



The Geography Teachers' Association of NSW & ACT

SHOWCASING STEM IN GEOGRAPHY

A two-day online symposium – Friday 27 May & Friday 3 June

Geography is as an 'interdisciplinary discipline'; it spans the sciences, humanities and social sciences. However, the scope and relevance of geography is often compromised through its positioning in curriculum development and school organisation structures as a subject only of the humanities and social sciences.

To strengthen understanding about the interdisciplinary nature of geography, *Showcasing STEM in geography* is designed to prompt thinking about the way in which geography is taught and presented to students, colleagues and the school community. The decadal plan for geography recommends there be formal recognition in policy and practice of geography as a STEM subject. The journey towards such recognition requires an informed, consistent approach. In the first instance, it is important for such recognition to occur in geography classrooms and for geography teachers to make clear to their students where geography becomes visible and contributes to what is known as the 'STEM field' and 'STEM education'.

Showcasing STEM in geography is an **online symposium** that brings together the academic and education communities over **two non-consecutive days**, with the purpose of exploring how STEM can be emphasised in geographical teaching, learning and assessment in alignment with the syllabus. Each session will go for 1 hour 15 minutes and comprise a presentation, Q&A time, a teacher panel response, and time to annotate/further develop teaching and learning programs. Each presenter will provide **pre-reading material** to support their presentation and form the foundation of the panel response.

Upon registration to the symposium, delegates will have the opportunity to **nominate themselves as a panel respondent** for a designated session. The accreditation process is underway. **Registration is now open and will close at 5.00pm Wednesday 25 May 2022.** Please contact gta.admin@ptc.nsw.edu.au for further information.

We look forward to welcoming you to this event

Dr Susan Caldis, President GTANSW & ACT | 2020 STEM Ambassador, geography education (Symposium Chair);
Stephanie Boden, Councillor GTANSW & ACT; James Harte, Councillor GTANSW & ACT; Katerina Stojanovski,
Vice President GTANSW & ACT (Symposium Co-Chairs)

COST & REGISTRATION

One day attendance (includes access to recordings):

Members: \$200; Non-members: \$300; Pre-service teachers / Concession: \$80

Two day attendance (includes access to recordings):

Members: \$380; Non-members: \$580; Pre-service teachers / Concession: \$100

You can pre-register for the course by:

- direct CC payment at <https://www.openlearning.com/ptc-nsw/courses/stem2022/> for each day (for discount inquiries, please email gta.elearning@gmail.com)
- or, if you want your school to pay for you, follow the instructions at shorturl.at/goIJ4 to organise an invoice.

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Symposium Program – Days One & Two

TIME	FRIDAY 27 MAY 2022	FRIDAY 3 JUNE 2022
8.30am – 8.45am	GTANSW & ACT team to meet and do a quick run through	GTANSW & ACT team to meet and do a quick run through
8.45am – 9.00am	JOINING THE EVENT	
9.00am – 9.15am	Acknowledgement of Country; Introductions, opening remarks	Acknowledgement of Country; Introductions, opening remarks
SESSION 1 9.15am – 10.30am	<p>Syllabus focus: Landscapes and Landforms</p> <p>Title of session: Understanding the processes, technologies and career pathways associated with the formation, transformation and management of coastal landscapes and landforms</p> <p>Presenter: Assoc Prof Hannah Power, University of Newcastle</p>	<p>Syllabus focus: Sustainable Biomes</p> <p>Title of session: The role of community food economies in promoting sustainable development across Australia and the Asia region</p> <p>Presenter: Dr Ann Hill, Senior Lecturer, University of Canberra</p>
15 minute break		
SESSION 2 10.45am – 12.00pm	<p>Syllabus focus: Environmental Management and Change</p> <p>Title of session: Citizen science for informing management strategies and health checks of the Great Barrier Reef</p> <p>Presenter: Prof Steven Turton, Central Queensland University</p>	<p>Syllabus focus: Environmental Management and Change</p> <p>Title of session: Hope and grief in the geography classroom – implications for teaching about and reflecting on climate change focused content</p> <p>Presenter: Assoc Prof Natascha Klocker, University of Wollongong</p>
12.00pm – 12.15pm	360info project and writing for the Geography Bulletin	360info project and writing for the Geography Bulletin
30 minute break		
SESSION 3 12.45pm – 2.00pm	<p>Syllabus focus: Sustainable Biomes</p> <p>Title of session: Problem solving and critical thinking targeting climate change and COVID-19 on food and nutrition security in the Asia Pacific region</p> <p>Presenters: Presenters: Cathy Reade, Heather MacDonald, and Belinda Nielsen, The Crawford Fund and NextGen Researchers</p>	<p>Syllabus focus: Landscapes and Landforms Environmental Management and Change</p> <p>Title of session: Tools for adaptation and resiliency amongst Inuit communities in the face of a warming climate and a changing landscape</p> <p>Presenter: Prof Lynn Moorman, Mount Royal University, Canada</p>
15 minute break		
SESSION 4 2.15pm – 3.30pm	<p>Syllabus focus: Environmental Management and Change</p> <p>Title of session: Regenerating Australia and launch of teaching resources</p> <p>Presenters: Adela Kasur and Mark Drummond, Education Team, Cool Australia</p>	<p>Syllabus focus: Water in the World</p> <p>Title of session: Fieldwork around the school grounds with a physical geography emphasis</p> <p>Presenter: Kathy Jones, geography and science teacher and Director, Fieldwork Connections</p>
3.30pm – 3.45pm	AGTA Careers website and Careers Posters	AGTA Careers website and Careers Posters
3.45pm – 4.00pm	Evaluation and close	Evaluation and close

