Centre for
Science, Mathematics
& Technology Education
OISE, University of Toronto

SPRING 2019 NEWSLETTER

IN THIS ISSUE

DIRECTOR'S MESSAGE

2018-2019 was another very eventful year for our SMT Centre community. I want to start this brief message by thanking the members for their commitment to the Centre and its various events over the last year. So many of you have volunteered your time and efforts to ensure the success of our many activities. Thank You!

Our monthly Centre members' meetings have been well-attended with an average of more than 20 at each session. In addition, we have had a couple of special events (such as the *Research Celebration* and the cross-Canada *STEM in Teacher Education* panel) where between 30 and 50 members and guests were in attendance. Members have also presented a series of very engaging research talks that have stimulated thoughtful discussions that have lingered long after the meetings have ended. The student-led group Café in Theory has also held regular meetings.

Finally, I am delighted to report that the Centre received favorable feedback from our 5-year review self-study and has been renewed for the next 5-year term. The Centre was also successful in its bid for internal funding for the project *Important Questions in Science, Mathematics, Engineering, and Technology (STEM) Education: A Colloquium for Exploring New Research Directions*. I end by inviting members and friends to work with us in the coming academic year and I invite your comments and feedback.

Carol-Ann Burke, Director, Centre for Science, Mathematics and Technology Education

OUR MISSION

We are a Centre for excellence in science, mathematics, and technology (SMT) education: undertaking research, development, and teaching that promote critical understanding, inclusion, diversity, equity, personal wellbeing, creativity, and social and environmental justice.

HIGHLIGHTS FROM THE YEAR

Research Celebration and SMT Education Emphasis Launch

On the evening of Thursday 17 January 2019, the Centre for Science, Mathematics and Technology (SMT) Education hosted an evening to celebrate the research works of students and faculty members in Science, Mathematics and Technology Education at OISE. The event was co-sponsored by the Curriculum, Teaching and Learning Student Association (CTLSA), OISE's Graduate Student Association (GSA), and the SMT Centre. Students' ongoing and completed research was showcased in a poster forum and recent faculty publications were displayed.

To launch the formal part of the evening, Erminia Pedretti gave a warm welcome to students participating in the new Science, Mathematics and Technology Education Emphasis. A focal point for the evening was a short address, given by the John Wallace, about the current issues and possible future directions for academic publication in the field of science, mathematics and technology education. SMT Centre Director, Carol-Ann Burke, thanked John for his dedicated efforts during his eleven-year tenure as Editor-in-Chief of the Canadian Journal of Science, Mathematics and Technology Education (CJSMTE) and presented him with a small token of appreciation. Carol-Ann also introduced Doug McDougall as the new Editor-in-Chief of the Journal. The event was well-attended by students and faculty members.

SMT Centre Summer Research Support

Special thanks are extended to Nishitha Shashidhar who was employed as an undergraduate researcher working for the SMT Centre during the summer of 2018. Nishitha was winner of a University of Toronto Excellence Award in Social Sciences and Humanities. For three and a half months, she worked closely with the Centre Director developing research tools and background documentation for the Centre's study *Interfaculty Collaboration About and Within Engineering Education*. Thanks to Nishitha's hard work, a preliminary literature review was conducted, ethical review documentation prepared, STEM teaching artefacts collated, and a new Centre website formatted in the OISE in-house style. Her enthusiasm, focus, and hard work resulted in creation of a solid foundation for the Centre's research study.

Thanks also go to Zoya Padamsi who worked with Nishitha and the Centre Director to create the SMT Centre introductory video (embedded in the new SMT Centre website and available via YouTube).

Centre Renewal

During the first SMT Centre meeting in the 2018-2019 academic year, details of the application for the 5-year Centre renewal were discussed. We are pleased to report that our renewal application was successful and we invite members and friends to support us as we work towards our new goals for the next 5 years. Agreed upon member-proposed goals for the current 5-Year term are as follow:

1. Revising the SMT Centre mission statement to make it more up-to-date and relevant to our goals
2. Finding a space for engineering to be formally acknowledged in the structure and fabric of the SMT Centre documentation
3. Generating and maintaining an accurate record of member roles and contributions to the SMT Centre community
4. Maintaining close ties with the new Editor-in-Chief of Canadian Journal of Science, Mathematics and Technology Education (CJSMTE)
5. Providing opportunities for public engagement with the research activities of the Centre

New Centre Research Initiative

In April 2019, Centre members made a successful bid for funding for a new Centre research initiative: ***Important Questions in Science, Mathematics, Engineering, and Technology (STEM) Education – A Colloquium for Exploring New Research Directions.*** A sub-committee of 4 SMT Centre members were supported by the SMT Centre Director in preparing the funding proposal. Thanks go to the sub-committee members: John Percy, Gurpreet Sahmbi, Sarah El Halwany and James Crimmins.

