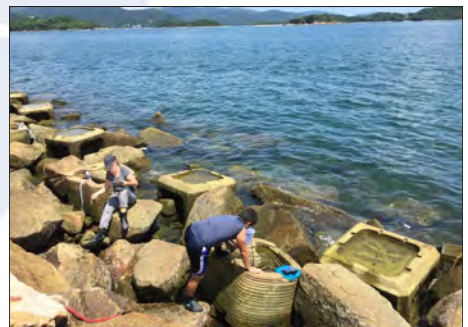




The Swire Institute of Marine Science

太古海洋科學研究所



Annual Report

2019



Gray in his more natural habitat, teaching in Penang

Director's Foreword

2019 was a massively challenging year for Hong Kong as it witnessed unprecedented socio-political protests which had huge impacts on all walks of life, but especially its universities. It was also another roller coaster ride in the expansion saga of SWIMS due to the termination of the original contractor and the impacts of Typhoon Mangkhut. As a result, there has been a great deal of effort to appoint a new contractor and restart the expansion. I am grateful to all the SWIMS staff who have worked tirelessly with the architects and HKU Estates Office team to keep pushing this project forward and, finally, in December we were able to officially 'break ground' in a ceremony attended by representatives from the Swire Group, Dean of the Faculty of Science and friends of SWIMS.

Unfortunately, these delays have had a huge impact on our functioning and especially SWIMS students. I am extremely appreciative for the positive attitude and teamwork shown by all staff and researchers as we have learnt many ways to stay functional during this period. We have been able to maintain our local and international presence during this time, although obviously activities such as workshops and outreach activities have been severely impacted. Our research outputs and funding have also continued on an upwards trajectory and will be a solid platform to launch SWIMS in late 2020.

This year we welcome new staff Sean Crowe, Jed Kaplan and Nicole Khan from Earth Sciences and Philip Li from the Department of Chemistry. We also welcome Science Distinguished Visiting Scholars: Prof Chris Bowler (Institut de Biologie de l'École Normale Supérieure, France) and Prof Minhan Dai (Xiamen University, China) who will help advise SWIMS scientific development both internationally and within China. During the last reporting period, Yvonne Sadovy retired, but we are very lucky that she is staying in Hong Kong and will continue her work on fish conservation and sustainable fisheries. She will also continue her strong links with SWIMS on different projects including the FishBase/SeaLifeBase with the University of British Columbia, so we look forward to continue working with Yvonne!

So our journey is on-going and, with work progressing on site at SWIMS, we can now see there is a light at the end of the tunnel and focus on our return to an exciting new facility.

Best wishes from the staff and students of SWIMS.

Gray A Williams

International Collaborations

This year we further developed links with Xiamen University (XMU), to establish a new PhD Studentship and Post Doctoral Fellowship programme which will be ratified in 2020. Gray also Chairs the International Advisory Committee of XMUs Dongshan Swire Marine Station, which is SWIMS' sister laboratory in China. A delegation from SWIMS, led by the Dean, Prof Matthew Evans and Ms Winnie Lai (China Affairs Office) visited the Institute of Oceanology, Chinese Academy of Sciences (CAS), Qingdao to initiate formation of a Joint Laboratory. SWIMS staff also visited Sun Yat-sen University (SYSU, Guangzhou) to discuss collaborations in the Greater Bay Area and are developing this further through HKUs Ocean Research Alliance which Kenny has been leading. Jed and Moriaki also visited SYSU to hold a workshop and Moriaki led his group to visit Nanjing Institute of Geology and Palaeontology CAS and China University of Geosciences (Beijing).

A new joint PhD programme was launched with the Marine Sciences Centre, Northeastern University (NU), Boston. As part of this exchange, Rajan and Gray led a 4 week fieldcourse with students from HKU and NU visiting Hong Kong, Boston and CeMACS, Malaysia. SWIMS staff continue to run international fieldcourses to Australia, South Africa and Okinawa as well as being part of the European Master of Excellence, TROPIMUNDO.

SWIMS staff continued their regional and international collaborations. Gray and his team continue to work with Prof Monthon Ganmanee (KMIT, Thailand) and started collaborations with Dr Kringpaka Wangkulangkul (Prince Songkal University, Thailand) visiting Krabi to work on the eco-physiology of Siphonaria. Prof Farid Dahdouh-Guebas (Université Libre de Bruxelles) joined Stefano in May to continue their work on mangrove socio-economics. Long term collaborators Profs Emilio Rolán-Alvarez and Antonio Carvajal-Rodríguez (Vigo University, Spain) visited as part of their joint EU-funded grant with Gray to work on sexual selection in snails.

