ENDPOINT

NEWSLETTER

A publication of the Australasian chapter of the Society of Environmental Toxicology and Chemistry

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Contents

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SETAC AUSTRALASIA

Message from the Editor

Darren Koppel (darren.koppel@uts.edu.au)
Communications Officer

Thanks to everyone who contributed to this issue!

Our new website is nearing completion and I'm excited to reveal that it will include a database of Australasian-specific ecotoxicology. We're aiming for something that looks and feels similar USEPA's ECOTOX Knowledgebase, so keep an eye out for that.

Our existing website is still going strong in the meantime. On there you'll find advertisements for 4x jobs that would suit our ECRs, including 2x postdoc positions in the environmental risk of mercury!

In this issue I wanted to highlight the great work being done by our members, collected by our regional representatives, and some of the stories that are making it into the national media. The Conversation is a platform that partners with researchers to tell stories that are timely and relevant to our region and the rest of the world. They publish under a creative commons license and encourage other outlets to republish their stories. So, I've done just that with a story from Dr Larissa Schneider (who is the Convener of Mercury Australia and an ARC DECRA Fellow at ANU). I'd love to see more stories from our members in the media and The Conversation is a great outlet for them!

Congratulations to our very own and very distinguished Dr Jenny Stauber FTSE **FAA**, who picked up a snazzy 3 extra post-nominals by becoming a Fellow of the Australian Academy of Science—one of Australia's 4 learned academies. They sit nicely next her Fellowship of the Australian Academy of Technology and Engineering awarded a couple years ago. In celebrating Jenny let's remember that we have many impressive and worthy members in our ranks, so consider nominating someone! Bonus points for nominating someone from an underrepresented group.

I wrote in the Acknowledgements of my honours thesis "To Assoc. Prof Teasdale ... thank you for your guiding wisdom.". I'm sure this is one of hundreds of acknowledgements from students and colleagues who received his help, wisdom, and expertise. In this issue we pay tribute to Peter with memories and stories from his friends and colleagues across the world. He will be missed.

It's still scary out there so take care of yourself, and if you can, somebody else.

Darren

From the President

Andrew Harford (Andrew.Harford@awe.gov.au)

In the May Endpoint edition, I expressed my hope that it would be our last "lockdown" edition but, unfortunately, that didn't work out for some of us. Our thoughts have been with those still at home, especially the students who have been unable to access their labs and field sites during this time. While the global pandemic is clearly here to stay for a little longer, the council and members have been doing a great job at meeting the challenges of doing and disseminating science. Despite the current situation, there has been many great events, and much be excited about in the future. I've been extremely impressed with the initiative of the regional SETAC-AU reps who have virtualised their local catchups. Thanks to Elissa O'Malley who provided an online Queensland Showcase in July and also watch-out for the Victorian Showcase on the 19th October, thanks to Jackie Myers. The great benefit of these virtual events is that we are all able to participate from anywhere in Australia or New Zealand and I'm looking forward to more virtual regional meetings in the future.

The *EnviSmart* virtual seminar series has also gone from strength-to-strength and Brad Clarke has been extremely busy with other fantastic ideas. The council will continue to support the next round of monthly seminars and we are especially pleased that the series will continue to focus on providing a platform for post-

grad students. The new series will also feature a student showcase and there will be more student scholarships offered, including free memberships to SETAC. The SETAC-AU council and the Environmental Contaminants Interest Group are also supporting an *EnviSmart Emerging Contaminants Workshop*, which will be a full-day of speakers on the 27th of October. Also, if you haven't already done so, take the time to check-out the *EnviSmart* podcast, which features interviews with inspiring environmental scientists who share stories about their research journey as well as their thoughts on science and life. They have been a lot of fun and contain fascinating discussions. Thanks to Brad Clarke and Drew Szabo for their fantastic efforts and to Kath Hassell for helping with the organisation of the seminars.

The SETAC-AU students should also be aware of the upcoming 10th Young Environmental Scientist (YES) meeting, which will be a virtual meeting from 22–26 February 2021. The YES meetings have been hugely popular SETAC events organised by students for students. The past meetings have all be held in Europe and North America but the 2021 virtual meeting offers our Australasian members a chance to participate. Thanks to Gwil Price and Drew Szabo who have offered to form a local committee with the aim of having a day of local student talks and keynote speakers in a suitable time for us. We also plan to use the momentum from the *EnviSmart* initiative to help stimulate our local contributions. However, don't wait to submit an abstract – if you are keen you can do so now!

The SETAC-AU council have also notified students that we've decided to support them by negotiating a deal with the RACI mentoring program. A number of SETAC-AU students will be given the opportunity to participate in the program and we will be subsidising the costs. It sounds like a great program and a great way for students to be linked with people with a wealth of scientific and professional experience. You can find more information on their webpage and if you are interested please contact Tom Creswell.

SETAC also has many exciting virtual and face-to-face meetings planned for the future. A new date of September 2022 has been set for the postponed Singapore SETAC World Congress. It's somewhat unfortunate that we'll need to wait another two years, but the World Council and Asia-Pacific board were keen to find a date when we will be able to meet in person without restrictions. In the meantime, there will be the SciCon2 meeting in November and late abstracts are still being accepted. Even if you aren't presenting, I strongly encourage you to register and participate in this event. It is going to be a massive event and it is a unique opportunity to be involved in one of SETAC's biggest meetings for the year. Moreover, most of the content will be available on-demand if you aren't a night owl. Finally, we are also progressing our next SETAC-AU and WiOW conferences for Early September 2021. I'm very excited about the prospect of catching you all in person next year and having another memorable meeting. Look out for the announcements in coming weeks.

Finally, I'd like to acknowledge the brilliant contributions that Peter Teasdale made to the SETAC-AU society. Peter sudden passing sent shockwaves through our close-knit membership and it has been difficult to reconcile the fact that his friendship and great science have been lost. Since his passing, I've learnt about his pivotal role of encouraging the environmental chemists to join the ecotoxicologists into the newly formed SETAC-Australasia. That move has forever strengthened our science and society. My personal experiences with Peter were always inspiring and convivial. We've reached out to his friends and colleagues and they've sent their thoughts and feelings, which we've formed into a tribute for this edition. I'm also pleased that SETAC-AU will honour his memory with a new award bearing his name.

Celebrating Peter Teasdale

This year we lost a dear friend, colleague, and mentor in Peter Teasdale. Here at SETAC AU we offer our deepest sympathies to Bernadette, Natalie, and Caitlin. The life Peter led was one we want to celebrate through the tributes and memories from our community.

Peter was an exceedingly generous mentor who never hesitated to drop whatever it was that he was doing and help students with their research. His door was never closed, and he would always greet any question or query, no matter how small, with a smile and an unwavering enthusiasm to help.

He never sought leadership roles for personal kudos or advancement but agreed to do them in the interests of helping and developing others. He created a culture of caring centred on understanding, inclusiveness and compassion. He enjoyed the success of those he led, even though those roles limited the time he had himself to undertake teaching and research, both of which he loved.

Peter was a talented researcher, a team player, and an outstanding teacher and mentor. Most importantly it was Peter's humanity that set him apart. This warm and kind man was well liked by everyone and greatly respected for his strong sense of integrity and desire for scientific truth. Peter's legacy will live on through his students, now scattered across Australia and the world, who surely strive to honour Peter's commitment to the next generation of scientists through their own professional and academic careers.

Richard John, Graeme Batley, Bill Davison, Hao Zhang, David Welsh, Jianyin Huang, Julie Mills and William Bennett

Saying goodbye to Peter Teasdale, a great scientist and friend.

It is with great sadness that I write about the untimely sudden death of a friend, colleague and collaborator. Peter Teasdale left us too soon, on the 7th August 2020.

I have had the pleasure of knowing Peter since 1994. He was a gentle man, a loyal friend and a brilliant scientist. His first love was his family, and a close second was his work. He was man of scientific passion, and he sought the scientific truth with integrity and respect. He had an overpowering sense of fairness and equality, and supported so many people (young and older) on their journeys. Peter was an inspiration to many; he was collaborative, supportive, and generous with his time and knowledge. And dang, did he love pizza, cider and dancing!

Peter's contributions to environmental and analytical chemistry spanned 25 years. Peter was a boy from the Gong born on 3rd November 1966. He graduated from the University of Wollongong with a Bachelor of Science (Honours 1 and the University Medal) in 1989, during which time his most success reaction was creating an unbreaking bond with his now wife, Bernadette Walsh. Peter went on to complete a PhD in Chemistry in 1993, during which time he worked with Gordon Wallace and colleagues on conducting polymers, and published his first paper in 1989. From 1993-1996 Peter worked as a postdoc in CSIRO Centre for Advanced Analytical Chemistry. Here he turned his chemistry talents to environmental applications, exploring contaminated sediment analyses and passive samplers alongside Graeme Batley, Simon Apte and Karl Bowles. In Graeme's words "We soon had him working on contaminated sediments. In particular, he initiated our use of sediment peepers which were applied looking at copper contamination in sediments from Macquarie Harbour in Tasmania. In 1995, we encouraged him to go to Lancaster to work with our colleagues Bill Davison and Hao Zhang. It was there that he learnt about DGT, a topic that was to be a major focus of his research for over 20 years."

In 2000, Peter returned to Australia to work at Griffith University where his research flourished and his expertise was sought from colleagues across the globe. During this time, Peter had what he declared his most prized achievements, the birth of his daughters Caitlin and Natalie.

Peter led a successful group of skilled researchers who, among other things, pioneered multiple applications of DGT, including expansion of his early success with 2D imaging for sulfide and several colorimetric techniques to increase our understanding of the heterogeneous nature of sediments. They identified new DGT binding agents to use in environmental settings, including titanium dioxide for oxyanions. Peter's achievements were many, with hundreds of publications in international journals and the grey literature that have been cited over 6000 times, with an H-index of 40. But Peter's impacts aren't limited to academia. Peter was genuinely focused on making contributions to society, working closely with industry and government partners, striving to achieve applied outcomes to improve and simplify environmental assessments.

Peter was also a committed teacher for over 20 years. This was acknowledged at Griffith University in 2013 when he was appointed as the Director of the (then) new Bachelor of Science Program, which had 13 majors across two campuses and involved five Schools. Peter went above and beyond to uphold the quality of the materials delivered in his programs and to ensure a positive student experience. He must have taught tens of thousands of students over the years. Peter was nominated multiple times by students for teaching awards, and will remain in their memory for the important role that he played in their lives.

Peter's achievements and expertise were recognised as a valued member of the Society of Environmental Toxicology and Chemistry (SETAC), as a fellow of the Royal Australian Chemical Institute (RACI), and being one of few chemists to be awarded both the RACI analytical chemistry Lloyd Smythe medal in 2011, and the RACI environmental chemistry medal in 2017. Peter was also the 2016 Erskine Visiting Fellow at the University of Canterbury, New Zealand, and a Nyrstar Visiting Lecturer in 2011 and 2012 at the University of Tasmania.

Peter often spoke of how happy he was with the move to Adelaide, and how much he enjoyed the new challenges he embarked upon at UniSA; he spoke of colleagues, opportunities, and a sense of belonging. Peter's roles at UniSA included the director of the natural and built environments research centre, head of school of the natural and built environments, professor of environmental science and professorial lead within UniSA STEM.

The loss of friend and colleague is difficult to accept, and not easy to understand. Our faith is a string support, yet as scientists we are trained to seek answers, and in this process I was inspired by the words of Aaron Freeman. To honour of Peter's scientific passion, I thought we could briefly consider the gift of life from a thermodynamics perspective.

In physical chemistry, we speak of the conservation of energy. The first law of thermodynamics states that no energy gets created in the universe, and none is destroyed. This means that our energy is conserved over time, and it will always remain. All of our energy is shared with our environment, over our lifetime we give and we take from our surroundings in various ways, such as vibrations and waves of light, heat and in ways we are yet to understand. So we should consider that every breathe that we expel remains with in this world, forever; that much of our energy is given off as heat, and the warmth that flows through us in life remains here, warming the lives of those around us; and that all the photons that ever bounced off our faces, all the trillions of particles whose paths were interrupted by a smile, have raced off in new directions, their paths forever changed by their contact with us.