In summary, the initiative is focused on a research and practice colloquium hosted by the SMT Centre. SMT Centre members will work alongside other researchers, graduate students, and educators from across the Greater Toronto Area (GTA) who have research interests in STEM education. The aim is to explore challenging questions that concern stakeholders with different institutional affiliations and to prepare collaborative research grant applications around those research questions. The colloquium planning workshop will take place on Friday 8 November, 2019. See below for further details.

Save the Date

Inter-faculty half-day planning workshop for the *Important Questions in Science, Mathematics, Engineering, and Technology (STEM) Education* Colloquium

All SMT Centre members are invited

9:00 am to 12:00 pm, Friday 8 November, 2019. The Nexus Lounge, 12th Floor OISE

Master of Teaching STEM Workshops

Again, SMT Centre members (faculty, students and one alumnus) worked together to prepare STEM workshops for students in primary/junior and junior/intermediate divisions of the Master of Teaching program. These workshops introduced students to the field of Engineering, sharing examples of activities that the pre-service teachers could offer to their K-12 students. The first workshop explored the STEM construct and the place of engineering in the K-12 curriculum. The second workshop focused on robotics and coding for K-12 learners. Again, Master of Teaching students were very appreciative of the workshops. Thanks go to this year's workshop leaders: Stacy Costa, James Crimmins, Ana Maria Navas Iannini, Rubaina Khan, and Ahmad Khanlari. Thanks also go to the group's mentor Michelle Dubek.

SMT Centre Research Study

During the 2018/2019 academic year, Centre researchers Christina Phillips and Zoya Padamsi have been conducting interviews and data analysis for the Centre's research study *Interfaculty Collaboration About and Within Engineering Education*. Their research has focused on the mechanisms and motivations that have supported collaborations between members of the Faculty of Applied Science and Engineering and OISE members in preparation of STEM workshops for OISE teacher candidates. The research team have compiled a report that will be shared with the Centre members in the coming weeks. Many thanks to all SMT Centre members and friends who have contributed their perspectives as data for this report.

SMT CENTRE ACTIVITIES AT AERA 2019

The Canadian Journal of Science, Mathematics and Technology Education (CJSMTE)

CJSMTE took part in AERA 2019, attending and connecting with scholars in the SMT field. Check out the journal's Twitter @CJSMTE for more photos and updates from the conference, and visit the journal website at www.springer.com/42330.

STEM in Teacher Education Panel

To coincide with the last day of the AERA conference, the SMT Centre organized a cross-Canada forum *STEM in Teacher Education: A Canadian Perspective.* The event was co-hosted by the SMT Centre and the Canadian Science Education Research Group (SERG). Panelists from a range of disciplines and provinces explored ways in which teacher educators in Canada respond to the rise of the STEM construct in education. The panel members were: Jesse Bazzul, University of Regina; Karen Goodnough, Memorial University; Marina Milner-Bolotin, University of British Columbia; Carol Rees, Thompson Rivers University; and Christine Tippett, University of Ottawa

Audience members participated enthusiastically during the question and answer stage of the event. Finally, 'afterthoughts' were provided by David Blades from the University of Victoria.

