

## 2022 Leadership in Teaching & Learning Fellows

### Sharonna Greenberg

Project title: Chem-FAST: A Formative Assessment Study Tool for Level I Chemistry

Collaborators: Danielle Brewer-Deluce, Jan-Hendrik Pöhls, Benjamin Potter, Longxi Lin, Shuruthi Sivadas



Sharonna Greenberg is an assistant professor in the department of Chemistry and Chemical Biology at McMaster University. She is responsible for teaching first-year and second-year chemistry courses and helping to coordinate outreach, recruitment, and mentorship events. Her research interests include creating new technologies and assessment methods in the chemistry curriculum.

**Project Abstract:** We are creating the Chemistry Formative Assessment Study Tool (Chem-FAST) for students to practice the course material, improve their long-term knowledge retention, and think critically about their problem-solving skills.

Our students' primary study resources first-year Chemistry are past assessments. Students comment that solving past assessments is the best way to study, even though this is not graded. Each year in course evaluations, students request more practice questions with higher degrees of difficulty.

Instructors similarly value past assessments. Through prior research, we have created a Test Archive and Analysis System (TAAS) to help instructors manage assessments for large-enrollment courses. The TAAS contains a database of questions, along with the difficulty level for each question. The TAAS is primarily a tool for instructors to design resources and assessments. Given this impressive tool we have created, and the fact that past assessments are students' primary studying resource, we now aim to extend the tool to students to help maximize their learning.

Chem-FAST will incorporate three components: (1) cognitive psychology principles (practice testing and spaced practice); (2) formative assessment in a low-stakes environment; (3) computerized adaptive testing, which delivers an individualized experience for each student to

master the material. If we find that Chem-FAST is effective at promoting learning, we may replace the costly publisher-created homework platform with our free tool, consistent with inclusive excellence and open education.

## **Chad Harvey**

Project title: Evaluation of a Virtual Field Guide to Iceland



**Project Abstract:** There is a meaningful movement in higher education to increase accessibility and the opportunity for inclusive experiences. This issue is being addressed for typical university courses, labs, student services and infrastructure, yet there is a clear lag in the options and innovations increasing accessibility for experiential educational opportunities. Hands-on, immersive field courses are one of the most rewarding learning experiences for many students, being offered in fields from geology to anthropology, history and fine art. Field courses offer students active engagement in the world around them and first-hand opportunity to see the concepts and practices they learn in the classroom.

Field courses catalyse applied learning and the ability for students to collaborate and actively exchange with other students and their instructors through observation and discourse. Yet, given the need for travel to remote environments or locales, field courses inherently become less accessible and less inclusive. Instructing three, different, interdisciplinary field courses several times over the past eight years, I have first-hand experience observing how field course participation wholistically enhances student learning but am also quite aware of the physical and financial barriers that these experiences create. Over past decades, there has been ever increasing use of technology in the classroom. With advancement in GIS, mobile cameras, smart phones and now drones, the incorporation of technology into field courses has occurred. These advancements facilitate greater accessibility to a wider range of students and course enrollment options.

This project proposes the creation of a virtual field guide (VFG) that will enhance learning of in-person students but also allow creation a distance-based version (DBV) of the field course SCI 3IS3 –Iceland Field Camp. Creation of DBV and inclusion of virtual field experiences will facilitate accessibility to students with financial and mobility challenges, increasing the diversity of students able to participate in the course and enhance the perspectives of student to student and student-instructor learning interactions.

Student engagement and learning facilitation with integration of the VFG will be assessed through a comparative study of students with and without access to the VFG as well as between students enrolling in the in-person and DBV of the field course. There is a paucity of research making such comparisons lending this study to expand a growing and necessary body of SOTL research

## **Seshasai Srinivasan**

Project title: Improving Student Wellness Through Reformed Pedagogy and Assessment Schemas



Dr. Seshasai Srinivasan has a PhD in Computational Science and Engineering from Michigan Technological University, USA. He is currently an Associate Professor at McMaster University's Faculty of Engineering and is the chair of the Software Engineering Technology program at the W Booth School of Engineering Practice and Technology. Prior to this, he has held research positions at the Department of Mechanical and Industrial Engineering of Ryerson University, the Laboratory of Food Process Engineering of Swiss Federal Institute of Technology (ETH-Zurich) in Switzerland, and the Engine Research Center of the University of Wisconsin-Madison.