PLEASE NOTE

This symposium will be recorded and made available only to those who register. Due to ongoing COVID-19 uncertainties and other unforeseen circumstances, the order and content of this program is subject to change.

SEE OVER FOR PRESENTER BIOGRAPHIES...

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Presenter biographies & abstracts – Friday 27 May (in session order)

Associate Professor Hannah Power, University of Newcastle

Biography: Dr Hannah Power has over ten years of experience working as a coastal and marine scientist and is an Associate Professor in the School of Environmental and Life Sciences at the University of Newcastle. Hannah has expertise in the processes and landforms of coastal environments and conducts research into waves, tides, and currents on coastlines. Her research also investigates how landforms, such as beaches, estuaries, and coral reefs, change through time. Hannah also conducts research into coastal hazards such as tsunamis and wave overtopping of rock platforms. Hannah holds a PhD (Coastal Engineering) from the University of Queensland and a B Sc (Marine Science) (Honours I) from the University of Sydney. Hannah is a Science Technology Australia 2021 Superstar of STEM and was awarded the NSW Young Tall Poppy Award in 2021. Hannah is the founder of the Australasian Young Coastal Scientists and Engineers Conference series which aims to connect, foster, and showcase the next generation of coastal scientists and engineers. Hannah is also a member of the NSW Coastal Council, an independent expert panel that provides advice to the Minister on coastal issues and management.

Abstract: Full abstract coming soon. This session draws on the resources available from the portal and also the following open articles reading <https://theconversation.com/waves-from-the-tonga-tsunami-are-still-being-felt-in-australia-and-even-a-50cm-surge-could-knock-you-off-your-feet-175056> and <https://theconversation.com/from-enormous-tides-to-millions-of-shells-here-are-6-unique-beaches-for-your-summer-road-trip-169164>

Professor Steven Turton, Adjunct Professor, Central Queensland University and University of the Sunshine Coast

Biography: Dr Steve Turton is a Councillor of the Royal Geographical Society of Queensland (RGSQ) and the Independent Chair of the Wet Tropics Waterways Partnership. He lives on the Sunshine Coast, where he is Adjunct Professor of Environmental Geography at Central Queensland University and the University of the Sunshine Coast. From 2006-to 2016, he held several senior roles as a Professor of Geography at James Cook University in Cairns, including Director of Research for the Rainforest Cooperative Research Centre. Steve is a former Councillor of the Institute of Australian Geographers and a former member of the Wet Tropics Management Authority's Scientific Advisory Committee. He is a Past President of the Australian Council of Environmental Deans and Directors, Past-President of the Institute of Australian Geographers and Past-Chair of the National Committee for Geographical Sciences, Australian Academy of Science. In 2016, Steve was appointed as a Distinguished Fellow of the Institute of Australian Geographers, and in 2017 was delighted to receive the RGSQ's J.P. Thomson Medal, recognising outstanding contributions to geography. He is currently an associate editor of Geographical Research.

Steve's research and teaching interests include tropical climatology and climate change, rainforest disturbance ecology (esp. due to tropical cyclones), the adaptation of tourism, agriculture, forestry and natural resource management sectors to climate change. He has published widely in these areas of study. Steve was an expert reviewer for the 5th and 6th IPCC Assessment Reports (Working Group 2, Impacts and Adaptation). His sole-authored book, *Surviving the Climate Crisis: Australian Perspectives and Solutions* (CRC Press, Taylor-Francis, UK), is to be published this July.