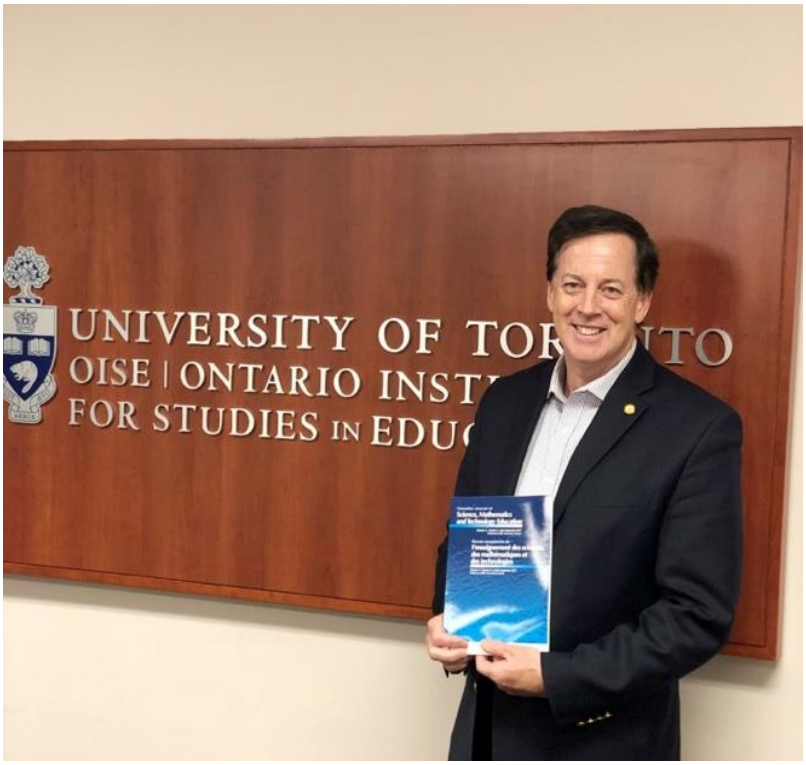
Café in Theory

Café in Theory ended another year of brain-picking discussions, this year revolving around literature in the field of Science and Technology Studies (STS). SMT Centre and non-SMT Centre members met monthly to discuss works such as Anna Tsing's *Mushrooms at the End of The World: On the Possibility of Life in Capitalist Ruins* and Donna Haraway's *Cyborg Manifesto*, amongst others. You could find more about the group's activity on their newly launched website: https://cafeintheory.wordpress.com/. Café in Theory would like to thank the SMT membership for continually advising and contributing to its activities.

As co-founders of the group, Kristen Schaffer, Majd Zouda and Sarah El Halwany would also like to extend their gratitude to the Graduate Student Association for their special project fund, which provided us with the means to organize monthly meetings and special events. The group was thus able to host a post-AERA conference social that followed the SMT-SERG sponsored *STEM in Teacher Education* panel event, to conclude its activities for the year. A picture from that night is shared here.

NEWS FROM THE CANADIAN JOURNAL OF SCIENCE, MATHEMATICS AND TECHNOLOGY EDUCATION (CJSMTE)

It has been a busy and exciting year for the Canadian Journal of Science, Mathematics and Technology Education. After 11 years as our Editor-in-Chief, John Wallace retired in December 2018 from his position. John led the journal to distinguished heights over the last decade and the wider SMT education community has benefitted immensely from his leadership and contributions. We will miss him and wish him the best for his retirement.



Doug McDougall, Editor-in-Chief

Doug McDougall, has been the newly appointed Editor-in-Chief since January 2019. Doug is a distinguished scholar, teacher, administrator and previous director of the SMT Centre. He brings a wealth of experience to the role. CJSMTE looks forward to continued growth and success of under Doug's leadership. In addition to Doug, the journal welcomed two new Associate Editors, Audrey Groleau of Université du Québec à Trois-Rivières and Jim Hewitt of OISE.

Audrey Groleau

Jim Hewitt

Hoping that everyone has had a safe and fruitful summer!
Doug McDougall (Editor-in-Chief) and the Editorial Team
Journal website: www.springer.com/42330

SMT MEMBER MEETING PRESENTATIONS

This year we continued our series of members' research presentations. These represent invaluable opportunities for members to share emerging and established research ideas with each other, engaging in scholarly discussion and gaining feedback on personal and collaborative research projects and research-informed initiatives. The list of talks and presenters is listed here. We continue to invite members and potential members (particularly students completing thesis degrees) who wish to share ideas to contact the Centre administrators to discuss opportunities for making presentations. We are also interested in hearing from Centre members and associates who wish to solicit feedback on research-related ideas such as proposing new courses or thinking through ideas for proposed research.