So allowing for the fundamentals of science, the evidence shows us that this is not the end of Peter's impact. According to the law of the conservation of energy, not one bit of Peter's is gone; Peter's energy is still around us, he is just much less 'organised' now.

But none-the-less, we will miss him.

Dianne Jolley

Peter chose to spend a fellowship in the late 90's working in the newly formed DGT research group at Lancaster. We were so lucky to benefit from the fresh eyes and welcome questioning that Peter brought. His willingness to share ideas and help others was a big factor in creating a positive team spirit and exciting working environment. He was the driving force behind developing simple procedures for using DGT to provide novel 2D images of solutes in sediments. These new approaches led to a step change in our understanding of biogeochemical processes in sediments, but his influence at Lancaster extended beyond his own research. He freely gave his time and expertise to PDRAs and PhD students, strengthening their work through his constructive input. Group barbeques improved markedly with his Aussie expertise and an Aussie presence on the staff cricket team was great for out-psyching the opposition. This warm and kind man was well liked by everyone, as well as being greatly respected for his strong sense of integrity and desire for scientific truth. Peter's creativity and natural leadership were plain to see at this early stage of his career, so his later success was no surprise. I was fortunate to maintain strong links with his own very successful research group, which pioneered many aspects of DGT, including developing rapid colorimetric methods for 2D imaging that enabled new insights into sediment processes and introducing alternative binding agents, most notably titanium dioxide for oxyanions. Peter played a leading role in all DGT conferences and the respect and affection in which he was held is clear from the personal messages I have received from the DGT community. Thank you for so much Peter, your friendship, your groundbreaking science and the many wonderful personal memories. We will miss you.

Bill Davison

Peter joined our group at CSIRO at Lucas Heights as a post-doctoral fellow in 1993, after successfully completing a PhD on polymer chemistry with Gordon Wallace at the University of Wollongong. He had excellent credentials having 1st class Honours and having won the University Medal in 1989. With us, he was working on contaminated sediments, in particular, the development and application of 'peepers' to sample sediment pore waters. He successfully deployed these in numerous studies including looking at copper contamination in Macquarie Harbour from the Mt Lyell copper mine in western Tasmania, and later at the Ok Tedi copper mine in Papua New Guinea. Here, he was working in remote locations in the highlands of PNG and managed to avoid malaria, crocodiles and other water-borne infections while wading in creeks to obtain the necessary samples. Peter's nearly 3 years with us yielded an amazing 9 scientific publications and set the group up with new skills for sediment sampling and analysis. Peter was a talented researcher, a team player, and popular with all who he contacted.

As a keen sportsman, Peter managed to fit in lunchtime soccer, touch football and tennis while at Lucas Heights.

Wanting to study further overseas, we suggested he contact our colleague Professor Bill Davison at Lancaster University in the UK. There he became highly proficient in the application of diffusive gel (DGT) samplers for contaminants in waters and sediments. The use of DGT was to be a major focus of his research for over 20 years. We are happy to accept some responsibility for his success in this area.

We were pleased to have supported Peter's successful applications for both the Analytical and the Environmental Chemistry Medals of the Royal Australian Chemical Institute.

We have maintained research collaborations with Peter since he moved to the Gold Coast and later Adelaide. This has been largely via Stuart Simpson and as recently as last year. He had so much more to contribute and will be sorely missed.

Graeme Batley, Simon Apte, Stuart Simpson, Jenny Stauber and colleagues

Peter was one of my SETAC-AU conference buddies. I greatly enjoyed the time we spent talking about environmental science, teaching and universities in general. In 2016 Peter spent 6 weeks as an Erskine Fellow at the University of Canterbury teaching into environmental science and environmental chemistry. Peter was a great colleague, scientist and mentor. I also appreciated his dedication to his family of whom he was very proud and talked about often.

Sally Gaw

My long-term friend Graeme Batley told me of Peter's unexpected passing several weeks ago, and I have been struggling to come to terms with it. My connection to Peter was relatively recent, linked to our joint authorship (along with four other authors) of a paper on the passive sampling of metals and metalloids that was published in 2014 (Peijnenburg, W. J. G. M., Teasdale, P. R., Reible, D., Mondon, J., Bennett, W. W. & Campbell, P. G. C. (2014), IEAM 10, 179-196). Most of the paper was written by Peter, Willie Peijnenburg and myself, on three different continents, and Peter proved to be an invaluable colleague, especially for the sections dealing with diffusive equilibration in thin films (DET) and diffusion gradients in thin films (DGT). There was a certain irony here, in that many years ago Peter actively considered coming to our research centre in Quebec City to do postdoctoral work with my colleague André Tessier, but instead he ended up going to the UK to work with Bill Davison… where he first started working on DET and DGT!

Peter Campbell

Regional Report | Tasmania

Cath King (cath.king@aad.gov.au)
Tasmania Representative

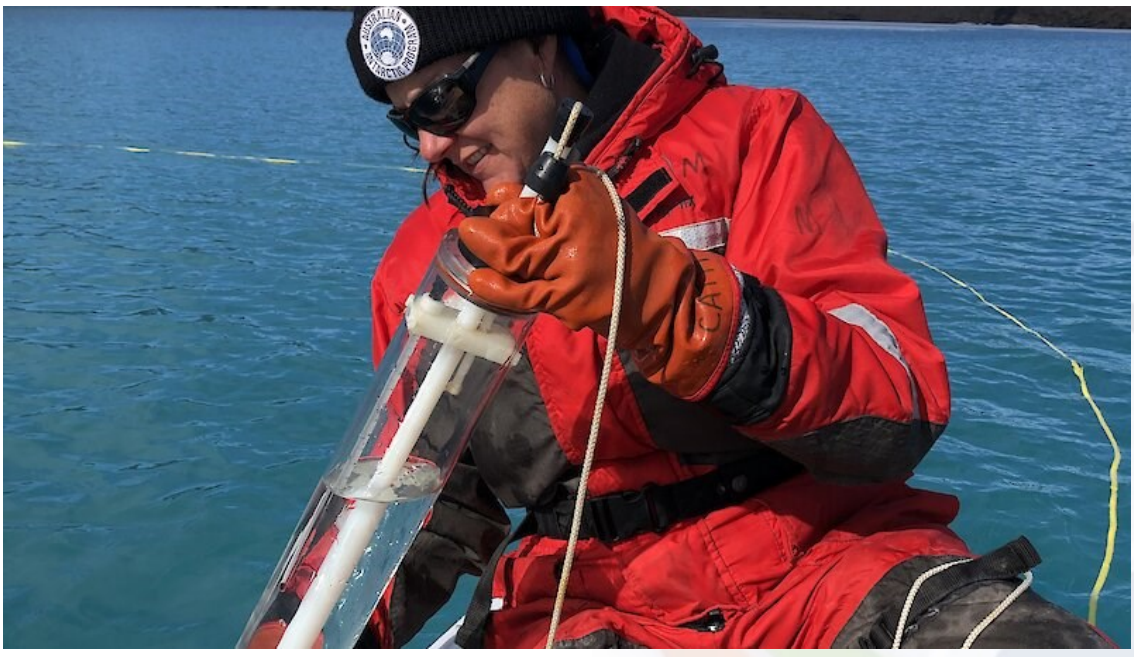
Australian Antarctic Division

There have been some significant structural changes in the Science Branch at the AAD this year, with the formation of the Environmental Protection Program, led by Cath King. This program focuses on assessing the distribution of, and risks to, environmental values in Antarctica, setting environmental standards and guidelines for ensuring effective protection and conservation, and remediating legacy contamination and sites of environmental damage. It is comprised of 3 sections, Ecological Risk Assessment & Management, Environmental Remediation & Restoration and Biodiversity Conservation. The change in structure highlights the great work of the Ecotox and Remediation teams and the importance of our research contributing to the ongoing management and protection of Antarctica.

This year Cath King and Kathryn Brown have been heavily occupied with progressing a comprehensive environmental assessment for a proposed aerodrome in the Vestfold Hills in Antarctica. Their main input to the assessment is focussed on the current status of and likely impacts to biodiversity of biota inhabiting a complex system of lakes in the vicinity of the proposed site. For a snapshot of their field work in this amazing location, check out the video here. Microinvertebrate cultures collected from the lakes are now being maintained in our Kingston laboratories by Kathryn and the team for future toxicity testing.

Another paper from Kathryn Brown's PhD work has recently been accepted for publication by ET&C. The work is titled 'Impacts of petroleum fuels on fertilisation and development of the Antarctic sea urchin *Sterechinus neumayeri*'. Look out for this in a coming issue. In her current role, Kathryn is working to complete a long term experiment in which she has been studying the aging of diesel fuels in Antarctic soils and its toxicity to the nematode *Plectus murrayi*. Final results are being prepared for publication. This work is important to our decision-making regarding soil reuse after fuel spill remediation in Antarctica.

Our work in a similar space for the sub-Antarctic region is progressing too. Cath King and Jane Wasley have recently finalised an assessment of the risk of groundwater discharges from remediated fuel spill sites to the marine environment at sub-Antarctic Macquarie Island. A manuscript of this work has recently been submitted to IEAM for publication. This work informs our environmental decision-making around whether sites that have undergone remediation continue to pose a risk to the environment.



Cath King collecting lake water samples in the Vestfold Hills, Antarctica.

Regional Report | Tasmania

Finally, in preparation for planning our next major field campaign in the summer of 20/21, in which our focus will move to Mawson station, Tania Raymond is preparing a desktop study of the current knowledge of the history of contamination in this area. In next years field season we will be conducting a comprehensive environmental assessment of waste and contamination, assessing both marine and terrestrial ecosystems, and ultimately providing recommendations for environmental management of Mawson station area. Mawson station is the oldest of our Antarctic stations, established in 1954, and therefore has had a relatively long history of impact and contamination by Antarctic standards. In assessing the current status of waste and contamination in this area we will identify needs and priorities for the clean-up of any impacted sites, again informing sound environmental decision-making and facilitating best practice management of our sites.

And finally, we are feeling even more isolated on our little island during these COVID times, so please stay safe and come and visit us again when boarders are reopened!

Cath King and Kathryn Brown conducting lake biodiversity fieldwork in the Vestfold

Regional Reports | Western Australia

Monique Gagnon (m.gagnon@curtin.edu.au),
Western Australia Representative

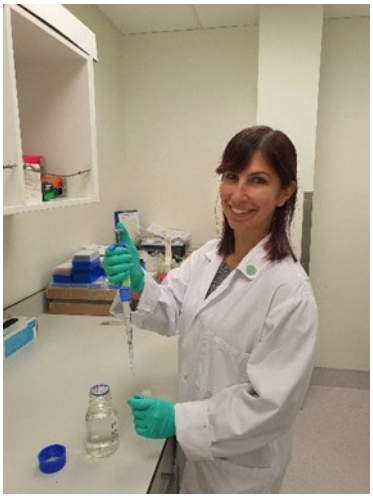
Damian Lettoof, PhD candidate at Curtin University, has just finished his third and final season of PhD field work, measuring a range of health parameters in Western tiger snakes along an urban gradient, and started the final year of my PhD. This year he has lead a published study on broad-scale screening of contaminants in sediment and tiger snakes with emphasis on using these snakes as bioindicators, this study was the first of its kind in Australia. He also lead and published a world-first study showing a suite of rat poisons in three species of urban-living reptiles diffing in diet and trophic tier, where it is suggested that reptiles are a significant vector of rat poisons in urban environments. Currently, he have a pilot study due for publication showing maternal transfer of metals in tiger snakes, and is about to submit a paper quantifying a suite of metals in snake scales. We are certainly discovering a lot with urban tiger snakes!

As for Francis, also at Curtin University, he has completed the last exposure experiment of his PhD and is currently generating and analysing data on dietary exposure of fish to crude oil. From biomarker work to fine chemical analyses and crude oil fingerprinting, Francis is drawing the picture that will assist forensic laboratories to link a spilled oil to its source.