Abstract: Regional Waterways Health Partnerships are an initiative of the Reef 2050 Long Term Sustainability Plan, with links to the Reef Water Quality Report Card and Water Quality Improvement Plan. Five partnerships operate within the wider Great Barrier Reef (GBR) region. They are a collaboration among government, industry, natural resource management, agriculture, traditional owners, research, community and citizen science organisations – working towards a common goal of monitoring and improving waterway health entering the GBR lagoon. The annual report cards provide local communities with an independent, credible, evidence-based assessment of condition and trends in an easily understood format. The Wet Tropics Waterways Partnership was launched in 2016 and has since delivered six report cards. Its goal is to monitor waterway health across the Wet Tropics region and bring the community together to raise awareness, share ideas and take appropriate action to enhance our waterways. This presentation will provide an overview of the Wet Tropics partnership, including some of its recent achievements in driving improved stewardship of waterways in the region. Discussion will include overviews of several citizen science projects that contribute data and information to the annual report card. The following resources form the foundation of this session: <https://wettropicswaterways.org.au/season-3-episode-7-report-card-results/> (podcast) and <https://wettropicswaterways.org.au/wet-tropics-report-card/> (open access reading) and Costanzo, S.D. et al. (2017). *Practitioner's Guide to Developing River Basin Report Cards*. IAN Press. Cambridge MD USA. <https://ian.umces.edu/publications/practitioners-guide-to-developing-river-basin-report-cards/> (open access reading)

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Presenter biographies & abstracts – Friday 27 May (in session order)

Cathy Reade, Heather McDonald, and Belinda Nielsen, The Crawford Fund and NextGen Research

Biographies: The Crawford Fund is a registered charity which highlights benefits to Australia and developing countries of research for food and nutrition security; supports Australians in training developing country scientists and farmers, and encourages young Australians in their careers, studies and volunteering in agriculture for development. Their NextGen activities include travel awards, conference scholarships, volunteering opportunities in developing countries and high school teaching materials focused on key issues in global food and nutrition security.

Heather MacDonald, the Crawford Fund's curriculum specialist and Founding Director of Education Partnerships, will showcase The Crawford Fund's "Development for a Better Future" Resources for Secondary Schools. Heather MacDonald has been designing and implementing school engagement programs for Primary and Secondary Schools for more than 20 years. In that time, she has delivered innovative programs and resources for organisations such as the Australian and the International Olympic Committees, the Cancer Council and UNICEF Australia.

Cathy Reade is the Director of Outreach at the Crawford Fund. Cathy has over 30 years' experience in the agriculture for development space and is passionate about the Fund's NextGen suite of activities to encourage young Australians in their study, careers and volunteering for food and nutrition security.

Belinda Nielsen is President of the Researchers in Agriculture for International Development Network. A keen agricultural enthusiast, with particular interest in how the power of agriculture and collaborative thinking can be harnessed to help people, Belinda studied geography through high school then completed a Science in Agriculture (Hons 1) degree at the University of Sydney in 2020. She is now a graduate officer in the soil and land management area of the Australian Centre for International Agricultural Research (ACIAR), Australia's specialist international agricultural research for development agency.

Abstract: Using contemporary case studies of activities and action in the Asia Pacific on climate change and food and nutrition security, Heather MacDonald will showcase the Crawford Fund resources for Australian Secondary educators*. The module, *Climate Smart Technologies*, will be profiled in the presentation, demonstrating how educators can showcase Sustainable Biomes with smart technologies, and how, through students' active participation, problem solving and critical thinking they can be a part of creating a better future.

Cathy Reade will be available for general inquiries on Australia's activities in agriculture for development and Belinda Nielsen will be available to respond to questions on the power of agriculture and collaborative thinking and her experience of agricultural research creating a better future.

Audience questions on the resources and on research in agriculture will be welcome. Audience wisdom will be sought on how The Crawford Fund can better support educators in providing opportunities for students.

* The modules are available on the registration portal and have been linked to the Australian National Curriculum across the curriculum areas of Design and Technologies, Geography, Media Arts, and Science. The cross-curriculum priorities of Asia and Australia's Engagement with Asia and Sustainability are also noted within the modules.