Prof Tânia Marcia Costa (São Paulo State University, Brazil), a collaborator with Gray and Stefano since 2016, visited to finalize research on thermal tolerance of Hong Kong and Brazilian fiddler crabs. In June, Prof Giacomo Bernardi (University of California, Santa Cruz) gave a talk on the evolution of fish life histories and visit wholesale fish markets with Celia. JD's group hosted Prof Leonardo Bacigalupe (Austral University of Chile) in Oct-Nov in collaboration with Dr Bonebrake to develop an Advanced R workshop for our postgraduates. To develop collaborations, Dr Daniel Naya (Universidad de la Republica, Uruguay) visited JD in Sept, and Stephen Obrochta (Akita University, Japan) visited Moriaki to start a new collaboration on Great Barrier Reef paleoecology and also gave a seminar.



Bayden, Gray and the Dean, Prof Evans visit Prof Guofan Zhang in Qingdao



Signing ceremony between SWIMS and Northeastern University, USA



Antonio and Emilio exploring Hong Kong mangroves in search of littorinid snails



Prof Bernardi with Arthur in a HK wholesale market



Bayden and Jay in Sydney with Prof Maria Byrne

JD established an international collaboration on the role of phenotypic plasticity of marine species to climate change with Dr Cristian Vargas (UDEEC), Dr Sam Dupont (University of Gothenburg, Sweden); as well as co-leading a 3 year ARC-Discovery grant to study the responses of seaweeds to climate change with colleagues from Australia. In January Celia travelled to White Island in New Zealand to study fish behaviour at the CO₂ vents together with Profs Ivan Nagelkerken, Sean Connell (University of Adelaide) and Timothy Ravasi (Marine Climate Change Unit, OIST) whilst Bayden continued his long term collaborations on OA with Dr Ben Harvey (Shimoda Marine Research Center, Japan) and Prof Maria Byrne (Sydney University, Australia).



The MarineGEO research team

MarineGEO Hong Kong

The Marine Global Earth Observatory (MarineGEO), directed by the Smithsonian's Tennenbaum Marine Observatories Network (TMON), is a global network dedicated to understanding how coastal marine ecosystems work and how to keep them working. Focusing on surveying biodiversity, partners deploy and sample Autonomous Reef Monitoring Structures (ARMS) to record, catalogue, and compare regional biodiversity. In 2015, SWIMS, led by Dave, became the first MarineGEO partner site in Asia and in 2019 collected and processed 41 ARMS. Thanks to collaborations with the Florida Museum of Natural History SWIMS is building a database of species associated with ARMS to inform future field experiments and implementing ecosystem function assays for a more complete picture of how marine ecosystems work.



Gray officiating at AFCD's Coral Garden exhibition

Community Outreach

Although SWIMS expansion has limited our ability to host visits we have maintained our roles in community service and outreach with many staff sitting on a variety of Government and NGO committees and advisory bodies. SWIMS staff also make important contributions in the international arena such as IUCN, where Moriaki contributed to the report on deoxygenation and was a member of IOC-UNESCO oxygen group, as well as global databases and projects such as MarineGEO; World Harbour Project; FishBase and SeaLife Base and the World Register of Marine Species.

We continue to contribute to the conservation of the HK marine environment. Following from the successful TingKok+ project, Gray's team have been developing a GIS platform for the general public supported by the Agriculture, Fisheries and Conservation Department. Oyster aquaculture and reefs in Deep Bay have also been a focus with Bayden joining forces with The Nature Conservancy (TNC) to investigate oyster reef restoration and Rajan continuing his successful collaboration with oyster farmers in Lau Fau Shan.

JD was an invited speaker for the virtual public seminars of the Association of Polar Early Career Scientists. Bayden hosted a workshop, facilitated by Prof Bob Chen (University of Massachusetts Boston) and Emily King (XMU) for staff and students on Scientific Education and Outreach and put these techniques to good use at several public and school events about his oyster reef restoration work with TNC.