Regional Report | New Zealand

Karen Thompson (Karen.Thompson@niwa.co.nz)
New Zealand Regional Representative

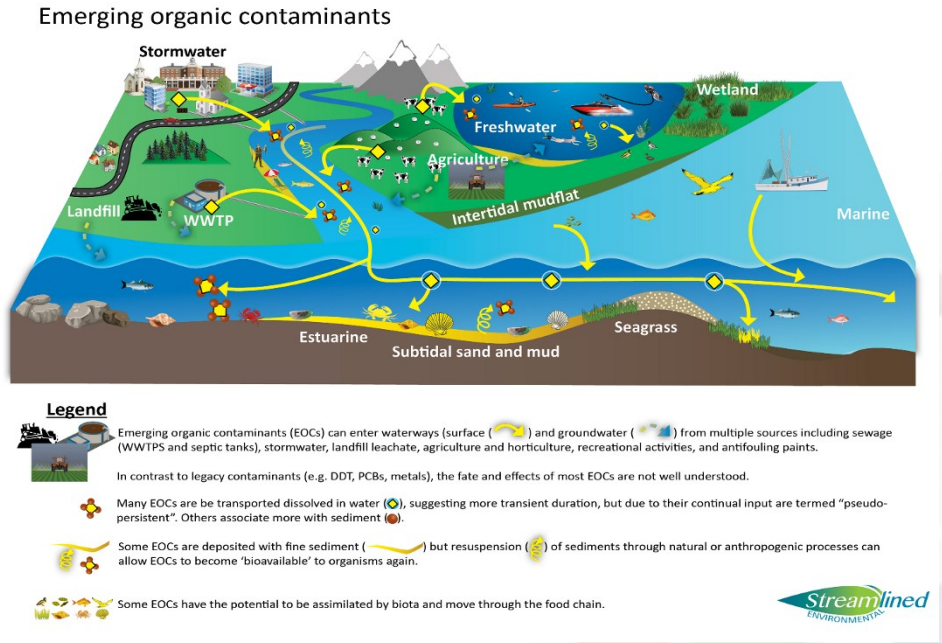
The NZ region has started virtual get togethers called SETAC Sessions – Quarterly Catchups. Members are encouraged to take a break from work and enjoy a short lunch break with their NZ colleagues. This is organized by **Karen Thompson**, the NZ council representative and includes a brief report from her, followed by a short presentation from a member and then general discussion. If you are interested in presenting or would just like more information, please get in touch.



Camille Baettig in the laboratory

Camille Baettig is a first year PhD student at the University of Auckland and a recent addition to **Dr. Louis Tremblay's** ecotoxicology lab at the Cawthron Institute. She completed her BSc in ecology and evolution at the University of California, Santa Cruz and MSc at Ludwig Maximilian University of Munich. Camille's PhD will assess whether emerging organic contaminants (EOCs) pose a risk to New Zealand's unique aquatic ecosystems. Research conducted thus far confirms some EOCs are present in the New Zealand environment similar to concentrations reported overseas. Her project will be a comparative study between the well-studied Mediterranean mussel (*Mytilus galloprovincialis*) and the New Zealand endemic greenshell mussel (*Perna canaliculus*) to determine if *P. canaliculus* can be used as a bioindicator of environmental health. The hypothesis tested will be whether these chemicals can alter the modulation of gene expression patterns at concentrations commonly found in the New Zealand coastal environments. To accomplish this novel molecular biomarkers for qPCR analysis for *P. canaliculus* will be used. In addition, *M. galloprovincialis* and *P. canaliculus* will be exposed in a laboratory setting to selected EOCs and transcriptome analysis will be done to determine how as a whole genes are altered. The overall outcome of this project will provide information and knowledge to better characterize the impacts of EOCs on New Zealand's unique aquatic ecosystems. The information of expression patterns should contribute to the establishment of adverse outcome pathways specific to native bivalves and could be tested against other species.

The ecotox team at Cawthron has bounced back quickly from the COVID-19 shutdown and research is progressing again. **Andrew Barrick,** a postdoctoral fellow, is focused on investigating the ecotoxicity of organic contaminants (pesticides, pharmaceuticals and plasticizers) using the NZ native copepod species, *Gladioferens pectinatus.* The results from acute and chronic tests will allow investigation of the ecotoxic potential of contaminant mixtures.



Conceptual model of the potential sources and fate of EOCs.

As part of this work, toxicity towards algae, *Dunaliella tertiolecta*, and mussel embryos from the Mediterranean mussel, *Mytilus galloprovincialis*, and green-lipped mussels, *Perna canaliculus* is also being characterised by **Olivier Champeau**.

Work has progressed well for both MBIE projects on Emerging Organic Contaminants (EOCs) and the ESR-led Aotearoa Impacts and Mitigation of Microplastics (AIM2). The Cawthron team have successfully developed a long-term multigenerational protocol using *G. pectinatus*. It is being further validated with select benchmark chemicals to establish a transcriptomic capability platform. As part of this, methodology has been established to optimize the extraction of RNA and DNA from the copepods. Recently, the team has received a range of different microplastic polymers at 5 different size classes and select plastic chemical additives to test. Testing will start soon to investigate their potential ecotoxicity as well as characterizing the interactions of different polymers with *G. pectinatus*.

As part of the MBIE EOCs project, Graham Sevicke-Jones has coordinated the development of a New Zealand strategy to manage the risk of emerging contaminants. The strategy has been developed to lead Aotearoa-NZ's industry, government and research focus on EOCs, and foster the establishment of an enduring partnership between Aotearoa-NZ scientists, regulators and policy makers, and world-class international EOC research groups. The strategy includes 3 major goals:

- To communicate knowledge of emerging contaminants in an effective and timely manner, in order to protect Aotearoa-NZ's prosperity, heritage and health.
- To identify research and development requirements for improving our knowledge of the toxicity of ECs to Aotearoa-NZ's people and environment.
- To provide direction, leadership and support to Aotearoa-NZ on the effects of ECs in the environment.

The next step is the development of an implementation pathway to advance solutions and actions that will contribute to safeguarding the health and well-being of our people and environment. While we need to focus on Aotearoa-NZ, we will ensure that the wider Australasian community is engaged and made more aware of the risks of ECs. As such, the New Zealand team is working closely with Australian colleagues Anu Kumar and Glen Walker to explore opportunities to develop an Australasian wide framework to better manage emerging issues in our region.

Mike Stewart (Streamlined Environmental Ltd) teamed up with **Louis Tremblay** (Cawthron Institute) to produce a report on potential issues associated with emerging organic contaminants (EOCs) in the Southland region. Using current understanding and knowledge, this report to Environment Southland is targeted at policymakers and outlines the risks to human health and ecosystem health from emerging contaminants that could potentially be in Southland's water bodies.

Chris Hickey out sampling after the grounding of MV Rena off the coast of Tauranga, NZ in 2011.

Regional Reports | New South Wales

Lisa Golding (lisa.golding@csiro.au),
New South Wales Regional Representative

ANSTO Aquatic Ecosystems Research (Tom Cresswell; Tom.Cresswell@ansto.gov.au)

Good progress is being made with assessing the ecological risk from decommissioning offshore petroleum infrastructure research. The team has conducted several assessments of subsea pipeline scale including: a determination of the total elemental and radiological constitution of scale; the speciation of metals such as mercury; the solubility of scale contaminants in seawater and dilute acid; and the dietary bioavailability of scale contaminants to a range of benthic marine taxa. The research is working toward the development of an assessment framework to aid in offshore infrastructure decommissioning planning. ANSTO is also collaborating with the Curtin University Oil and Gas Innovation Centre (CUOGIC) and the University of Aberdeen on the National Decommissioning Research Initiative (NDRI) project into contaminants of primary concern (Naturally Occurring Radioactive Materials; NORMs and mercury) from decommissioning oil and gas infrastructure (project info here).

MRes student **Amy MacIntosh** (Macquarie University) is finalising her systematic literature review to better understand the specific contaminants present within offshore pipeline scale as well as anything that is currently known about the effects of scale contaminants on marine biota. The review will be published in late 2020 but has already highlighted that there are major differences in how offshore decommissioning is conducted across the world and that there are very few, if any, acknowledgements of the presence of NORMs within such scales. The review will hopefully act as a roadmap for future research and **Amy** will be conducting marine organism bioaccumulation studies with NORM scale in early 2021 to determine the dietary bioavailability of radionuclides such as ^{226}Ra, ^{210}Pb and ^{210}Po. **Amy** will be presenting results from her literature review at the International Atomic Energy Agency (IAEA) virtual Conference on the Management of NORM in Industry 2020 in October. **Amy** and **Tom** will be giving a joint presentation on NORM associated with offshore oil and gas decommissioning and **Tom** will be a panel member in the Workshop on the Oil and Gas Industry, with a focus on Decommissioning of Oil and Gas Facilities.

PhD student **Danielle Hill** (Griffith University) is finalising her systematic literature review of the impacts of insect and amphibian metamorphosis on metal and radionuclide bioaccumulation. Freshwater insects and amphibians often form the most sensitive part of freshwater ecosystems to inorganic contaminants and yet there are relatively few studies conducted to understand how metamorphosis can impact the bioaccumulation of these contaminants. Huge congratulations to **Danielle** for being awarded an AINSE Residential Student Scholarship, which provides a top-up scholarship and travel funding for students based at ANSTO for their research and who are conducting research aligned with ANSTO's priority research areas. In the coming months, **Danielle** will be conducting a range of radiotracer experiments using ^{73}As, ^{75}Se, ^{134}Cs, ^{85}Sr and hopefully ^{203}Hg to understand bioaccumulation of these elements by metamorphosing freshwater insects. **Danielle** has also been shortlisted in the Fulbright scholarship application process, which will hopefully provide her with funding to travel to the Savannah River Site in South Carolina, U.S., to conduct a series of mesocosm and field studies to better understand contaminant bioaccumulation by metamorphosing organisms at a site contaminated with both radionuclides (^{137}Cs and ^{90}Sr) and metals/metalloids from coal fly ash (As, Se and Hg). If successful, **Danielle** is hoping to travel to the U.S. to conduct this research in 2022.

PhD student **Sarah McDonald** (University of Melbourne) had planned to undertake a field campaign around the creeks and rivers of urban Melbourne to understand the speciation and partitioning of trace metals before, during and following large stormwater events. Unfortunately, due to COVID-19 restrictions, **Sarah** has had to postpone her fieldwork so she too has turned her attention to a systematic literature review and meta-analysis. **Sarah** has investigated the experimental designs and data analysis techniques for aquatic live animal radiotracing studies. She has focussed on how researchers implement well (or not) statistical approaches to analyse the complex data from these methods. As live animal radiotracing studies can provide very powerful longitudinal information on individual organism variation and bioaccumulation profiles, **Sarah** has investigated whether authors make full use of this data and will provide some

guidance on the best statistical approach to use depending on the hypothesis and data generated. The review will have implications for the broader ecotoxicology community, as well as researchers conducing live radiotracing studies.

The group has recently published the following papers that may be of interest to the SETAC-AU community:

- Copplestone, D., Hirth, G. A., Cresswell, T. and Johansen, M. P. (2020). Protection of the environment. Annals of the ICRP. DOI: https://doi.org/10.1177/0146645320944291.
- Cresswell, T., Metian, M., Fisher, N. S., Charmasson, S., Hansman, R. L., Bam, W., Bock, C. and Swarzenski, P. W. (2020). Exploring New Frontiers in Marine Radioisotope Tracing – Adapting to New Opportunities and Challenges. Frontiers in Marine Science; 7(406) DOI: https://doi.org/10.3389/fmars.2020.00406.
- McDonald, S., Cresswell, T. and Hassell, K. (2020). Bioaccumulation kinetics of cadmium and zinc in the freshwater decapod crustacean Paratya australiensis following multiple pulse exposures. Science of The Total Environment; 720: 137609 DOI: https://doi.org/10.1016/j.scitotenv.2020.137609.
- Mariotte, P., Cresswell, T., Johansen, M. P., Harrison, J. J., Keitel, C. and Dijkstra, F. A. (2020). Plant uptake of nitrogen and phosphorus among grassland species affected by drought along a soil available phosphorus gradient. Plant and Soil; DOI: https://doi.org/10.1007/s11104-019-04407-0.

