



STEM Education Futures Research Centre Newsletter Issue # 2, December 2018

Director's Message

Welcome to the second half-yearly newsletter of the STEM Education Futures Research Centre! This issue highlights the activities and achievements of the Centre in the second half of 2018, including a number of review submissions, international collaboration, contribution of STEM education Higher Degree Students to the activities of the Centre and individual members' achievements.

I would like to thank our Centre Manager, Dr Meera Varadharajan who will be leaving UTS at the end of 2018 to take up a research position at the University of New South Wales in the new year. Meera has been the manager of the Centre since its inception in 2017 and has been instrumental in undertaking the administrative work for the Centre to be established. While we feel sad to see Meera leave, we also know that a career in research is what she desires. Congratulations, Meera, on this next step of your career and thank you for your conscientious support in ensuring that the Centre ran smoothly. We wish you the very best in your future endeavours!

As I will be on Professional Experience Program (PEP) for the first six months of 2019, A/Professor Matthew Kearney will be Acting Director of the Centre in that period of time.

Best wishes for a very happy festive season and safe holidays!

A/Professor Wan Ng
(Director, STEM Education Futures Research Centre)

Website: <https://www.uts.edu.au/research-and-teaching/our-research/stem-education-futures-research-centre>

Contact us: STEMEDFutures@uts.edu.au

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DISTINGUISHED VISITING SCHOLAR 2019



We are delighted that Professor Merrilyn Goos from the University of Limerick will be visiting the Centre as UTS Distinguished Visiting Scholar in March 2019 to engage in research collaboration with Centre members. Professor Goos is recognised as a world leading authority in mathematics education and is the Director of EPI*STEM, the National Centre for STEM Education, at the University of Limerick, Ireland. Professor Goos will lend her expertise to increase the excellence, impact and reputation of the Centre, both nationally and internationally.

In February 2018, the Centre (led by A/Professor Wan Ng) collaborated with the Australian Council of Deans of Education in a submission responding to the STEM Education Forum chaired by the Chief Scientist, Alan Finkel. Since then the Centre has also submitted responses to a number of other reviews:

1. [Women in STEM Decadal Plan](#) (October 2018). The Federal Government, through the Australian Academy of Science, released its Women in STEM Decadal Plan discussion paper and sought response submissions to a series of questions (for a list of questions see [Women in STEM Decadal Plan Discussion Paper](#)). The VC office led this submission in a cross-faculty/unit/Centre effort. Centre member contributions to this review include A/Professor Wan Ng (lead writer), Dr Jane Hunter (lead writer), A/Professor John Buchanan, A/Professor Mary Coupland, A/Professor Anne Prescott and Dr Meera Varadharajan.
2. [NESA's curriculum review](#) (November 2018). It is pleasing to note that the higher degree students researching in STEM education led this response. The main contributors were Dr Jim Scott (lead writer), Jane Martin, A/Professor Wan Ng, Melissa Silk and George Harb. Thanks also to Ruth Fentie, Davis Jean-Baptiste and Laruen Knussen for their input. Our response focused on STEM education that included its rationale, the nature of STEM education in the school curriculum and what changes are needed for it to happen.
3. [Review into the non-educational use of mobile devices in NSW schools](#) (October 2018). The NSW Minister for Education launched a review into the risks and benefits associated with the use of mobile digital devices, in particular smartphones, in NSW schools. A/Professor Matthew Kearney (lead writer), Professor Sandy Schuck and A/Professor Wan Ng contributed to this submission.

Project updates

A 15 month school - university partnership research conducted by **Dr Jane Hunter**, involving 22 teachers in 6 primary schools concluded in December 2018. The study: ***Building Middle Level Leaders in STEM*** using the pedagogical framework of High Possibility Classrooms was a category 2 funded research supported by the NSW Department of Education. The findings of the research will be available after 1 March 2019. Four teachers from the 2016-17 research studies in NSW schools have been asked to form a STEM panel at a plenary session at the National Future Schools Conference in Melbourne in March 2019.

