachandar** was awarded \$10,000 to replace the *Laser Doppler Velocimeter* (LDV) system. Funds were sought for a new LDV system that can resolve two velocity components and facilitate measurements in air and water. Availability of LDV technology is critically important in the investigation of turbulence structure of free flows, 3D jets, wakes and fluid structure interaction. In the immediate future, the equipment will be used in the following projects: Experimental study of self-aerated free surface flows; Energy exchange between flapping/bending structures; Scour studies; Cooling applications of impinging jets; and Bed roughness in open channels.

**Dr. Ofelia Jianu** was awarded \$6,395 for the project "*Transport Phenomena in multiphase Reacting Flows for Performance of Sustainable Energy Systems*". This research will explore the parallels between momentum, energy, and mass transport with respect to entropy and the Second Law of Thermodynamics. The focus is to gain a better understanding of transport phenomena in unit operations and make sure efficient integration of the cycle is possible by identifying and minimizing losses that compromise the efficiency of systems, via the Second Law of Thermodynamics.

**Dr. Hanna Maoh** established *The Transportation Association of Canada (TAC) Foundation and the Norman Esch Foundation Undergraduate Scholarships in Transportation Science and Engineering* in 2015-2016, through an agreement with the TAC and Esch Foundations and the Faculty of Engineering at the University of Windsor. Now in its final year of funding, the Foundations have provided scholarship funding in the amount of \$12,500 per year with a matching amount contributed equally by the RSF funds and the Faculty of Engineering or \$6,250 each. The scholarships provide additional benefits to undergraduate students who are furthering their training in transportation engineering and science. Each year, five undergraduate students will receive \$5,000 through an internship for a four-month work term with the Transportation Systems Innovation Lab or other transportation-related research facilities within the Faculty of Engineering.

**Dr. Ming Zheng** received \$50,000 in support of his senior *NSERC/Ford/UWindsor Industrial Research Chair (IRC) in Clean Combustion Engine Innovations-Deterministic Ignition Control*. This highly regarded IRC program continues to perform fundamental and applied studies which aim to improve

fuel efficiency, emphasize efficient ignition techniques, and modify mechanisms that modulate power to distribute the sites of energy release during ignition.

## Human Kinetics

The Faculty of Human Kinetics supports the study of human movement, including recreational, leisurely and high-performance sports activities.

**Dr. Cheri McGowan** was awarded \$10,000 for the Faculty of Human Kinetics Research Leadership Award. Dr. McGowan will use the award to extend her efforts in advancing Kinesiology research, including promoting research, supporting Kinesiology Research Day, maintaining research equipment and software licenses, purchasing equipment and software, providing support for undergraduate thesis students and conference travel funds for undergraduate students, hiring research assistants, and inviting guest speakers.

## Law

At Windsor Law, research is vibrant. Faculty members share a commitment to access to justice that permeates their research. Professors are scholars and experts in a variety of areas including public law, Indigenous legal orders, corporate and commercial law, environmental law and civil procedure, to name just a few.

**Dr. Julie MacFarlane** received \$5,000 in support of her SSHRC Partnership Engage Grant entitled "*How Canadian Courts are responding to self-represented litigants*". The goal of this project is to track and analyse the jurisprudence on how courts are adjusting to increasingly large numbers of the public appearing without counsel in family and civil courts. The primary outcome of this project is to offer researchers, self-litigants and lawyers, access to a searchable and comprehensive open access database of self-represented litigated cases.

**Dr. Anneke Smit** was provided \$5,000 in support of her Environment Canada project "*Cities and Climate Emergency Declarations: Tools for (Local) Action*". This project has two main goals: 1) To build capacity and collaboration among students and other young people in order to raise awareness of climate change and to work for climate change mitigation in partnership with municipalities; and 2) To provide youth and other community-builders, as well as municipal politicians and staff, with the tools (including legal tools) required to implement climate emergency declarations and climate change mitigation at the municipal level.

## Science

The Faculty of Science invested in several collaborative infrastructure grants in addition to supporting other research activities, such as the acquisition of technology.

**Dr. Steven Loeb** received \$67,998 for the purchase of a *Porosity Analyzer* as part of his NSERC RTI. The Porosity Analyzer is an instrument capable of carrying out analytical measurements for the determination of surface area and pore size distribution in porous materials by physical adsorption. The fundamental data provided by this instrumentation is essential for the full characterization of all

types of porous material such as zeolite, metalorganic framework, covalent organic framework, supramolecular-organic framework, porous polymeric network or porous carbon material.

**Dr. Drew Marquardt** was awarded \$25,000 for his work on "*Neutron generation from accelerators for material research*". Neutron generators are neutron source devices which contain compact linear particle accelerators and that produce neutrons by fusing isotopes of hydrogen together.

**Dr. Mir Munir Rahim** was provided with \$20,000 for his NSERC RTI project "*Multi-user in vivo animal imaging system*". Currently, the entire Windsor region lacks any capacity for fluorescence/luminescence imaging of whole animals/plants and tissues. Acquisition of a core facility in vivo/ex vivo imager with capabilities to image a wide range of different colours with high quality resolution is essential to facilitate the success of the research and training in this field.

**Dr. Lisa Porter** was provided with \$15,000 as a contribution to the *Windsor Cancer Research Group* (WCRG). WCRG is an assembly of local researchers, healthcare professionals and community partners working together to build teams to strengthen local cancer research programs and form collaborations with neighbouring cancer centres.