Opportunities:
ANSTO will soon be advertising for a Post-Doctoral fellow to work with our industry partner on understanding the biological fate of mercury in the marine environment originating from oil and gas infrastructure. The position will commence in January-February 2021 and is expected to be contracted for 2 + 1 years working at ANSTO Lucas Heights. For more information, please contact Tom Cresswell.

CSIRO Land and Water, Lucas Heights, Aquatic Contaminants Group (Jenny Stauber; jenny.stauber@csiro.au; and Lisa Golding lisa.golding@csiro.au)

The last few months have been interesting, with all travel replaced with endless zoom and webex meetings for the various advisory committees on which we serve. The biggest challenge for **Jenny Stauber** was having to participate in one committee -the international metals associations Ecotoxicity Technical Advisory Panel (ETAP) for 4 nights in a row from 11 pm to 3.30 am in August. It's very different presenting virtually to just a computer screen at this hour when you can't see the audience. Last year's ETAP meeting was in the south of France, so this just wasn't then same!


Gaby's PhD thesis is submitted!

We were delighted that our PhD student **Gaby Macoustra** submitted her thesis on 31 August. **Gaby**, supervised by **Aleicia Holland, Di Jolley, Jenny Stauber and Darren Koppel**, investigated the effect of DOC concentration, source and season on the toxicity of copper and nickel and metal mixtures to a tropical freshwater microalga. She has already had three journal papers published or in press, with a further paper soon to be submitted.

Gwil Price is also making good progress on his PhD project, a collaboration between CSIRO, UTS, NIWA and the International Zinc Association, to develop bioavailability models for zinc using a freshwater microalga. **Gwil** is about to submit his first paper from this project on the effect of pH on zinc speciation and toxicity to the alga.

Jenny was also elected as a Fellow of the Australian Academy of Science (AAS), one of 24 new Fellows elected this year across Australia in a wide range of disciplines. We think she may be the first ecotoxicologist in the Academy and she has vowed to increase representation of our discipline in AAS in future. You can learn more about the 2020 elected AAS Fellows here: https://www.science.org.au/news-and-events/news-and-media-releases/australias-top-scientists-elected-fellows-of-academy.

One of the more recent research programs that **Jenny** has been a lead researcher on is developing risk assessment tools

for nickel and has been funded by NiPERA Inc. The aim of the program was to determine the applicability of bioavailability-based approaches for assessing the potential environmental impacts of nickel in the Southeast Asia, Melanesia and Australasia regions, as well as to develop new water quality guidelines for nickel in freshwater and marine systems to ensure appropriate environmental protection. This is particularly important because these tropical ecosystems have different climate and geochemistry, unique ecosystem composition, endemic species and greater biodiversity than temperate ecosystems. This involved PhD students **Francesca Gissi** (graduated and now with NSW DPIE) and **Megan Gillmore** (soon to complete and now with NSW DPIE), the Lucas Heights ecotoxicology team: **Merrin Adams, Monique Binet, Kitty McKnight** and **Lisa Golding** as well as **Graeme Batley** and a broad range of international collaborators from New Zealand, USA, UK, China, New Caledonia and Belgium. Some of the major outcomes were:

- The first bioavailability-based guidelines for nickel in freshwaters for the region that take account of water chemistry and toxicity modifying factors such as pH, hardness and dissolved organic carbon.
- World first multiple linear regression models that enable prediction of nickel toxicity to freshwater biota
- A risk assessment framework for nickel in the SEAM region.
- New toxicity tests to assess the effect of nickel on marine and freshwater biota, which have provided new data on the toxicity of dissolved and particulate nickel to corals and other key tropical biota.
- Evidence to support that tropical species are of similar sensitivity to nickel as temperate species, meaning that data can be pooled to derive guidelines for ecosystem protection
- Successful testing of new eDNA methods to measure community composition and biodiversity changes in sediment-dwelling biota along a nickel contaminant gradient.
- Field and laboratory studies showed that nickel in sediments collected around mining and refinery operations has low bioavailability to benthic marine biota

So far, the outputs are 16 publications (3 of which are submitted or in preparation), 5 reports, and 41 presentations. This large body of work has led to additional research that will be addressing the development of site-specific nickel guidelines in New Caledonia in the future.

Lisa Golding is continuing the lead the ecotoxicology component of the geological bioregional assessment programme for assessing the effects of hydraulic fracturing fluids and produced waters from shale and tight gas development in the Northern Territory. This is a team effort between the Lucas Heights and Adelaide ecotoxicology and chemistry laboratories to develop "safe" dilution factors for modelling risk of the chemicals and geogenic contaminants from the shale gas industry to the environment.

Ecotox Services Australia (ESA) (Rick Krassoi; RKrassoi@ecotox.com.au)

Having provided commercial ecotoxicity testing services for the last 20 years, we have experienced several 'waves' of work covering different market segments. Some may be passing due to issues current to the time, others phases persist at some level. We have seen waves of work revolving around pulp mill discharges, desalination plant discharges (and associated process chemicals), oil spill dispersants and cleaning agents, coal seam gas discharges and fracking fluids, and agricultural chemical formulations. Over the most recent years, we have observed an increasing interest in the use of test organisms collected from the site or region of interest, cultured in the laboratory, and testing to develop site-specific guidelines and safe discharge limits. Occasionally these organisms prove to be as sensitive as the routine species that we and others offer, and sometimes they are as tough as old boots. Although we don't have permission to provide details here of the species and sites for which we have developed methods and undertaken test programmes, they cover a range of micro-algae, cladocerans, copepods, rotifers, gastropods, bivalves, Hydra and fish from both tropical and temperate regions. So aside from our routine testing work, novel test development keeps us very busy, challenged and engaged.

Aquatic and Coastal Environmental Sciences Lab (ACES), Macquarie University - Department of Earth and Environmental Sciences (EES) (Amy MacIntosh amy.macintosh@hdr.mq.edu.au; Katherine Dafforn, k.dafforn@gmail.com)

In these doubtful times of COVID-19, the ACES lab at Macquarie has continued to thrive and persevere.

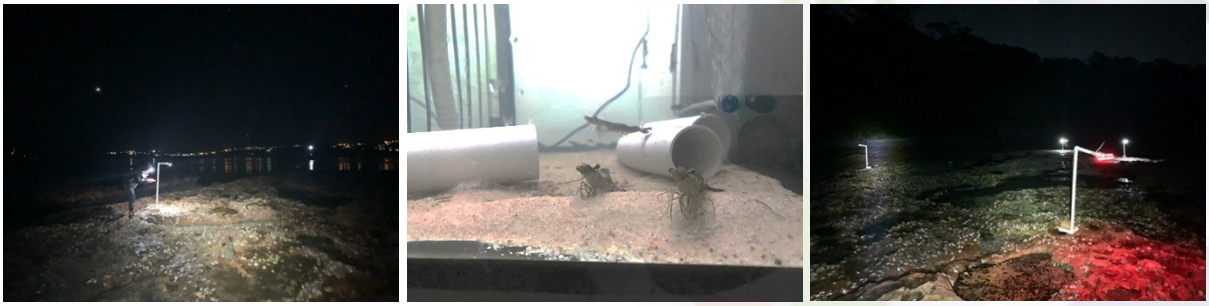
Since the start of the year, our international lab team of students and researchers have had many superb successes. Our supervisor, **Dr Katie Dafforn** recently co-authored a review paper titled *Emerging Solutions to Return Nature to the Urban Ocean* in the Annual Reviews of Marine Science (August 2020; https://doi.org/10.1146/annurev-marine-032020-020015) focused on emerging approaches to enhance urban ocean sustainability. Also, Katie alongside with **Dr Mariana Mayer-Pinto** (UNSW) co-authored another two papers; *Knowledge exchange to improve research and management of the impacts of artificial light at night* (August 2020; https://onlinelibrary.wiley.com/doi/full/10.1111/aec.12948) and *Current and projected global extent of marine built structures* (August 2020; https://www.nature.com/articles/s41893-020-00595-1).

Dr Nina Schaefer presented a webinar as part of the international GloFouling Project partnerships Webinar Series which is a platform that shares knowledge and awareness of biofouling and invasive aquatic species. Her talk (in collaboration with the Sydney Institute of Marine Science) was entitled: "Ecological engineering of marine infrastructure for biosecurity" and over 100 attendees were present from all across the world! She presented the results of her current literature review as part of a larger project for the Department of Agriculture, Water and Environment: read more here. She used existing literature and a combination of large-scale surveys and small- and large-scale field experiments to provide a rigorous scientific basis and testing for how artificial structures can be designed to increase the diversity of associated communities, while minimising negative impacts such as the establishment of invasive species. Her presentation was met with positive feedback and was fantastic to see our lab works being showcased to an international audience. The link to her recorded webinar is as follows: https://video.wixstatic.com/video/34a7be_8ca0db05010f4cd592bd21ca22d304b4/480p/mp4/file.mp4

Giulia Filippini recently participated in the Departmental 3MT competition and came 2nd for "Oysters: the kidneys of the sea"! Congratulations to her and her oysters! It is fantastic to hear a nice summary of her work for future management, conservation and restoration of degrading oyster reefs across Australia: https://vimeo.com/445036449

MRes students **Megan Trethewy** and **Amy MacIntosh** are in the final stretch of their theses! Meg finished up her experiment investigating impacts of Artificial Light at Night (ALAN) on grazer activity in the rocky intertidal zones around Sydney's rocky shores and is in the process of data analysis and final write-up. Through the extreme nocturnal fieldwork, she has made it out the other side and we are looking forward to hearing her findings on artificial light pollution across Sydney!

On the subject of ALAN, in early September**, Katie, Mariana and Dr Emily Forbert** (Flinders University) launched the website for the Network for Ecological Research on Artificial Light (NERAL)!: https://www.neralaus.com/. Fantastic to see more incredible outputs from this emerging science field!



(Left) Meg's light experiment setting up artificial lights. (Middle) Amy's now deceased juvenile giant tiger prawns from the start of the year (Right) More of Meg's light experiment around the shorelines of Sydney

Before COVID, **Amy** was in the aquatic lab at ANSTO performing contaminant bioaccumulation tests on tiger prawns. However due to lockdown, she had to go to plan B with her research and ended up conducting a desktop systematic literature review on current knowledge of the ecotoxicological effects of Naturally Occurring Radioactive Material (NORM) associated with offshore petroleum infrastructure (spoiler: very limited work being done). She is currently a mentor in the PACE Program at Macquarie where she has third year marine science students helping her perform additional systematic review tasks, more directed towards the ecological benefits/consequences of decommissioned petroleum structures.

Alongside her research, **Amy** competed in domestic and international hackathons alongside other members from ANSTO and the nandin Innovation Community; NASA Space Apps COVID-19 Challenge: https://www.ansto.gov.au/news/covid-19-global-nasa-hackathon-win (global finalist!) and won first place in the Australian and New Zealand Defence Force Trans-Tasman Hackathon: https://www.australiandefence.com.au/news/winners-of-australian-and-nz-defence-hackathon-announced. **Amy** also virtually attended a SETAC conference and mentored in ANSTOs first high school Hackathon, an activity as part of Australia's National Science Week, with her team placing second overall!

We welcomed a new MRes student into the lab with **Julia Palmer** doing her research project on oyster reef restoration and the exciting return of **Elena Gialdi** working on eco-friendly shorelines!

As the year comes to an end, our lab is getting back into the 'normal' scheme of things with both experimental and fieldwork. We look forward to what the rest of the year offers us with the submission of theses, new papers and the holiday season.

From our lab to the rest of SETAC NSW, be safe during the summer holidays.

University of Technology Sydney, Freshwater Applied Ecology Group, Anne Colville (anne.colville@uts.edu.au)

At the University of Technology Sydney, **Simon Mitrovic**'s Freshwater and Estuarine Research Group (FERGies) have been busy with starting field work, writing papers and finalising theses.

Laura Michie has submitted her thesis on cold water pollution and its effects on native fish and has received some good news about a couple of papers submitted to journals.