- **Nishitha Shashidhar:** *The New SMT Centre Website and Introductory Video*
- **Jason To:** *The Drive for Equity and Inclusion in Math Spaces at the TDSB*
- **Jim Slotta:** *Smart Classrooms For K-12 Science Inquiry Communities*
- **Carol-Ann Burke & Michelle Dubek**: *Two New Integrated STEM Courses*
- **Cathy Marks Krpan & Gurpreet Sahmbi:** *Taking the Journey Less Travelled: Elementary Mathematics Teachers' Perceptions of the Impact of Action Research on the Implementation of Argumentation Tasks in their Classroom Practice*
- **Jim Hewitt:** *Community-Building in Online Courses*
- **Christina Phillips & Zoya Padamsi:** *"It's Complicated …": Explorations of Interfaculty Collaborations Between the Faculty of Applied Science and Engineering and the Education Faculty*

CONGRATULATIONS TO 2018/2019 SMT DOCTORAL GRADUATES

Alisa Acosta Supervisor: James Slotta	*Scripting and orchestration of a knowledge community and inquiry curriculum for secondary biology*
Vanessa Rosemary Farren Supervisor: Douglas McDougall	*Experiencing the activity of teaching "at risk" college mathematics students: Perspectives of two college teachers*
Marie Noelle Morris Supervisor: James Hewitt	*To the 21st Century, and beyond! Investigating the practical ways that secondary school teachers can develop the "21st Century Competencies" in their students*
Julie Louise Middleton Supervisor: Douglas McDougall	*The role of instructional coaching for teacher learning in elementary mathematics: A multi-case study*
Stephanie Ann Sadownik Supervisor: Douglas McDougall	*Under construction: developing mathematical processes and discourse through dialogue in computer supported collaborative learning environments*
Kamla Kerry-Ann Reid Supervisor: Clare Brett	*An investigation of the nature and purpose of critical thinking in the Revised Intermediate Ontario Science curricula (Grades 9 and 10): Educator's and administrator's meta-perspectives*

RECENT RESEARCH GRANTS, AWARDS AND HONOURS

Research Grants

Carol-Ann Burke (2018-2020). *Could this be a place for us? A community-level analysis exploring the engagement of children from a low-income community with a local science centre.* SSHRC Insight Development Grant. $44,153. Collaborator: **Ana Maria Navas Iannini**.

Stacy Costa (2018-2019). *Collaborative annotation and scientific inquiry: Students sharing science.* Ontario Graduate Scholarship (OGS). $15,000.

Sarah El Halwany (2018-2019). *Emotions in science and technology education discourses: The case of the microbiology lab.* SSHRC Doctoral Fellowship. $20,000.

Jim Hewitt (2018-2020). *A new approach to Ontario's problems with elementary school mathematics*. SSHRC Insight Development Grant. $51,642. Co-Applicant: **Mary Reid.**

Sheliza Ibraham Khan (2018-2019). *Neutral places: Unpacking invisible privilege with students and educators towards an equitable, diverse and inclusive STEM future.* Research & Development Grant, Brock University. $1000.

Sheliza Ibraham Khan (2019-2021). *Creating neutral places: Can a program exploring implicit bias, stereotype & microagression towards minorities in STEM fields teach for an equitable future?* Research Initiative Award, Brock University. $2000.

Limin Jao (2018-2020). *Designing more effective secondary school mathematics teacher education programs: The influence of content and sequencing for methods courses and practica on pre-service teachers' beliefs.* SSHRC Insight Development Grant. $72,451. Co-Applicant: **Douglas McDougall**.

Rubaina Khan (2018-2019). *Uncovering differences in the learning cultures of the Engineering and Education departments to foster an effective collaboration space.* Ontario Graduate Scholarship (OGS). $15,000.

Martha Marandino (2018-2020). *Science, technology, society and environment (STSE), and science museums.* CNPq - National Council of Research/Federal Government/Brazil. $15,000. Co-Applicant: **Erminia Pedretti**.

Martha Marandino (2018-2020). *Museum education and science, technology, society and environment: Interconnections.* FAPESP - São Paulo Research Foundation/ State Government. $42,000. Co-Applicant: **Erminia Pedretti**.

Jim Slotta (2018-2023). *Active Learning Communities for K-12 Science Classrooms*. SSHRC Insight Grant. $316,041.