**Dr. Simon Rondeau-Gagne's** project "*Dynamic Mechanical Analyzer (DMA) for Rheological Characterization of Soft Materials*" was awarded \$60,000. Dynamic mechanical analysis is a technique used to study and characterize materials. It is most useful for studying the viscoelastic behavior of polymers. A sinusoidal stress is applied and the strain in the material is measured, allowing one to determine the complex modulus.

**Dr. Yufeng Tong** received \$35,000 in support of his NSERC RTI project "*A Platform for Assessment of Samples from Biomolecules to Living Cells*" for the purchase of a plate reader. The multi-mode plate reader will not only measure UV/visible absorbance, fluorescence, and luminescence of biomolecular samples, such as enzymes, antibodies and nucleic acids, but will also create images of living cells and three-dimensional spheroids at sub-second temporal resolution. This plate reader is vital for implementing complex experiments on biomolecular and cellular systems, including enzymatic assays, phenotypic assays, molecular targeting, cell proliferation and cytotoxicity analysis, as well as for biomarker quantification and training the next generation of impassioned scientists.

**Dr. Dan Xiao** was awarded \$20,000 for the project "*Acquisition of a para-hydrogen-based hyperpolarizer and radiofrequency probes for  $^{13}C$ ,  $^{15}N$  and  $^{19}F$  MRI*". Parahydrogen-based hyperpolarization techniques will provide order of magnitude signal enhancement for magnetic resonance spectroscopy (MRS) and magnetic resonance imaging (MRI).

## Faculty of Arts, Humanities and Social Sciences

The Faculty of Arts, Humanities and Social Sciences (FAHSS) has supported several collaborative research projects with a wide variety of stakeholders in the community. This will help facilitate the knowledge mobilization through dissemination and training. FAHSS elected to use the RSF 2019-20 funding in support of their Collaborative Research Grants (CRG).

**Dr. Christopher Abeare** received \$8,000 to support the "*Concussion Research Group*". Dr. Abeare's research aims to promote collaborative research in sport-related concussions, brain health and safety of athletes, as well as to provide state-of-the-art training to students.

**Dr. Amy Fitzgerald's** research group "*Animal and Inter-Personal Abuse Research Group*" (AIPARG) was provided with \$17,792. AIPARG is comprised of faculty and graduate students across disciplines who conduct research on the intersection of abuse against people and animals. Working with the community, the group aims to understand the co-occurrence of animal and interpersonal violence and advocate for change in policy and practice to better address the needs of those affected by abuse – human and animal alike.

**Dr. Patti Fritz's** research group "*Health Research Centre for the Study of Violence against Women (HRC-VAW)*" was awarded \$8,000. HRC-VAW is an interdisciplinary group of faculty and researchers with interests in the causes of violence against women/girls, its prevention, and the rehabilitation of its effects.

**Dr. Catherine Kwantes** was provided with \$8,000 for her research group "*Trustworthiness Research Alliance*". The Trustworthiness Research Alliance is an international and multidisciplinary group of researchers who investigate trust, and the role that perceptions of trustworthiness of individuals, organizations, and institutions plays in decision-making.

**Dr. Carlin Miller** received \$1,750 for the project "*Comparing mindfulness training and physical activity in wellness outcomes*". The primary research objective is to test the role of differential time reallocation in overall wellness. This project will focus on time allocation, readiness-to-change, and perceived wellness in a two-group intervention involving exercise and mindfulness training.

**Dr. Kim Nelson's** "*Propeller Project*" was awarded \$13,000. The Propeller Project is comprised of a team of artists, artist-researchers, and scholars, working in the dissemination of research via multimedia across the disciplines of installation art, bio-art, documentary film, live performance, and digital storytelling. They aim to explore and experiment with research-creation both in terms of artist-led research and researcher/artist collaboration.

**Dr. Robert Nelson's** project "*In-Terminus*" received \$8,000. The In-Terminus group is interdisciplinary, cross-border and collaborative, and explores the boundaries between media, arts, science, technologies and the urban environment.

**Dr. Wansoo Park's** project "*Health, Equity and Social Inclusion*" was awarded \$8,000. This research uses both quantitative and qualitative methods in the areas of health and mental health issues of immigrants, health access among immigrants, international adoption, Korean transnational educational migration, and international social work education.

**Dr. Stephen Pender** was provided with \$1,750 for the project "*Therapy and the Passions in Early Modern England: Rhetoric, Medicine, Moral Philosophy*" which explores rhetorical, medical, and moral philosophical thought concerning the passions in early modern England, circa 1500 to 1750. This work secures a wide range of readers, including historians of medicine, historians of rhetoric, intellectual historians, literary scholars and scholars of historical and contemporary rhetoric.

**Dr. Christopher Tindale** was awarded \$8,000 for the "*Centre for Research in Reasoning, Argumentation and Rhetoric*" (CRRAR). CRRAR is an internationally recognized leader in individual and collaborative research on the theory and practice of research in reasoning, argument and argumentation, and rhetoric from the perspective of all related academic disciplines.



**Dr. Lionel Walsh** was awarded \$1,750 for his work "*The efficacy of new exercises in fantastic realism in creating heightened theatricality in a production of Salt-Water Moon by David French*". The goal of this research is to test the efficacy of exercises in Fantastic Realism in the rehearsal and performance of *Salt-Water Moon* by David French.