**Project Abstract:** Student wellness issues are a serious emerging concern for academic departments. These issues are largely due to the stress and duress that the students undergo, emanating from two key factors, namely, cognitive overload and the assessments related grade anxiety. Our pursuits of quality education and a transformational education environment would be incomplete without accommodating the student wellness strategies in our curriculum design, delivery, and operations. In this project, we plan to address this serious issue by introducing major operational reforms within the Software Engineering Technology (SETECH) program at the W Booth School of Engineering Practice and Technology (SEPT).

Specifically, we will revamp the pedagogical practices with an optimal blend of synchronous and asynchronous learning by introducing modular and flexible curriculum delivery that are carefully designed to accelerate the knowledge and skills base of our students while minimizing the cognitive load in the classroom sessions. A second major change would be the transformation of the entire program to a gradeless format in which letter grades will be replaced with pass/fail annotations in the transcript. This in conjunction with optimized assessment schemas and pedagogies that encourage to students to take risks and pursue

exploratory learning outside the curriculum to push the envelope of learning will significantly alleviate the anxiety and stress. Collectively, these measures will enable us to offer a curriculum without negatively impacting the wellness of the students, supporting nearly 350 students annually in the SFWRTECH program. The students will be excelling at innovation and discovery, and be transformed into lifelong learners, providing the necessary impetus to graduate an enlightened citizenry.

### **Sandra VanderKaay**

Project title: Implementing Trauma-Informed Pedagogical Practices Across the MSc OT Program to Promote Inclusive Excellence: Reimagining Student Learning Experiences

Collaborators: **Dr. Ruth Chen, Dr. Michelle Phoenix, Dr. Sarah Wojkowski**



Sandra VanderKaay is an assistant professor in the School of Rehabilitation Science and a CanChild Scientist at McMaster University. Her current program of research is focused on trauma-informed pedagogy, and clinical reasoning and ethical decision-making in occupational therapy practice, including ethical decision-making in school-based occupational therapy. Sandra's teaching foci include pediatric OT practice, clinical reasoning, and ethical decision-making. Sandra has been a registered occupational therapist since 1996.

**Project Abstract:** The experience of past or current trauma can interfere with learning at all stages of education but can be particularly problematic at the post-secondary level in both in-classroom settings and during clinical education placements (for students in health professional programs). Furthermore, students from equity-seeking groups, including those who are racialized and/or minoritized, two-spirit, lesbian, gay, bisexual, transgender, and queer/questioning (2SLGBTQ+), women, disabled, and Indigenous People are disproportionately affected by trauma and at risk for poorer learning experiences and outcomes. The COVID-19 pandemic has expanded and magnified the experience of trauma. Trauma can manifest in many ways including high absenteeism, difficulty retaining and recalling information, severe anxiety and stress regarding academic performance, poorer academic performance, heightened feelings of anger and helplessness, and even dropping out. Trauma-informed pedagogical approaches can contribute significantly to post-secondary education, by promoting inclusion, advancing accessibility, and fostering a sense of support, safety, and

student empowerment, particularly for those from equity-deserving groups, thereby leading to improved learning outcomes.

The objective of this project is two-fold – to expand trauma-informed pedagogical practices identified via previous IDEAS research across the MSc Occupational Therapy (OT) program including problem-based learning tutorials and clinical education placements, and to study the impact of implementing trauma-informed pedagogical practices on teaching and learning.

There are three main components to the proposed project to achieve the above objective each with a distinct research question: (1) a survey of traumatic experiences/adverse child experiences (ACEs) among student occupational therapists, (2) an environmental scan of current Universal Design for Learning strategies already implemented, and (3) expansion of trauma-informed practices across the MSc OT program including an evaluation of impact on learning and teaching. The latter component involves first creating a knowledge dissemination module to support expansion of trauma-informed practices. Three student partners will be engaged to support this project. Several tangible outcomes and deliverables have been identified and knowledge will be disseminated widely through a variety of means including presentations and manuscript publications.