Awards & Honours

Alysse Kennedy was recipient of an OISE Muriel Fung Award for outstanding extra-curricular contributions.

Claudia Mandekic was recipient of an OISE Conference Grant.

John Percy ended his term as Honorary President (2013 – 2018) of the Royal Astronomical Society of Canada.

Nadia Qureshi was granted a Travel Award from the Canadian Association for Studies in Adult Education.

Jim Slotta was promoted to Full Professor and was appointed to the President's Chair in Knowledge Technologies.

MEMBERS' CORNER

SMT Faculty Profiles

Clare Brett

Research Interests:
Online learning, educational technology

Carol-Ann Burke

Research Interests:
Science education; postcolonial theory in science education; underrepresented youth in science education; cultural context of science

Michelle Dubek

Research Interests:
STEM education; co-teaching; assessment in integrated contexts

Greg Evans

Research Interests:
Engineering education; Urban air quality and air pollution; energy systems and climate

Wanja Gitari

Research Interests:
Use of school/academic science in everyday life; access and equity to school/academic science

Gila Hanna

Research Interests:
Mathematics education; mathematical proofs; gender and mathematics education

Jim Hewitt

Research Interests:
Educational technology; computer-supported learning environments; electronic discourse; distance education

Sheliza Ibrahim Khan

Research Interests:
Science education; place-based education; STEM, critical pedagogy; mathematics education

Cathy Marks Krpan

Research Interests:
Mathematics education: Student communication; argumentation; English language learners; learners who struggle

Doug McDougall

Research Interests:
Mathematics education; teacher education; qualitative methods

Emily Moore

Research Interests:
Leadership in STEM

Erminia Pedretti

Research Interests:
Science education (in school and non-school settings); STSE education; science museums, controversy and exhibition practices; teacher education; action research

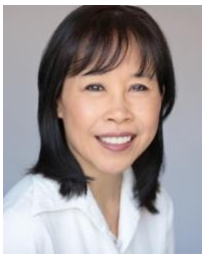
John Percy

Research Interests:
Astronomy and astrophysics; nature and evolution of stars; formal and informal astronomy education at all levels

Christina Phillips

Research Interests:
Science education; environmental education; STEM education

Mary Reid



Research Interests:
Math education; math knowledge for teaching; math content knowledge and its relationship with anxiety and efficacy

Jim Slotta

Research Interests:
Learning sciences; technology; collaborative learning; STEAM

John Wallace

Research Interests:
Curriculum integration, teacher learning; STEM; qualitative research

Lesley Wilton

Research Interests:
Online learning (e-learning, blended learning); pre-service education; teaching with technology; social practices and new literacies

SMT Student Profiles

Thelma Akyea

Research Interests:
Black Canadian women in physics

Paul Alexander

Research Interests:
Educational/immersive technology

Daniel Atkinson

Research Interests:
Food education, health education, science education

Abraham Blair

Nasim Booloorsaz

Research Interests:
Equity issues in STEM Education

Pamela Brittain

Research Interests:
Mathematics (elementary and pre-service teachers)

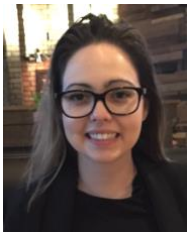
Jennifer Calix

Research Interests:
Mathematics education and technology; curriculum studies; teacher professional development

George Chiran

Research Interests:
Science, Mathematics and Technology Education

Stacy Costa



Research Interests:
Knowledge building, annotation, STEM, problem solving; puzzles

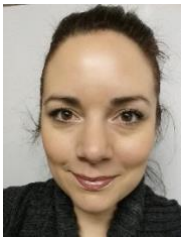
James Crimmins

Tanya Demjaneko

Sarah El Halwany

Research Interests:
Affect/emotions in science education; STSE education

Darlee Gerard



Research Interests:
Science/engineering/STEM education; experiential and co-curricular learning; access to/equity in education leadership/outdoor/ environmental education

Sasha Gollish

Research Interests:
Engineering education; mathematics

David Hung

Research Interests:
Mathematics education

Alysse Kennedy

Research Interests:
Environmental education

Rubaina Khan

Research Interests:
Engineering education; online learning; active learning

Ahmad Khanlari

Research Interests:
Robotics; STEM education; knowledge building; learning analytics