The Literacy and Numeracy Action Plan K-2 project, funded by the NSW Department of Education and shared with UTS's Institute for Public Policy and Governance has reached the end of its first year. Centre researchers **Professor Peter Aubusson, A/Professor John Buchanan, Dr Kimberley Pressick-Kilborn** and UTS School of Education researcher, Dr Don Carter, are also working with researchers from ACU. They have undertaken about 20 school site visits this year and are currently writing up some preliminary findings from them. They have also almost completed devising surveys to be disseminated to Instructional Leaders (the personnel key to the project in each schools) and other stakeholders.

The STEAMPunk Girls project, a *Women in STEM and Entrepreneurship* initiative that is funded by the Australian Government Business aims to support women in STEM and to eliminate barriers for women's participation in STEM education and careers, including entrepreneurship. The first stage of the STEAMPunk Girls' project is completed with teachers from several independent schools attending the workshop on design thinking and STEM education facilitated by Taylor Szyzka and Lisa Aitken from the Equity and Diversity Unit. **A/Professor Wan Ng** and Dr Jennifer Fergusson, researchers for the project are conducting impact studies on teachers and female students. Case studies report of the first stage are being written up. Numerous government schools from metropolitan and regional schools have expressed interest for Stage 2 of the project that will begin early in 2019. The project aims to reach about 20 schools and 350 female students.

The Maths Inside Project is in its final phase and results have been disseminated at the ASERA, MANSW and MAV conferences. In addition the project has submitted a paper to the MTED journal of MERGA. Dr Marco Angelini and Centre members **A/Professor Mary Coupland, A/Professor Anne Prescott and Professor Sandy Schuck** are now focused on submitting the main results as part of the "SpringerBrief" volume series, aiming for publication in 2019.



Good News and Achievements

Professor Didar Zowghi has had a double win at the 26th IEEE International Requirements Engineering Conference RE 2018 in August in Banff, Canada (<http://www.re18.org/>). The RE conference is ranked A in CORE (www.core.edu.au) and one of the prestigious conferences in Software Engineering. Professor Zowghi's first paper was awarded the 'Distinguished Research Paper Award' in the main research track. The title of this co-authored research paper was *Learning from Mistakes: An Empirical Study of Elicitation Interviews performed by Novices*. The



Award winners. Fourth from left is Professor Didar Zowghi

second paper titled *Dynamic Visual Analytics for Elicitation Meetings with ELICA* won the best poster/research demo award and was an international collaboration effort with researchers from Calgary University, Canada, and Pisa University Italy. Well done, Didar!

Dr Simon Knight delivered an invited keynote [Who to believe? How epistemic cognition can inform science communication](#), at the Australian Science Communicators' conference, Sydney, November 2018.

A/Professor Wan Ng was one of two invited plenary speakers for the conversational topic on *Can authentic use of mobile technologies promote accurate and elaborated learning of English?* at the [Australian Council of TESOL Associations conference, Adelaide](#), October 2018.

Professor Lori Lockyer's team's BERA blog post <https://www.bera.ac.uk/blog/how-might-teacher-design-help-to-support-sustainable-innovation-in-higher-education> provides highlights from their work published in the high ranking journal BJET. Bennett S, Agostinho S and Lockyer L (2018) 'Towards sustainable technology-enhanced innovation in higher education: Advancing learning design by understanding and supporting teacher design practice', *British Journal of Educational Technology*. <https://onlinelibrary.wiley.com/doi/10.1111/bjet.12683>

Dr Jane Hunter was part of the feature symposium *Motivational and Instructional Influences on STEM Learning and Teaching* at [AARE held at Sydney University](#) in December 2018. Her paper titled *STEM, fads and necessities: How teachers' balance the high wire of teaching multiple disciplines* was well received and detailed two studies at 8 low SES schools in SW Sydney. Jane was also featured as a case study by UTS Centre for Social Impact for her work that highlights the impact the High Possibility Classrooms Framework is making in NSW primary schools. Read the case study [here](#).