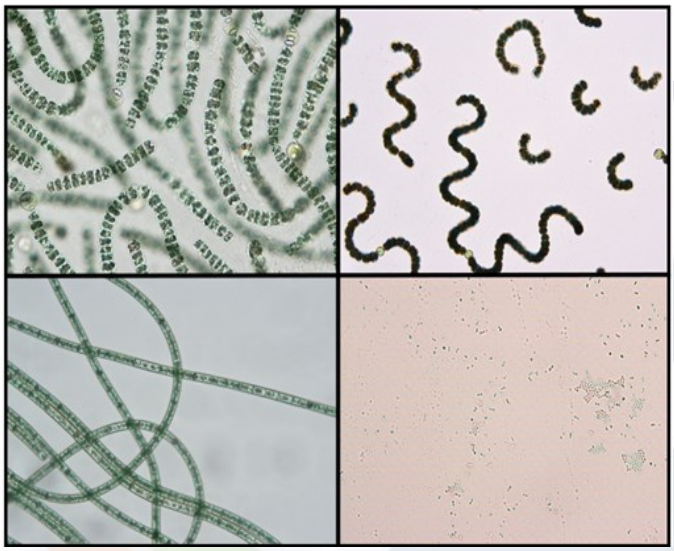
Matt Balzer is finishing a PhD, looking at the role of environmental flows and allochthonous carbon fuelling food webs in Australian inland rivers. He is currently finishing the manuscript from a large scale mesocosm experiment run in the summer of last year.

Jordan Facey is also finalising his thesis on trace metals and cyanobacterial blooms co-supervised with **Dr Simon Apte** at CSIRO.

Lauren O'Brien has converted from Masters to PhD and will study the effects of tributary flows on the microbial food web.

Ellery Johnson is writing up his thesis on carbon and nutrient transport and food webs in the Hunter Estuary and is looking forward to finishing early next year.

Andrew (Huy) Luong is finishing his Honours with supervisors **Simon Mitrovic, Anne Colville, Ken Rodgers and David Bishop**, studying the production of a neurotoxin, β-methyl-N-amino-L-alanine (BMAA), by freshwater cyanobacteria (blue-green algae) in the Riverina Region of NSW.



Microscope photographs of four of Andrew Luong's cyanobacterial

BMAA may be implicated in the development of motor neurone disease. **Andrew** has collected samples from Lake Wyangan near Griffith where there is a motor neurone disease hotspot, isolated and cultured the cyanobacteria in the laboratory and analysed them for the neurotoxin.

Terence Rogers and **Jarrod Walton** are starting field work for Masters Research projects with supervisors **Simon Mitrovic; Yoshi Kobayashi** (OEH), and **Nicholas Williamson** (University of Sydney). They are looking at how nutrients and flow rates on the Murray River influence the cyanobacterial blooms. Their sites stretch from Corowa to Cullulleraine, and they are very happy that the Murray is in NSW so they can still access them while the state borders have been closed with the Covid-19 shutdowns.

Jolley Research Group, Darren Koppel (darren.koppel@uts.edu.au)

Congratulations to Gabriella Macoustra who submitted her PhD! Read more about her topic in the CSIRO Lucas Heights section, above.

Sarah Stone (PhD candidate supervised by Stuart Simpson, Monique Binet, Darren Koppel, and Di Jolley) has been hard at work investigating pulse-exposures of contaminants. She has completed work the nefariously fiddly tropical copepod *Acartia sinjiensis* and is moving on to microalgae! Expect to see some great research out soon. Alternatively, catch her (virtually) at SETAC SciCon2 in November.

Darren Koppel has started a new Postdoctoral Fellowship at Curtin University on the environmental risk of naturally occurring radiological material (NORM) risk in subsea oil and gas infrastructure. This is a project under a National Decommissioning Research Initiative project led by Dr Stuart Higgins at Curtin University but is in collaboration with the great work Tom Cresswell and group are doing. Darren has started part time from Sydney but will transition to full time in Perth from January 2021.

Some recent publications from our group:

- Lakmini Egodawatta, Aleicia Holland, Darren Koppel, Dianne F Jolley (2020). Influence of soil phosphate on accumulation and toxicity of As and Sb in choy sum cultivated in individually and co-contaminated soils. *Environmental Toxicology and Chemistry* 39(6). DOI: 10.1002/etc.4708
- Gabriella Macoustra, Dianne F Jolley, Jenny Stauber, Darren J. Koppel, Aleicia Holland (2020). Speciation of nickel and its toxicity to *Chlorella sp.* in the presence of three distinct dissolved organic matter (DOM). In press. Chemosphere.
- Gabriella Macoustra, Dianne F Jolley, Jenny Stauber, Darren J. Koppel, Aleicia Holland (2020). Amelioration of copper toxicity to a tropical freshwater microalga: Effect of natural DOM source and season. Environmental Pollution 266(2). DOI: 10.1016/j.envpol.2020.115141
- Lien K. Ngo, Helen L. Price, William W. Bennett, Peter R. Teasdale, Dianne F.Jolley (2020). DGT and selective extractions reveal differences in arsenic and antimony uptake by the white icicle radish (*Raphanus sativus*). Environmental Pollution 259. DOI: 10.1016/j.envpol.2019.113815

Regional Reports | Victoria

Jackie Myers, (Jackie.myers@rmit.edu.au),
Victoria Regional Representative

AQUEST Research Group, School of Science, RMIT University

Monica Tewman (monica.tewman@rmit.edu.au).You can contact the AQUEST research group at http://rmit.edu.au/aquest or at AQUEST@rmit.edu.au

What a year! COVID has challenged us and changed the way we work. For the AQUEST research group, it's been all about setting up our home offices, getting access to our labs, getting out into the field when we were able and reshaping projects into what is now possible! Opportunities as much as impediments. We've gotten really good with the tech, hosting Webinars for projects including for the Stony Creek whole of catchment litter Project and recording lunchtime seminars for Melbourne Water through our A3P research partnership.

In the past couple of months, PhD student Charlene Trestrail has been awarded the Young Scientist Prize from the Royal Society of Victoria and Dr Claudette Kellar has been accepted as part of the veski inspiring women STEM sidebyside program.

Our visiting postdoctoral fellow, Dr Michela Di Giannantonio, is now working for us, as her initial funding was withdrawn. An environmental chemist, Michela is working with Dr Sara Long developing new monitoring tools using metabolomic techniques. Our students, honours and PhD have been working hard on literature reviews and preparing for field activities as soon as restrictions ease.

Our two citizen Science projects "The Pesticide Detectives" and "Litter Trackers" are coming to a close. Final results for both the sampling and pesticide use survey are now available on our webpage: http://pesticidedetectives.com.au.

Animated video journeys of tracked litter are now also available on our litter trackers project website: http://rmit.edu.au/littertrackers. We have tracked what happens to litter in 17 waterways across Greater Melbourne over the last year, deploying GPS enabled bottles at various sites in collaboration with school and community groups and tracking their journeys downstream towards Port Phillip Bay. Many of the bottles reached and even crossed the bay, while others stayed close to where they were dropped.

There are several PhD projects on offer with the AQUEST group, to find out more about these please go to https://www.rmit.edu.au/about/schools-colleges/science/research/research-projects/project-guides

Recent publications from the group include:

- Georgia M. Sinclair, Sara M. Long and Oliver A.H. Jones (2020) What are the effects of PFAS exposure at environmentally relevant concentrations? *Chemosphere* https://doi.org/10.1016/j.chemosphere.2020.127340
- Nanthi S. Bolan, M.B. Kirkham, Claudia Halsband, Dayanthi Nugegoda, Yong Sik Ok (2020) Particulate Plastics in Terrestrial and Aquatic Environments https://bit.ly/33wwnyi
- Hao Shen, Stephen Grist, Dayanthi Nugegoda (2020)The PAH body burdens and biomarkers of wild mussels in Port Phillip Bay, Australia and their food safety implications https://doi.org/10.1016/j.envres.2020.109827
- Charlene Trestrail was the winner of the Royal Society of Victoria, Young Scientist Prize, see: https://rsv.org.au/events/ysrp-2020/

School of Biological Sciences, Monash University

Professor Bob Wong (bob.wong@monash.edu, bobwonglab.org)

The restrictions imposed by COVID-19, especially here in Victoria, have been challenging. Nevertheless, with comprehensive COVID safety plans in place, the Behavioural Ecology Research Group has been able to see several experiments through to completion. This included research by PhD student Jack Orford, honours student Shiho Ozeki and research associate Dr Jake Martin investigating the impacts of the agricultural pollutant 17B-trenbolone on the behaviour, morphology and physiology of tadpoles. In addition, we initiated several new projects, including the setup of

an outdoor mesocosm experiment at Monash studying the effects of the antidepressant fluoxetine on aquatic community structure, with research associate Dr Marcus Michelangeli and collaborator Prof Tomas Brodin from the Swedish University of Agricultural Sciences.

In the past few months, members of the research group have also received major research awards. Dr Michael Bertram was awarded the 2020 David Healy New Investigator Award from the Society for Reproductive Biology for his PhD research studying the effects of pharmaceutical pollutants on sexual selection in fish. Dr Jake Martin was a joint winner of a 2020 SETAC Australasia research publication award for his research studying the impacts of antidepressant contamination on fish behaviour. Jake's prize is the 5th SETAC award won by research group members over the past 3 years, and follows on from Michael's 2019 SETAC Australasia research publication award, Dr Minna Saaristo's 2019 SETAC Australasia early career medal, Jake's 2019 SETAC North America's best platform presentation award, and Michael's 2018 SETAC Europe's best platform presentation.

Recent relevant publications (lab members in bold)

- **Aulsebrook, L.C., Bertram, M.G., Martin, J.M.**, Aulsebrook, A.E., Brodin, T., Evans, J.P., Hall, M.D., O'Bryan, M.K., Pask, A.J., Tyler, C.R., **Wong, B.B.M.** 2020. Reproduction in a polluted world: implications for wildlife. Reproduction 160: R13–R23.
- **Martin, J.M., Nagarajan-radha, V., Tan, H., Bertram, M.G., Brand, J.A., Saaristo, M.**, Dowling, D.K., **Wong, B.B.M.** In press. Antidepressant exposure causes a nonmonotonic reduction in anxiety-related behaviour in female mosquitofish. Journal of Hazardous Materials Letters.
- **Wiles, S.C., Bertram, M.G., Martin, J.M., Tan, H., Lehtonen, T.K., Wong, B.B.M.** 2020. Long-term pharmaceutical contamination and temperature stress disrupt fish behaviour. Environmental Science and Technology. 54: 8072–8082.

Centre for Anthropogenic Pollution Impact and Management (CAPIM), University of Melbourne – Assoc. Prof. Suzie Reichman (suzie.reichman@unimelb.edu.au)
You can contact CAPIM at capim-info@unimelb.edu.au

In late June, Suzie Reichman moved from the RMIT University to take up her new role as the Director of CAPIM at the University of Melbourne. CAPIM has had a small name change to the *Centre for Anthropogenic Pollution Impact and Management* and is in the process of becoming a broad-based pollution research centre including, water, soil, air, and light pollution as well as wastes and hopefully noise pollution soon as well. Work is happening behind the scenes on an updated website and prospectus for potential collaborators. For Suzie's research team, PhD students Jordan McCarthy, Steph Wallace-Polley and Zhuyun Gu are in the process of making the transition from RMIT to the University of Melbourne while Justin Morrissy and Slavica Kandic decided to stay at RMIT to complete their PhD studies.

Congratulations to Dr Slavica Kandic (RMIT) who has recently been awarded her PhD for her thesis entitled "Human health risk assessment of historical metal pollution in vegetable gardens in the west and north of Melbourne, Australia" (Supervisors: Suzie Reichman, Susanne Tepe and Ewan Blanch) and Lenka O'Connor Šraj (UoM) who submitted her thesis in entitled "Development of an automated trace analyser and a novel passive sampling device for the monitoring of ammonia in marine environments" (Supervisors Spas Kolev and Stephen Swearer).

In July, Katie Plaisted started her Master Science (BioSciences) at CAPIM (supervisor Suzie Reichman) and will be undertaking a research project on "The impacts of Cd on Antarctic terrestrial microinvertebrates" in collaboration with the Australian Antarctic Division.

Due to Victoria's COVID-19 lockdowns, things have been a little slow in the lab and field this year for CAPIM but we're excited to ramp things back up as restrictions ease.