Eitan Laufer

Research Interests:
STEM education

Claudia Mandekic

Research Interests:
Math education; academic engagement through sports

Nurul Hassan Mohammad

Research Interests:
STEM education; identity construction

Nadia Qureshi

Research Interests:
Racialized adult learners in science; social justice in STEM

Tasha Richardson

Research Interests:
Physics education; digital game-based learning

Novella Ricotti

Gurpreet Sahmbi

Research Interests:
Mathematics education

Kristen Schaffer

Research Interests:
Ecology Education and Informal Science Education

Sadia Sharmin

Research Interests:
Computer science education

Alvin Singh

Research Interests:
Active learning (undergraduate biology); experiential learning; scientific literacy; science (biology)/statistics/STEM education; science outreach

Erin Sperling

Research Interests:
Food justice education; ecojustice; science and community-based education

Majd Zouda

Research Interests:
STEM education; socioscientific issues; STSE issues; youth activism; critical discourse analysis

Affiliate and Alumni Members

Affiliates: Sarah Aldous; Cresencia Fong; Jason Foster; Einat Gil; Albert Huynh; Serhiy Kovalchuk; Qin Liu; Martha Marandino; Elham Marzi; Melody Neumann; Andrew Petersen; Cindy Rottmann; Angela Schoeling; Xinghua Sun; Chirag Variawa

Alumni: Alex Bing; Limin Jao; Genie Kim; Brenda McLoughlin; Ana Maria Navas Iannini; Zoya Padamsi; Lucia Rosatone; Jason To; Zhaoyun Wang; Naxin Zhao

Selected Member Publications for 2018/2019

(*indicates student SMT Centre member authorship; member names in bold; no more than 3 publications submitted per member)

Acosta, A., & **Slotta, J.** (2018, June). *Representations of progress in a learning community curriculum for Grade 12 biology.* Paper presented at the 13th International Conference of the Learning Sciences (ICLS), London, England.

Bencze, L., ***El Halwany, S.**, Krstovic, M., Milanovic, M., **Phillips-MacNeil, C., & *Zouda, M.** (2018). Estudantes agindo para resolver danos pessoais, sociais & ambientais ligados à ciência & tecnologia [Students acting to address personal, social & environmental harms linked to science & technology]. In N. Nunes-Neto & D.M. Conrado (Eds.), *Questões sociocientíficas: Fundamentos, propostas de ensino e perspectivas para ações sociopolíticas [Socioscientific issues: Foundations, teaching proposals and perspectives for sociopolitical actions]* (pp. 515-560). Salvador, Bahia, Brazil: Editora da Universidade Federal da Bahia.

Burke, L. E. C., & **Navas Iannini, A. M.** (2019, April). *Factors impacting the science identities of children from low-income neighborhoods enrolled in STEM clubs.* Paper presented at the American Education Research Association (AERA) Annual Conference, Toronto, ON.

Burke, L. E. C., & Duodu, E. (2018, November). *Community-informed STEM programming: Prospects and pressures from a STEM club case study.* Paper presented at the 5th International STEM in Education Conference, Brisbane, Australia.

Burke, L. E. C., Wessels, A., & McAvella, A. (2018). Using theatre and drama to expose and expand the epistemic insights of youth regarding the nature of science. *Research in Science Education, 48*(6), 1151-1169.

Campbell, J., **Petersen, A.**, & Smith, J. (2019). Self-paced mastery learning CS1. In E. K. Hawthorne, & M. A. Pérez-Quiñones (Eds.), *Proceedings of the 50th ACM Technical Symposium on Computer Science Education* (pp. 955-961). New York, NY: ACM.

DeCoito, I., & **Richardson, T.** (2018). Teachers and technology: Present practice and future directions. *Contemporary Issues in Technology and Teacher Education, 18*(2), 362-378.

Denny, P., Luxton-Reilly, A., Craig, M., & **Petersen, A.** (2018). Improving complex task performance using a sequence of simple practice tasks. In I. Polycarpou, & J. C. Read (Eds.), *Proceedings of the 23rd Annual ACM Conference on Innovation and Technology in Computer Science Education* (pp. 4-9). New York, NY: ACM.