CONGRATULATIONS TO

Jim Scott for conferral of his PhD degree. Thesis titled *Exploring the impact of formative practices on Science learning outcomes: A mixed methods study of the Essential Secondary Science Assessment Program in New South Wales*

Mary Coupland for promotion to Associate Professor

Simon Knight for winning the UTS Teaching and Learning Early Career Academic award for Leading learning.futures approaches to data literacy

Lori Lockyer for being named as a Research Field Leader in Educational Technology in *The Australian special report on Research* (see <https://specialreports.theaustralian.com.au/1163512/> under the Engineering and Computer Science section)

Wan Ng for the Dean's Quiet Achiever Award for Leadership, Collegiality and Contribution as Director of STEM Education Futures Research Centre

SPECIAL THANKS TO

STEM education PhD students Ha Do Thi and Bijoy Rai for their delicious cooking for the Centre's Christmas and New Year break-up lunch on 28 December. Yum!

International Collaborative Research

South East Asia Ministers of Education Organisation (SEAMEO) - RECSAM research. In collaboration with SEAMEO's Regional Centre for Education in Science and Mathematics (RECSAM), **A/Professor Wan Ng** is leading a research project on students' voice in science education. More than 15,000 responses have been gathered from Year 9/10 students in seven SE Asian countries: Vietnam, Philippines, Brunei, Myanmar, Indonesia, Malaysia and Thailand and 1,300 responses from Australia. Comparative analysis of the data with SEAMEO - RECSAM researchers will be undertaken during Wan's Professional Experience Program in semester 1, 2019. SEAMEO - RECSAM is also funding the travel of associate researcher Dr Jennifer Fergusson to RECSAM in Penang, Malaysia in January 2019.

Quality and Equity in Science and Mathematics Education in Nepal and Bhutan. A/Professor Nick Hopwood leads this project that is funded by the Department of Foreign Affairs and Trade's (DFAT) [Australia Awards Fellowship](#) scheme (Project number R17003). Centre members working with A/Professor Nick Hopwood are **A/Professor Anne Prescott, Dr Kirsty Young** and **Dr Kimberley Pressick-Kilborn**. The project aims to enhance the quality of teaching and learning in science and mathematics in these two Himalayan countries, with a particular focus on increasing the engagement of girls and learners with diverse accessibility requirements in these subjects. A collaborative approach is taken, working with Kathmandu University School of Education, Tribhuvan University Faculty of Education, Royal University of Bhutan (Paro College of Education), Royal University of Bhutan (Samtse College of Education) and Sunrise Education Foundation. Read more [here](#).

Centre Director **A/Professor Wan Ng** established relationship with the Vietnam Institute of Educational Sciences via a Skype conversation with A/Professor Anh Vinh Le, Vice Director General of the Institute on 5 September 2018. A/Professor Le has the role of designing a National STEM Framework for K-12. There are similarities in the current state of STEM education between Australia and Vietnam in that STEM education is encouraged but not made explicit in the syllabus. A collaborative research project that study Australian and Vietnamese teachers' views of STEM and the state of its implementation in schools is underway.

A delegation from the **Faculty of Industrial Education and Technology at King Mongkut's Institute of Technology Ladkrabang, Bangkok**, visited the Centre on 14 September. They are interested in collaborative research in STEM education and Technology-enabled Learning. Centre members can apply for funded short visits to their faculty to collaborate in research and publications in journals.

A delegation of 16 visitors from the **Vietnamese Ministry of Education and Training (MOET)** visited UTS on 24 September on a week-long short training course. Centre Director **A/Professor Wan Ng** presented a talk on STEM education and the research that the STEM Education Futures Research Centre undertake.

Professor Sandy Schuck recently visited two UTS KTP universities: (i) to explore further research collaboration between the Centre and Eindhoven University and (ii) to establish new relationships for research collaboration in technology-enabled learning with Lancaster University. Topics of interest raised include designing STEM curricula and projects associated with that, developing a joint international STEM innovation Masters Degree (with pathway to PhD) and developing an Erasmus+ project.