Mark Drummond and Adela Kasur, Cool Australia

Biographies: **Adela Kasur** is an Education Specialist at Cool Australia. She has a Bachelor's in Psychology, a Master of Arts and a graduate diploma in Education. Adela has worked as a teacher and has a great appreciation for creative thinking and is passionate about teaching contemporary issues in the classroom.

Mark Drummond is Head of Education at Cool Australia. After teaching for seven years in Australia and in his homeland of Scotland, Mark worked in ed-tech and science education consulting before moving to Cool Australia.

Abstract: What might Australia look like in 2030 if we simply listened to the needs of its people? Regenerating Australia is one of the latest teaching and learning units from Cool Australia. It encourages learners to explore land, flora, and fauna and connect with nature. This rich unit is matched to Science, Geography, Civics and Citizenship. Students can watch Regenerating Australia, which uses hypothetical news reports and media featuring journalists, politicians, business leaders and citizens telling the story of what Australia could look like in 2030. This unique session from Cool Australia will highlight the array of free resources available to teachers, from ecosystems to zero emissions transport, from carbon sequestration to circular economy, all curriculum-aligned, inquiry-based, and action-driven. The following resources will be showcased and the science lessons which connect into geography will be launched at this session <https://www.coolaustralia.org/> and <https://www.coolaustralia.org/regenerating-australia-education-resources/>

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Presenter biographies & abstracts – Friday 3 June (in session order)

Dr Ann Hill, Senior Lecturer, University of Canberra

Biography: Dr Ann Hill is a Senior Lecturer and researcher in community education and community development for a more sustainable world and part of the University of Canberra (UC) Centre for Sustainable Communities and the UC Future of Food in the Capital Region network. She is a human geographer and diverse economies scholar by training and has specific interests in collective ethics and methods for living in a climate and resource changing world. She currently works with communities in Australia's SE rural-urban fringe and in Manila and Mindanao, the Philippines, on growing community food economies, among other things. Prior to academia she worked in different research and education fields including ten years' experience as a high school humanities (HSIE) teacher in southwest Sydney, and time spent as a health and nutrition consultant for Russell's Natural Food Markets and as an agricultural technical officer for University of Sydney's plant breeding institute.

Abstract: In 2019 as the human world began to grapple with COVID-19, one of our most sought-after foods, the Cavendish banana was grappling with its own pandemic —TR4, commonly known as Panama disease, a soil-borne fungus with the potential to wipe out 95% of the bananas grown and sold in Australian supermarkets. The banana pandemic raises questions about human food security and what kind of food economies and biomes are going to sustain human and planetary survival into the future. We might think of bananas as relatively cheap, made so through global commodification and fossil fuelled mass production and transportation, but when we look beneath the surface, we see many people and environments bear significant cost to put fruit like this in our basket. We also see we can no longer sustain such practices. The time is ripe to rethink our food system. In this presentation using examples from urban and peri-urban Australia and Asia, we will explore 'community food economies' and the role they might play in growing more sustainable food production and consumption practices. We will make links to the teaching of Sustainable Biomes in Geography. This session draws on the case studies profiled in the following open access links <https://yoursayconversations.act.gov.au/food-and-fibre> and also https://researchsystem.canberra.edu.au/ws/portalfiles/portal/45685368/Making_Vegetables_Visible_Insights_from_Mindanao_Hill_2021.pdf

Associate Professor Natascha Klocker, University of Wollongong

Biography: Associate Professor Natascha Klocker works at the School of Geography and Sustainable Communities; and the Australian Centre for Culture, Environment, Society and Space (ACCESS), University of Wollongong. She is a critical social geographer with a research and teaching focus on discrimination, marginalisation and belonging. Her current research explores the environmental and agricultural knowledge and capacities of migrants and seasonal workers, and the rural and regional settlement of former refugees.

Abstract: Geographers engage students in learning about a world characterised by environmental and social disarray. It follows that our students are exposed to deeply confronting topics: climate change, global inequality, food insecurity, and racism, to name a few. Prompted by research on the painful emotions elicited by climate change communication, we asked human geography students at the University of Wollongong about their experiences of our teaching. We invited them to consider which emotions 'belong' in our classrooms and how difficult emotions might be managed to minimise harm. Students explained that they expect to feel distress while studying geography and found being confronted a productive experience. They considered the responsibility for managing difficult course-related emotions to be distributed and identified a range of strategies to prevent painful emotions from corroding their wellbeing. Many of these strategies, particularly making room for difficult emotions – by acknowledging, holding onto, and working through them collectively – are relevant in school and university classrooms alike. This seminar is based on the following article available from the registration portal: Klocker, N., Gillon, C., Gibbs, L., Atchison, J., Waitt, G. (2021), 'Hope and grief in the human geography classroom', Journal of Geography in Higher Education <https://doi.org/10.1080/03098265.2021.1977915>