***El Halwany, S.** & Bencze, L. (2019). *"Teaching desire": Exploring international college students' and their instructor's be-longings in a biotechnology pedagogical context.* Paper presented at the annual meeting of the American Educational Research Association (AERA), Toronto, ON.

Elias, P., & ***Qureshi, N.** (2018). Critical analysis of the OALCF (Ontario Adult Literacy Curriculum Framework). In R. McGray, & V. Woloshyn (Eds.), *Proceedings of the 37th CASAE/ACÉÉA Annual Conference* (pp. 58-60). Ottawa, ON: Canadian Association for the Study of Adult Education (CASAE).

Fong, C. & **Slotta, J. D.** (2018). Supporting communities of learners in the elementary classroom: The common knowledge learning environment. *Instructional Science, 46*(4), 533-561.

***Gerrard, D.**, & Chiarot, P. (2018, June). *Growth from the STEM: Exploring an international model of apprenticeship for outreach programs*. Paper presented at the American Society of Engineering Education Annual Conference and Exposition, Salt Lake City, UT.

***Gerrard, D.**, & **Gitari, W.** (2018, May). *Adult students' memories of learning in school and non-school contexts: Implications for science pedagogy.* Paper presented at the annual meeting of the Canadian Society for Studies in Education (CSSE), Regina, SK.

***Gerrard, D.**, & **Variawa, C.** (2018, June). *Bridges and barriers: A multi-year study of workload-related learning experiences from diverse student and instructor perspectives in first-year engineering education.* Paper presented at the American Society of Engineering Education Annual Conference and Exposition, Salt Lake City, UT. [Awarded Best Paper Presentation in First-Year Programs Division.]

Gil, E. (2019). *Emergent simulation models for teaching and training in a college of education. A research report produced for Levinsky College of Education.* Toronto, Canada: University of Toronto.

Hanna, G. (2019, February). *Proof and proving.* Invited plenary and workshops at Universidad Surcolombiana. Neiva, Colombia.

Hanna, G. (2019, March). *Verifying informal proofs in mathematical practice: Implications for mathematics education.* Keynote presentation made at MaP-Symposium 2019: Mathematics and Practice - Philosophical, historical and educational perspectives. Rostock, Germany.

Harwood, C., & **Brett, C**. (2019). Obuchenie online: The applicability of Vygotskian pedagogy to online teaching and learning. *Technology, Instruction, Cognition and Learning, 11*(2/3), 141-161.

Harwood, C., Demmans Epp, C., & **Brett, C.** (2019). Appropriating Facebook Groups to support literacy development in L2 higher education contexts. In A. Palalas (Ed.) *Blended Language Learning: International perspectives on innovative practices* (pp. 134-156). Beijing, China: Open University of China Press.

Hoeg, D., Bencze, L., ***El Halwany, S., *Sperling, E., & *Zouda, M.** (2019). Confronting self: Stories of incipiency, disequilibrium, and becoming critical in science education. In J. Bazzul & C. Siry (Eds.), *Critical voices in science education research: Narratives of hope and struggle* (pp. 127-139). Dordrecht, The Netherlands: Springer.

Inwood, H., ***Kennedy, A.**, Heibein, P. Kurucz, C., Rigler, A., Ryan, L., & Venalainen, J. (2019, April). Natural Collaborations: How teachers are using action research to enhance environmental education. *Green Teacher, 119*(Spring). Retrieved from https://greenteacher.com/natural-collaborations/

Jennings, A., & **Brett, C.** (2018). The pedagogical practices of clinical nurse educators-Les pratiques pédagogiques des infirmières formatrices cliniques. *Quality Advancement in Nursing Education-Avancées en formation infirmière*, *4*(2), Article 7. doi: https://doi.org/10.17483/2368-6669.1142

Marandino, M., **Navas Iannini, A. M.**, & **Pedretti, E.** (2018, September). *Science museums as spaces for displaying controversial issues about biodiversity: What do visitors say*? Paper presented at the 3rd meeting of the Brazilian Association of Science Museums and Science Centres, Rio de Janeiro, Brazil.

Marks Krpan, C. (2019). Semantic mapping. In L. Swartz (Ed.), *Word by word: 101 ways to inspire and engage students by building vocabulary, improving spelling, and enriching reading, writing, and learning* (pp. 55-56). Toronto, ON: Pembroke Publishers.