Select recent publications from CAPIM (members in bold):

- de Silva, S., Ball, A.S., Indrapala, D.V., and **Reichman, S.M.** 2021. Review of the interactions between vehicular emitted potentially toxic elements, roadside soils, and associated biota. *Chemosphere.* 263:128-135.
- **Gu, Z.,** de Silva, S. and **Reichman, S.M.** 2020. Arsenic concentrations and dietary exposure in rice-based infant food in Australia. *International Journal of Environmental Research and Public Health.* 17: 415, doi.org/10.3390/ijerph17020415
- Moniz, T., Bassett, C. **Almeida, M.I.G., Kolev, S.D.,** Rangel, M., and Mesquita, R. Use of a hydrophilic 3,4-HPO chelator as new chromogenic reagent in the development of a microfluidic paper-based analytical device for iron determination in

natural waters. *Talanta 214:* 120887, 10.1016/j.talanta.2020.120887.

- Netherway, P., Gascó, G., Méndez, A., Surapaneni, A., **Reichman, S.,** Shah, K., Paz-Ferreiro, J. 2020. Using phosphorus-rich biochars to remediate lead-contaminated soil: Influence on soil enzymes and extractable P. *Agronomy* 10: 454, https://doi.org/10.3390/agronomy10040454.
- **O'Connor Šraj, L., Almeida, M.I.G.S.,** Sharp, S.M., McKelvie, I.D., Morrison, R., and **Kolev, S.D.** 2020. Ammonia passive sampler for monitoring of marine waters with biofouling resistance and neural network-based calibration. *Environmental Pollution* 267: 115457, https://doi.org/10.1016/j.envpol.2020.115457.
- Seraj, M.F., Rahman, T., Lawrie, A.C., and **Reichman, S.M.** 2020. Assessing the plant growth promoting and arsenic tolerance potential of *Bradyrhizobium japonicum* CB1809. *Environmental Management*, https://doi.org/10.1007/s00267-020-01351-z.
- Steinemann, A., Nematollahi, N., Rismanchi, B., Goodman, N., and **Kolev, S.D**. 2020. Pandemic products and volatile chemical emissions. *Air Quality, Atmosphere & Health*, https://doi.org/10.1007/s11869-020-00912-9.
- Steinemann, A. Nematollahi, N., Weinberg, J.L., Flattery, J., Goodman, N., and **Kolev, S.D.** 2020. Volatile chemical emissions from car air fresheners. *Air Quality, Atmosphere & Health*, https://doi.org/10.1007/s11869-020-00886-8.

Australian Laboratory for Emerging Contaminants (ALEC)
Dr Brad Clarke brad.clarke@unimelb.edu.au; 0498 200 277

Environmental Science Meeting for Australian Research Teams (EnviSMART)

The Environmental Science Meeting for Australian Research Teams (EnviSMART) was a national online forum hosted by the Australian Laboratory for Emerging Contaminants (ALEC) at the University of Melbourne that was launched through the first Australian COVID lockdown. In season one, there were seven weekly seminars from 14th May to the 18th June held from 17:00-18:30 AEST. Each EnviSMART included one invited keynote address and two student presentations. The forums were well attended with 982 registrants and 571 unique attendees by a mix of education (46%), government (14%) and professionals (40%).

A key objective of EnviSMART was to support students who may have found themselves in situation of financial hardship due to lockdown. Sponsorship from our supporting organizations allowed us to provide $500 scholarships to all the student presenters. Student presentations were solicited in advance through the submission of a one paragraph abstract and assessed by the organizing committee. The selection was based upon academic merits as well as diversity of topics, geographic region and gender. A total 14 student presentations who were all supported with $500 scholarships (total $7000 AUD).

EnviSMART will now move to a monthly format ('*EnviSMART Monthly*') held on the first Thursday of the month 16:00-17:00 (AEST). EnviSMART Monthly will be based upon contemporary environmental science themes and seek to include three speakers from academia, government, and the private sector. A separate lunch-time event specifically for postgraduate students ('*EnviSMART Student Forum*'). Each month 3-4 student speakers from across the country will present their environmental science work. We are establishing a volunteer student committee to organize these events. For more information please go to (alec.science.unimelb.edu.au) or contact Dr Brad Clarke (brad.clarke@unimelb.edu.au).

Thanks to the supporting organizations, the organizing committee, the keynote speakers, the student speakers for co-creating a very successful environmental science forum.

Emerging Contaminants Workshop

The emerging contaminants workshop is an online workshop hosted by the Australian Laboratory for Emerging Contaminants (ALEC) on Tuesday 27th October 2020 10:00-16:00 AEST. The workshop will focus on chemicals risk of the future and will feature two international keynote addresses as well as local speakers. The morning keynote address will be by Dr Mark Strynar from the United Stated Environmental Protection Agency discussing "novel PFAS in environmental samples" while the afternoon keynote will be given by Dr Sonia Dagnino (Imperial College, London) discussing "exposomics". Local speakers will cover a range of topics from regulation, monitoring, risk prioritization and human exposure. Thanks to out supporters we can make this event free and open to all!

All EnviSMART Monthly and Student Forum dates can be found here: alec.science.unimelb.edu.au

Regional Reports | Northern Territory

Ceiwen Pease, (Ceiwen.Pease@environment.gov.au),
Northern Territory Representative

The Ecotoxicology team at eriss have just published their ***Standardised chronic toxicity test protocols and culturing methods for a suite of tropical freshwater species*** in the Australasian Bulletin of Ecotoxicology and Environmental Chemistry. This compilation of methods has been developed over the past 40 years to i) create site-specific water quality guidelines for the highly valued, world heritage-listed Kakadu National Park of the Alligator Rivers Region, Northern Territory, and ii) specify a dilution of any given waste water required to provide a 99% protection level for aquatic organisms of tropical freshwater systems in this region. Much of the research carried out for the species contained in this issue has been a regulatory requirement for the protection of the Alligator Rivers Region from the effects of mining activities.

Find the issue here: https://australasia.setac.org/index.php/publications/abeec/

ERISS, in collaboration with Macquarie University and NT government, has started building a DNA barcode library for freshwater macroinvertebrate species found in the streams northern Australia. To date we have focussed on caddisflies (*Trichoptera*), mayflies (*Ephemeroptera*) and non-biting midges (*Diptera: Chironomidae*). Samples from the initial phase of the barcode library have been collected and are currently being sequenced with plans to expand the library to include other key taxa. This library will be a useful research and monitoring tool for ERISS and other research and regulatory bodies in the Northern Territory.

Sam and Claudia performing an *A. cumingi* toxicity test

Regional Reports | Queensland

Elissa O'Malley (e.omalley@uq.edu.au),
Queensland Representative

On the 30th of July, three students and a supervisor of theirs presented their individual research during a virtual QLD Research Showcase. I feel that this event was a great success thanks to the range of interesting presentations and thanks to all who attended.

Great presentations were given by Elvis Okoffo and Jake O'Brien, The University of Queensland; Madeline McKenzie and Shelley Templeman, James Cook University; Emily Bryson and Amie Anastasi, Central Queensland University.

Based on an audience vote, the best presentation awards were presented to Emily Bryson (left) and Dr Amie Anastasi (right) for their respective research on home composting of domestic canine faeces, and microplastics in the environment. Congratulations!

Emily Bryson (left) and Dr Amie Anastasi (right) were awarded best presentation awards at the virtual QLD Research Showcase.

Ban on toxic mercury looms in sugar cane farming, but Australia still has a way to go

Larissa Schneider, *Australian National University*; Cameron Holley, *UNSW*; Darren Sinclair, *University of Canberra*, and Simon Haberle, *Australian National University*

This month, federal authorities finally announced an upcoming ban on mercury-containing pesticide in Australia. We are one of the last countries in the world to do so, despite overwhelming evidence over more than 60 years that mercury use as fungicide in agriculture is dangerous.

Prime Minister Scott Morrison visiting a sugar cane farm in 2019. Mercury-containing pesticides will be banned. Cameron Laird/AAP

Mercury is a toxic element that damages human health and the environment, even in low concentrations. In humans, mercury exposure is associated with problems such as kidney damage, neurological impairment and delayed cognitive development in children.

The ban will prevent about 5,280 kilograms of mercury entering the Australian environment each year. But Australia is yet to ratify an international treaty to reduce mercury emissions from other sources, such as the dental industry and coal-fired power stations. This is our next challenge.

A mercury disaster

Mercury became a popular pesticide ingredient for agriculture in the early 1900s, and a number of poisoning events ensued throughout the world. They include the Iraq grain disaster in 1971-72, when grain seed treated with mercury was imported from Mexico and the United States. The seed was not meant for human consumption, but rural communities used it to make bread, and 459 people died.

In the decades since, most countries have banned the production and/or use of mercury-based pesticides on crops. In 1995 Australia discontinued their use in most applications, such as turf farming. Despite this, authorities exempted a fungicide containing mercury known as Shirtan. They restricted its use to sugar cane farming in Queensland, New South Wales, Western Australia and the Northern Territory. According to the sugar cane industry, about 80% of growers use Shirtan to treat pineapple sett rot disease. But this month, the Australian Pesticides and Veterinary Medicines Authority cancelled the approval of the mercury-containing active ingredient in Shirtan, methoxyethylmercuric chloride. The decision was made at the request of the ingredients manufacturer, Alpha Chemicals. Shirtan's registration was cancelled last week. It will no longer be produced in Australia, but existing supplies can be sold to, and used by, sugar cane farmers for the next year until it is fully banned.

Workers and nature at risk

Over the past 25 years, Australia's continued use of Shirtan allowed about 50,000 kilograms of mercury into the environment. The effect on river and reef ecosystems is largely unknown. What is known is that mercury can be toxic even at very low concentrations, and research is needed to understand its ecological impacts.

The use of mercury-based pesticide has also created a high risk of exposure for sugar cane workers. At most risk are those not familiar with safety procedures for handling toxic materials, and who may have been poorly supervised. This risk has been exacerbated by the use itinerant workers, particularly those from a non-English speaking background.

Further, in the hot and humid conditions of Northern Australia, it has been reported that workers may have removed protective gloves to avoid sweating. Again, research is needed to determine the implication of these practices for human health. To this end, Mercury Australia, a multi-disciplinary network of researchers, has formed to address the environmental, health and other issues surrounding mercury use, both contemporary and historical.

South Sea Islanders hoeing a cane field in Queensland, 1902. Cane workers have long been exposed to mercury. State Library of Queensland

Australia is yet to ratify

The Minamata Convention on Mercury is a global treaty to control mercury use and release into the environment. Australia signed onto the convention in 2013 but is yet to ratify it. Until the treaty is ratified, Australia is not legally bound to its obligations. It also places us at odds with more than 100 countries that have ratified it, including many of Australia's developed-nation counterparts.

Mercury-based pesticide use was one of Australiaâ€™s largest sources of mercury emissions. But if Australia ratifies the convention, it would be required to control other sources of mercury emissions, such as dental amalgam and the burning of coal in power stations. The three active power stations in the Latrobe Valley, for example, together emit about 1,200 kilograms of mercury each year.

Country	Mercury pesticide usage	Minamata Convention
Japan	Banned 1973	Ratified in 2016
Brazil	Banned in 1985	Ratified in 2017
USA	Banned in 1993	Acceptance in 2013
Thailand	Banned in 2005	Accession in 2017
China	Banned in 2010	Ratified in 2016
India	Banned 2018	Ratified in 2018
Australia	Some banned in 1995 and an exception granted until 2020	Not ratified

Australia's outlier status in this area is shown in the below table: Accession, acceptance or ratification have the same legal effect, where parties follow legal obligations under international law.

The coal-burning Mount Piper Power station near Lithgow in NSW. Government efforts to reduce mercury emissions should focus on coal plants. David Gray/Reuters

Time to look at coal

If Australia ratified the Minamata Convention, it would provide impetus for a timely review and, if necessary, update of mercury regulations across Australia. Emissions from coal-fired power stations in Australia are regulated by the states through pollution control licences. Some states would likely have to amend these licences if Australia ratified the convention. For example, Victorian licences for coal-fired power stations currently do not include limits on mercury emissions.