Professor Lynn Moorman, Mount Royal University, Alberta, Canada

Biography: Dr Lynn Moorman teaches physical geography, geomorphology, and advanced GIS/spatial analysis. Her goal in teaching is to make geographic concepts relatable and help students better understand their local environments and know the capabilities of mapping and modelling software to enhance their work and studies. Lynn's research interests lie at the intersection of spatial technologies and learning sciences with a focus on Digital Earth, remote sensing, GIS, citizen science, and applied visualisation technology, including virtual and augmented reality to support geographic teaching and applied research. She is involved in active climate change adaption strategies including co-developing operational sea ice

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Presenter biographies & abstracts – Friday 3 June (in session order)

safety mapping programs with Inuit using optical and radar satellite imagery and drone data (SmartICE), and immersive technology development (GeoEpic). Lynn contributes to national and international geography education organisations including the Royal Canadian Geographical Society, Canadian Geographic Education, National Geographic, International Geography Olympiad (iGeo), and is a Canadian representative for the International Commission on Geographic Education.

Abstract: Warmer temperatures greatly affect the functioning and continuity of ecosystems. Some of the most severely affected are the polar regions -the Arctic and Antarctica. Sea-ice Monitoring and Real-Time Information for Coastal Environments (SMARTICE) has developed an integrated, near real-time monitoring and dissemination system to help Inuit people adapt to rapidly changing sea-ice conditions in Arctic Canada. This session showcases how the use of geospatial technologies, spatial analysis, and an understanding of mapping and modelling software enables Inuit people in Arctic Canada to develop resilience in adapting and responding to a changing landscape brought about by the effects of a warming climate. A sense of place and context shapes the design, conduct of, and responses to research. The session draws on the three easy-reading and open-access articles which bring forward the concept of living in the Arctic together with the nature of research conducted there.

Resources: Our work as described in the UN Climate Change Solutions website <https://cop23.unfccc.int/climate-action/momentum-for-change/ict-solutions/smartice>

A recent article in Bloomberg featuring the work of Inuit colleagues
<https://www.bloomberg.com/features/2022-pond-inlet-arctic-inuit-climate-science/>

A recent article about the lived experience of what the loss of ice means for Inuit people. The graphics are beautiful.
<https://www.nytimes.com/interactive/2017/11/25/climate/arctic-climate-change.html>

Kathy Jones, geography and science teacher; Director, Fieldwork Connections

Biography: Kathy Jones is a Geography and Science teacher who specialises in the design and implementation of fieldwork for school-based and beyond-the-school settings. She is the founder and director of Fieldwork Connections, a small business aimed to equip geography teachers with meaningful and accessible fieldwork investigations to use around the school grounds as well as offering school-based fieldwork facilitation. When Kathy is not out in the field with Fieldwork Connections, you can find her working with AUSECO and at The Hills Grammar School. Kathy holds a Bachelor of Environmental Science, and before embarking upon a teaching career, she used her scientific expertise to work in the contaminated land industry. It was here that Kathy gained many industry-based fieldwork skills which she can now integrate into an educative school-based setting. After completing a Bachelor of Education (Secondary) at Macquarie University, Kathy identified the immense benefit students gain from learning outside the classroom; she also realised the need for teachers of geography to be supported with ideas for simple, accessible fieldwork investigations. Kathy's background in science and physical geography results in many of her fieldwork investigations having a strong emphasis on STEM. Kathy firmly believes that through the study of geography, the natural world around us, and being able to understand simple biophysical processes we are then able to better understand human impacts and the flow on effects to effective management of environments.

Abstract: Every day I see the benefits of students learning outside the classroom. Learning new skills to use geographical tools to answer questions they have about the world around them. Fieldwork is an integral part of geography, however, taking your class outside may seem a little daunting. Fieldwork doesn't have to be done as a full day immersive program. It can be done in your school grounds in as little as one or two lessons with simple field equipment. In this session I will show you how I approach fieldwork in a school setting, focussing on Stage 4, Water in the World, with my Year 8 Geography class. I will address a real world issue at the school, related to runoff in the school catchment, and apply fieldwork skills that you can replicate with your own class. The broad fieldwork design can be found in my accompanying reading "Simplifying the Science" which can be further obtained from the registration portal and used for your own fieldwork design in physical geography.