McDougall D., & Ferguson S. (2018). Building capacity in Grade 9 mathematics: Case studies from a collaborative inquiry project in applied level mathematics. In A. Kajander, J. Holm, & E. Chernoff (Eds.), *Teaching and learning secondary school mathematics: Canadian perspectives in an international context* (pp. 125-138). Cham, Switzerland: Springer.

McDougall, D. E., Ferguson, S., & ***Sahmbi, G**. (2018). *Collaborative teacher inquiry project: Grade 7, 8 & 9 mathematics – Report for Toronto District School Board.* Toronto, Canada: Ontario Institute for Studies in Education.

Nachlieli, T., Mor, Y., **Gil, E.**, & Kashtan, Y. (2019, February). *Evolving discourse of practices for quality teaching in secondary school mathematics.* Paper presented at the Eleventh Congress of the European Society for Research in Mathematics Education (CERME11). Utrecht, The Netherlands.

Pedretti, E., **Navas Iannini, A. M.**, & Nazir, J. (2018). Exploring controversy in science museums: Non-visitors and the Body Worlds exhibits. *Canadian Journal of Science, Mathematics and Technology Education, 18*(2), 98-113.

Pedretti, E., **Navas Iannini, A. M.**, & ***Atkinson, D.** (2019, April). *A cross-case analysis of visitor engagement with controversial exhibitions: Towards participatory models of science communication*. Paper presented at the American Education Research Association (AERA) Annual Conference, Toronto, ON.

Percy, J. R. (2018). Careers in astronomy - Or not. J*ournal of the Royal Astronomical Society of Canada, 112*(2), 94-95.

Percy, J. R. (2018). Forty years of linking variable star research and education. *Remote Telescopes and Student Research and Education Proceedings, 1*(1), 95-104.

Percy, J. R. (2018). What use is astronomy? *Journal of the American Association of Variable Star Observers, 46*(1)*,* 1-2.

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Rottmann, C., Reeve, D., Sacks, R., & Klassen, M. (2018, June). *Where's my code? Engineers navigating ethical issues on an uneven terrain.* Paper presented at the American Society of Engineering Education Annual Conference and Exposition, Salt Lake City, UT.

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UPCOMING EVENTS & MEMBER ANNOUNCEMENTS

From the STEPWISE Group

Science Education Resources for Teachers
A 'STEPWISE' Project www.stepwiser.ca

Because of general government inaction on problems like: climate disruption from fossil fuel combustion; human illnesses like cancer and heart disease; loss of privacy from electronic surveillance; death and destruction from gun use and wars; loss of wealth for many from tax avoidance systems; species losses from industrial environmental destruction; etc., societal members MUST be critical of profit-motivated products and services of science and technology and, where they perceive harms, develop socio-political actions to address them.

The STEPWISE team have developed the following three Open Access resources to support teachers to achieve these goals in their classrooms.

Science Education for Civic Action!

- A resource book for teachers

Teaching and learning resources in *Science Education for Civic Action!* can help teachers encourage and enable young people to gain expertise, confidence and motivation for civic action to address harms associated with for-profit science and technology.
https://tinyurl.com/y26l84o8

Ban the Dust!

- A graphic novel about citizen actions to eliminate urban dust pollution

Ban the Dust! is an interdisciplinary novel that describes the real-life engagement of citizens from Québec City in science research and civic actions to address problems of industrial dust pollution. https://tinyurl.com/yxa9ptq6

- A complementary pedagogical booklet

This booklet provides some teaching and learning suggestions for use of the graphic novel *Ban the Dust!* https://tinyurl.com/y4ft6rv9

If you are interested in working with us to implement these resources, send a message to larry.bencze@utoronto.ca

Environmental Education Links and Events

Environmental and Sustainability Education

The Canadian Network for Environmental Education and Communication (EECOM; https://eecom.org/) will be convening their next conference (October 2020) in Toronto, co-hosted by OISE, the TDSB, and EcoSchools. Visit https://eecom.org/eecom-2020/ for further details. For more information on inter-university Environmental and Sustainability Education activities please visit the ESE-TE Working group http://eseinfacultiesofed.ca/.

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