Pollution control technologies were introduced at Australian coal plants in the early 1990s. But they do not match state-of-the-art technologies applied to coal plants in North America and Europe. Australian environment authorities have been examining the implications of ratifying the convention. But progress is slow.

The issue of mercury emissions does not attract significant public or political attention. But there is a global scientific consensus that coordinated international action is needed. The pesticide phase-out and ban is an important step. But Australia still has a way to go.

Larissa Schneider, DECRA fellow, *Australian National University*; Cameron Holley, Professor, *UNSW*; Darren Sinclair, Professor, *University of Canberra*, and Simon Haberle, Professor, *Australian National University*

Students Corner

Gwilym Price (Gwilym.A.Price@student.uts.edu.au) ,
Student Representative

RACI Mentoring program

Following a SETAC student survey, SETAC AU have agreed to partnering with RACI to offer SETAC-AU student and recent graduate members places on the RACI Mentoring program.

What does the program involve?
The program includes, webinars, videoconferences and podcasts; through to lectures, workshops, exclusive networking opportunities, useful resources and online learning. Mentees are paired one-on-one with mentors, most of whom are members of RACI. More information can be found here: https://www.raci.org.au/RACI/Web/Careers/Career-Development-Program.aspx

The program will cost $100 for SETAC-AU student/recent graduate member participants and spaces are limited!

Interested and need to know the next steps?
Register your interest with Tom Cresswell (SETAC-AU Vice President) by sending an email to tom.cresswell@ansto.gov.au by **Friday 16th October.**

EnviSMART student forum

ALEC is running a lunch-time event specifically for postgraduate students ('*EnviSMART Student Forum*'). Each month 3-4 student speakers from across the country will present their environmental science work. They are also establishing a volunteer student committee to organize these events. For more information please go to alec.science.unimelb.edu.au or contact Dr Brad Clarke (brad.clarke@unimelb.edu.au).

Recent graduate membership

SETAC AU offers discounted membership rates to all recent graduates. The rate is AUS$65 for your the first year after graduation, AUS$95 for the second year and AUS$130 for your third year.

Conferences and workshops

The 10th Young Environmental Scientists (YES) Meeting is completely virtual this year and registration is open to all SETAC student and recent graduate members. The condition to participate is the acceptance of a presentation. Here we are currently calling for abstracts until the 29th of October. Please find more information on the website https://yes2021.setac.org

The European students are currently busy planning the social program, side events and the keynote talks.

PhD Projects

There are several PhD projects on offer with the AQUEST group, to find out more about these please go to https://www.rmit.edu.au/about/schools-colleges/science/research/research-projects/project-guides

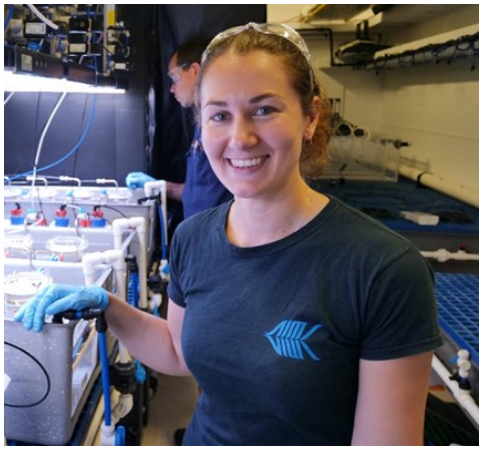
There are also paid internship opportunities with the Victorian EPA. More details here https://aprintern.org.au/internship/epa-victoria-apr-1600

Job openings

There are 4x jobs openings that may be of interest into SETAC AU ECRs. Find them on our website: https://australasia.setac.org/index.php/noticeboard/job-advertisements/.

Student Profile

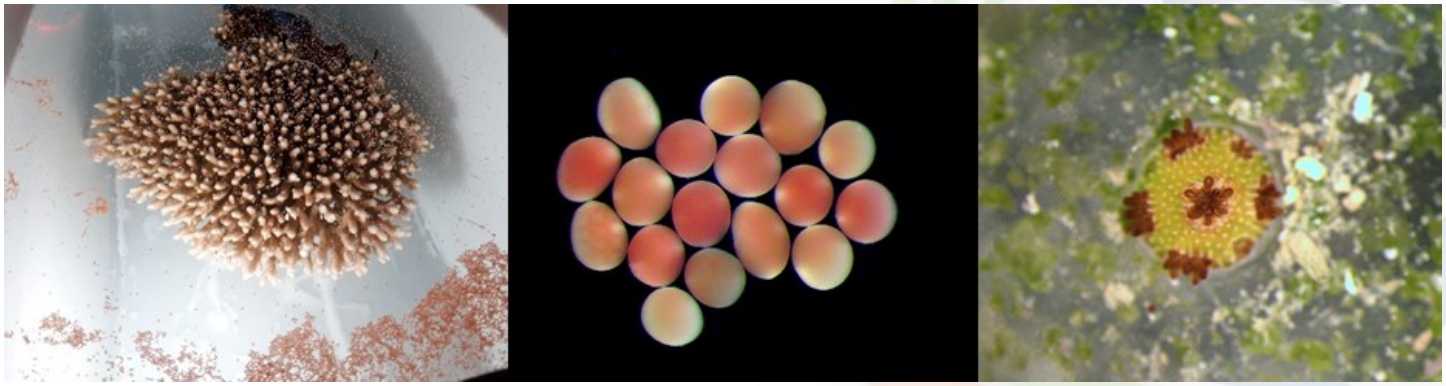
with Mikaela Nordborg



Degree	Doctor of Philosophy
Topic	Cumulative impacts of oil pollution, UVR and climate change on coral reef organisms: Implications for risk assessment and spill modelling
Institutions	James Cook University, AIMS@JCU Collaborative Research Program and the Australian Institute of Marine Science (AIMS)
Supervisors:	Dr Andrew Negri, A/Prof Michael Oelgemöller and Dr Diane Brinkman
Email:	mikaela.nordborg@my.jcu.edu.au
LinkedIn	https://www.linkedin.com/in/mikaelanordborg/
Twitter	@MikaelaNordborg

I started my trajectory towards marine science at the start of year 10 when I moved away from home to attend a three-year high school program specialising in marine biology on the west coast of Sweden. After finishing high school, I worked in recreational scuba diving, both in Sweden and abroad, before undertaking my Bachelor of Science, majoring in Marine Science and Biology, at the University of Gothenburg, Sweden. While mainly focused on marine ecology this undergraduate program also included oceanography, chemistry and marine monitoring. It is also where I had my first taste of marine ecotoxicology. I completed a six-month thesis project testing whether the calcium content of Norway lobster eggs and embryos was affected (using flame atomic absorption spectroscopy) when reared under future predicted temperature and pH conditions. During the coursework for my Master of Science I studied further chemistry as well as travelled to Australia for a semester on exchange at the University of New South Wales in Sydney. My coursework at UNSW included marine microbiology, Australian marine ecology and oceanography, as well as being a part of the first cohort taking the collaborative 'Topics in Australian Marine Science', which was held at the Sydney Institute of Marine Science (and included me running across the UNSW campus from the Biological Sciences to Anzac Parade once a week so I could catch the only bus that would get me to SIMS in time).

Following the completion of my semester abroad I took a break from university studies for a few years to work and travel in Australia. This included working in outdoor education and as an adventure tourism guide and eventually led me to AIMS and assisting Dr Andrew Negri and his ecotoxicology research group during and after the annual coral spawning events at AIMS HQ in Townsville, QLD. I loved the fast paced, and slightly crazy, work that takes place during coral spawning and later completed a one-year MSc thesis project under Dr Negri through the University of Gothenburg to finish up my MSc degree. The project focused on testing the effects of diesel and a heavy fuel oil on the settlement of coral larvae, with the added complexity of assessing whether ultraviolet light would affect their toxicity or not (and how to test it). It turns out that it did and that AIMS was interested in continued work on oil ecotoxicology as a fully funded AIMS@JCU collaborative PhD project was announced towards the end of 2016. As I could see how little high quality information we had on the effects of petroleum products on coral reef taxa and how interesting the project could be I applied and was accepted on the condition that I complete my MSc degree. There was really nothing to it but to get it done, I completed my thesis while working part time as a coral technician and defended my MSc thesis in Gothenburg on the 31st of May 2017 and had started my PhD at James Cook University and AIMS in Townsville by the end of June.



Student Profile

with Mikaela Nordborg

PhD Research. My PhD project focuses on the combined effects of oil pollution and tropical environmental conditions on shallow water, reef-building corals. The extraction use and transport of oil through coral reef environments is likely to continue for the foreseeable future. While the impacts of oil towards temperate and sub-tropical marine ecosystems are by now relatively well known, their tropical marine counterparts lag behind. This is further confounded by how tropical environmental conditions, including light and high temperatures, can impact oil toxicity. In particular, ultraviolet light (UV) can significantly increase the toxicity of aromatic hydrocarbons, the main water-soluble components of oil that causes toxicity. High UV irradiance is ubiquitous in most coral reef environments hence the likelihood of co-exposure during a spill is high. The effects on habitat-forming taxa such as corals is of particular concern and, as illustrated by recent large scale shipping-associated spills, not yet a thing of the past. Despite decades of intermittent research into the effects of oils on coral it is still unclear what life stages or endpoints that are most susceptible to exposure. Additionally, no coral reef associated species have been included in any of the predictive oil toxicity modelling data bases commonly used for risk assessments in other parts of the world.

In the first part of my PhD project I compare the sensitivity of six distinct life stages across the coral life cycle to identify the most sensitive, and ecologically relevant, life stages and endpoints for use in risk assessments. This has included continuing to refine the larval assays I used for my MSc project as well as adapt, and develop, assays for additional coral life stages. Among other things I have been heavily involved in the development and testing of a custom, flow-through exposure system for use in the National Sea Simulator at AIMS Townsville (https://www.aims.gov.au/seasim) and LED lights emitting in both the visible and UV spectrum. This has not only enabled a fair comparison of corals' sensitivity to oil exposure across their life cycle but also the quantification of how the toxicity of the oil changes under UV co-exposure. Specifically, I have assessed the impacts of the water-soluble components of a standard heavy fuel oil towards *Acropora millepora* gametes, embryos, larvae, newly settled recruits, juveniles and propagated adults. By testing how each of these life stages are affected by exposure under standardised conditions I have been able to identify the life stage that is the most sensitive to oil exposure and which endpoints are most suitable, and relevant, for use in future studies.

The second part of the project focuses on deriving the species-specific constants that are a prerequisite for applying the predictive oil toxicity modelling tools already in use for risk assessments in other marine ecosystems. These constants can be derived by modelling the relationship between the 50% effect- or lethal concentrations of individual aromatic hydrocarbons against their respective octanol-water partitioning coefficients. Additionally, by using the same exposure methodology and coral species as in the first part of the project I will be able to compare the modelled toxicity of the heavy fuel oil I have used to what I actually observed in my earlier assays. This will be an important step in validating the use of predictive oil toxicity models for risk assessments relating to reef environments. It will also enable me to compare the sensitivity of this model coral species to that of the 70+ (mostly temperate) species currently included in the database underpinning the toxicity models.

In the final part of my project I am investigating the potential interactions between oil toxicity, UV light and elevated temperature towards coral larvae. As anthropogenic climate change continues to increase average sea temperatures, in Australia and globally, understanding the combined effects of climate change and pollutants will be critical to ensure successful management of ecosystem resilience during the transition away from fossil fuel reliance. This will be the first study to assess the combined effects of oil pollution under multiple temperature scenarios while accounting for UV-associated phototoxicity. The results from this study will help inform management of oil pollution hazards in reef environments in the coming century as well as provide critical information on the temperature-dependence of oil toxicity in tropical regions for spill and toxicity modelling purposes.

Future work. I am currently completing the statistical analysis and write up of the first two parts of my PhD project. I will be undertaking my final experimental work during the November coral spawning here at AIMS in Townsville and am planning to submit my thesis next year. Beyond the submission of my thesis I look forward to exciting opportunities for new research and collaborations as a post doc.

Photo credit: Mikaela Nordborg and Marie Roman (AIMS)

Member Profile

with Suzie Reichman

I first met Associate Professor Suzie Reichman at the SETAC Australasia Darwin Conference in 2019 but I had known of her work for a while before. Our interests aligned on Antarctic ecotoxicology, with her PhD researcher Jordan McCarthy developing new bioassays with Antarctic microinvertebrates like the adorable water bears (tardigrades). Suzie's research on the effects of contaminants in the terrestrial environment has an impressive breadth, focusing on almost every class of contaminants including metals such as lead and arsenic, hydrocarbons, and emerging chemicals such as per- and poly-fluoroalkyl substances (PFAS). It's also extended to waste management, mine-site rehabilitation, and phytoremediation. You may have recently seen her in the news following her findings that 75% of rice-based snacks tested had concentrations of arsenic that exceeded the EU guideline for safe rice consumption for babies and toddlers. European standards had to be used because Australia does not have standards specific for children! You can hear an ABC news interview with her here https://www.abc.net.au/radio/programs/babytalk/babytalk-arsenic-in-rice/11901302

Suzie has led a rich research career with postdocs at the University of California (Riverside) and the University of Melbourne before working as a senior lecturer at Lincoln University in New Zealand. Her next step was at the Environmental Protection Authority in Victoria before 10 years at RMIT. Her breadth of research and experience with academia and the regulator must come in handy as the new Director of the Centre for Anthropogenic Pollution Impact and Management (CAPIM) at the University of Melbourne.

CAPIM is an interdisciplinary research centre that aims to minimise the risk of pollution to humans and the environment by providing high quality and usable risk assessment, technical solutions and science for policy, standards and guidance. Under Suzie's leadership, CAPIM is broadening out from its traditional coverage of water pollution into soil and air pollution and also into human health aspects of pollution. While CAPIM has always covered a broad range of chemical contaminants from traditional metals and nutrients through to emerging contaminants like PFAS and microplastics, the Centre is now also including nonchemical pollution like light and noise in its scope.

You can find Suzie:

- On Twitter: @Reichman_Lab
- On LinkedIn
- On ResearchGate

Resilience and recovery amidst global environmental change

Invitation to Submit Session Proposals

The Call for Sessions for SETAC AU 2021 is now open!

We encourage active members within SETAC Australasia, our Regional Chapters and National Networks to submit a session proposal for inclusion in the conference program.

Visit the conference website for more details:

www.setac-au2021.com.au

Submissions close Sunday 18th October

Date: Mon 30th Aug – Fri 3rd Sept, 2021

Location: RMIT City Campus, Melbourne

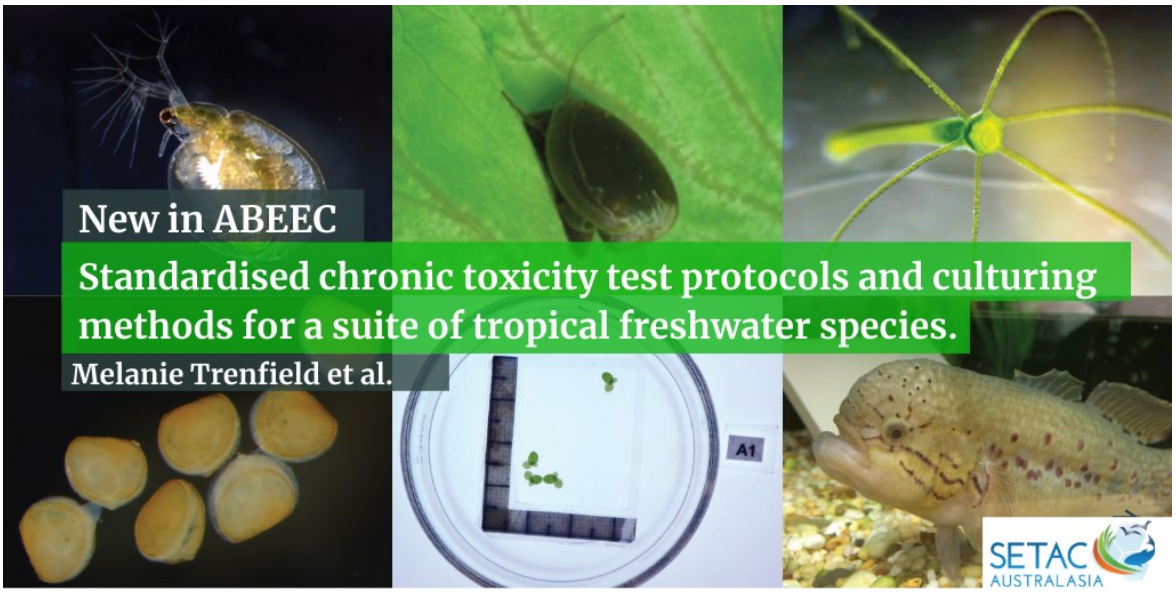
The conference will focus on the environmental impacts of major environmental events, including bushfires, droughts and the global COVID-19 pandemic.

SETAC-AU Co-Chairs: Kathryn Hassell and Vin Pettigrove

WIOW Co-Chairs: Anu Kumar and Rai Kookana

Australasian Bulletin of Ecotoxicology and Environmental Chemistry (ABEEC)

New in ABEEC



The most recent issue, Volume 6 page 1-80, presents a compilation of ecotoxicological test protocols developed at the Environmental Research Institute of the Supervising Scientist (eriss) in Australia. It provides detailed methods for seven tropical species: the green alga *Chlorella sp.*, duckweed *Lemna aequinoctialis,* cladoceran *Moinodaphnia macleayi,* coelenterate *Hydra viridissima*, gastropod mollusc *Amerianna cumingi*, freshwater mussel *Velesunio* spp., and the teleost fish *Mogurnda mogurnda*. The compilation represents 40 years of work by the scientists at *eriss.*

Call for papers

We invite all SETAC AU members to submit new manuscripts to the *Australasian Bulletin of Ecotoxicology and Environmental Chemistry*. The *Bulletin* is a publication of the Australasian Chapter of the Society for Environmental Toxicology and Chemistry (SETAC AU), and is a regional publication dedicated to publishing original, scientifically-sound research dealing with all aspects of ecotoxicology and environmental chemistry relevant to Australasia. Papers published may be research reports, review papers, short communications, descriptions of new techniques and equipment, thesis abstracts, thesis literature reviews and comments on previously published papers.

All papers published in ABEEC will be made freely available through the website for SETAC AU. It will be an online publication only.

This is how the submission process works. Contributions should be submitted to the editor as a manuscript in the same manner as you would for any other journal. You also need to provide the name(s) of at least one reviewer to assess the manuscript. All manuscripts will be sent out for review by at least two experts in the field. After the review process, manuscripts will be sent back to authors for final revisions prior to online publication.

If you wish to submit a manuscript to *ABEEC* or would like to discuss publication of a manuscript, then please contact the editor. A copy of *Instructions to authors* is also available from the editor.

We look forward to receiving you manuscripts.

Reinier M Mann (reinier.mann@des.qld.gov.au)
Editor – *ABEEC*

Membership Details

How to join SETAC Australasia

Even if you are a SETAC member based in Australia, New Zealand or PNG, you may not be a member of SETAC Australasia. You can join SETAC Australasia by going to www.setac.org. After logging in, go to the SETAC Australasia page and click 'Request Membership'. You can find this page by either searching 'Australasia' or going to the 'Get Involved' tab on the left of the page, then 'Regional Branches and Chapters', then 'Asia Pacific Chapters'. There are no additional fees attached to the SETAC Australasia chapter.

Keeping your contact details up to date

To make sure you don't miss out on attending SETAC get-togethers in your state or territory or the opportunity to contribute your latest research to Endpoint, please update your SETAC profile to include your location so your regional rep can get in touch with you. You can do this by logging into www.setac.org and selecting 'Manage Profile', then 'Edit Bio'.

Suzanne Vardy (suzanne.vardy@des.qld.gov.au)
SETAC AU Secretary

How to renew your membership

SETAC AU offers discounted membership rates to all recent graduates. The rate is AUS$65 for your the first year after graduation, AUS$95 for the second year and AUS$130 for your third year.

A reminder that all membership renewal payments for SETAC members in Australasia should be made to SETAC Asia-Pacific, and not to the SETAC North America office in USA. The link to renew your membership, which is provided in the reminder email as your renewal date approaches, is https://setacap.site-ym.com.

Around 25% of members are still paying through SETAC North America and this causes several administrative problems including:

- Charges by the USA office for their staff time handling these wrongly made payments
- Currency exchange fee losses for AUD (or NZD) to USD then back to AUD
- Foreign transaction charges on the member's credit card (charged to the member by their credit card provider)
- It can take up to a year for wrongly paid renewal payments to reach SETAC AU via SETAC North America
- Members' expiry dates for their next membership renewal date may be set wrongly when they pay North America instead of Asia-Pacific
- Members may not get automatic reminders next time (the North America office does not send automatic reminders)
- The AU Treasurer has to waste his time untangling the administrative mess involving all of the above.

If a member does log in at setac.org they can navigate to the Asia-Pacific payment page, but it is easier to use https://setacap.site-ym.com.

Also, a BIG NO NO is for a SETAC AU member to purchase a "combi-registration" at a SETAC Europe or SETAC North America conference (a "combi-registration" is a combined conference registration and membership payment). This causes total chaos in the membership system (all of the above plus others) and the membership fee may never reach AU, but instead is swallowed up in the conference.

A detailed guide to renewing your SETAC membership online can be found here.

Munro Mortimer (ase@hydrobiology.biz)**, Treasurer**

Ad corner

Advertise in Endpoint

Do you or your organisation have a product, service or upcoming event that might be of interest to SETAC members? For example: technical services, vacant positions, meetings and workshops or student opportunities?

If so, you should consider advertising in Endpoint and on the SETAC AU webpage. The Endpoint newsletter goes out to a readership of 300 SETAC members across academia, industry and government, providing a great way to reach your target audiences.

Details

- Advertising charges for Endpoint AND the webpage are $100 half page, $200 per full page.
- A Standing Committee with membership determined by Council will vet (by majority vote) all adverts on the basis of appropriateness of material relative to the aims & objectives of SETAC AU.

For further information please contact the SETAC AU Secretary **Suzanne Vardy** (suzanne.vardy@des.qld.gov.au)

Your SETAC AU Council

Council Members (2019-2021)

Position	Elected Member
President	Andrew Harford (andrew.harford@environment.gov.au)
Immediate Past President	Anthony Chariton (anthony.chariton@mq.edu.au)
Vice Presidents	Kathryn Hassell (kathryn.hassell@rmit.edu.au) Tom Creswell (tom.cresswell@ansto.gov.au)
Secretary	Suzanne Vardy (suzanne.vardy@des.qld.gov.au)
Treasurer	Munro Mortimer (munro@ozemail.com.au)
Membership Officer	Chantal Lanctôt (chantal.lanctot@gmail.com)
Bulletin Editor	Reinier Mann (reinier.mann@des.qld.gov.au)
Communications Officer	Darren Koppel (darren.koppel@uts.edu.au)
Strategic Directions Officer	Katelyn Edge (Katelyn.Edge@epa.nsw.gov.au)
Student Representative	Gwilym Price (Gwilym.A.Price@student.uts.edu.au)

Regional Representatives

Region	Elected Member
Australian Capital Territory	Julia Jasonsmith (Julia.jasonsmith@murrang.com.au)
New South Wales	Lisa Golding (lisa.golding@csiro.au)
Northern Territory	Ceiwen Pease (Ceiwen.Pease@environment.gov.au)
Queensland	Elissa O'Malley (e.omalley@uq.edu.au)
South Australia	Antony Lockyer (Lockyer.antony@electranet.com.au)
Tasmania	Cath King (cath.king@aad.gov.au)
Victoria	Jackie Myers (jackie.myers@rmit.edu.au)
Western Australia	Monique Gagnon (m.gagnon@curtin.edu.au)
Papua New Guinea	Kundo Hundang (guba.hundang@gmail.com)
New Zealand (North Island)	Karen Thompson (Karen.Thompson@niwa.co.nz)
New Zealand (South Island)	Sally Gaw (sally.gaw@canterbury.ac.nz)