Plastic pollution is a hot topic and Christelle maintained her profile presenting at workshops involving Greenpeace and the HKU Sustainability Office and was invited to the Transdisciplinary Research on Complex Environmental Health Problems workshop and the Asia-Pacific Economic Cooperation workshop on marine debris and microplastics; as well as co-organizing two workshops on microplastics in HK waters with Morgan Stanley. Christelle is the mentor of the French International School team in the Ocean 3C's collaborative program and also the GT college team which won the gold medal in the International Genetically Engineered Machine Competition 2019. To further this work Christelle has started a collaboration with the Center for Research and Development Hong Kong to develop continuous monitoring of marine environmental parameters.

International Conferences and Workshops

The 9th International Conference on Marine Pollution and Ecotoxicology

Co-Chaired by Kenny and Prof Paul Lam (Director of State Key Laboratory of Marine Pollution), the 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9), an internationally recognisable signature event in marine pollution research and management, was held during 10-14 June at HKU, and attracted over 300 participants from 17 countries.

During the conference, a special session was organised for discussion and identification of priority areas for research collaborations in marine pollution among scientists and regulators within the Greater Bay Area of China. In addition, two training workshops regarding the adverse outcome pathways (AOPs) and academic writing were also held. The conference proceedings will be published as a special issue in Marine Pollution Bulletin. Our SWIMS PhD students, Racliffe Lai and Jason Yau, won the Prof Rudolf Wu Award for the Best Oral Presentation, and Prof John Gray Memorial Award for the Best Marine Pollution Study Associated with Benthic Ecology, respectively.



Christelle running a workshop on microplastics with Morgan Stanley



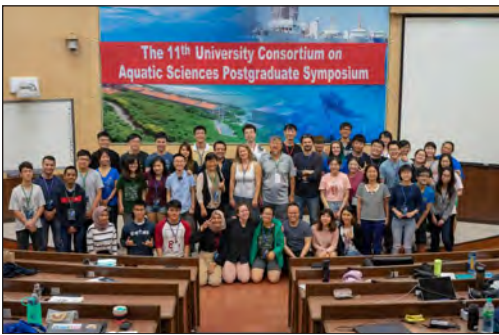
A group photo taken after the opening ceremony of the ICMPE-9 at Rayson Huang Theatre, HKU



Group photo taken after the lion dance ceremony of the 12th ITRS

The 12th International Temperate Reefs Symposium

SWIMS hosted the 12th International Temperate Reef Symposium (ITRS) at HKU between 6-11 January, which included 165 scientists from 25 countries and was the first time for this meeting to be held in SE Asia. This meeting brought together the world leaders in coastal ecology and, as well as the formal talk sessions; cultural activities; workshops; poster sessions and excursions, delegates also enjoyed a traditional Lion Dance ceremony to kick-off the meeting in true Hong Kong style. We also managed to ensure a plastic-free meeting with re-useable beverage containers, plant-based cutlery, etc. Bayden and Gray, on behalf of the organizing committee, would like to thank all the SWIMS and School of Biological Sciences staff and students for their support and especially the Swire Group and Faculty of Science for financial support.



Group photo of the 11th UCAS Postgraduate Symposium in Kaohsiung

The 11th UCAS Postgraduate Symposium: How, What, When & Why? Interactions between Ocean and Human

The annual University Consortium on Aquatic Sciences (UCAS) symposium promotes scientific knowledge and cultural exchange among researchers from universities in Hong Kong, Taiwan and Mainland China. From 24-29 March, 50 postgraduates and staff from four universities including HKU, National Sun Yat-sen University (NSYSU), National Taiwan Ocean University (NTOU) and XMU joined UCAS in Kaohsiung, Taiwan, hosted by NSYSU. Students from a range of disciplines gave talks to share their research. The meeting included four inspirational keynote presentations by Prof James T Liu (NSYSU), Prof Ka-Lai Pang (NTOU), Prof Guizhi Wang (XMU) and JD; a software workshop on data analysis and presentation led by HKU students; academic salons with staff sharing their personal experiences; and a field trip to the Shoushan National Nature Park; all of which were well received by the participants.



Participants of the EBSD workshop

Technical Workshop on “Application of Scanning Electron Microscope - Electron Backscatter Diffraction (SEM-EBSD) for Studying Biomineralized Structures”

Kanmani and Rajan organised a technical workshop funded by a *Universitas 21* Graduate Collaborative Research award, from 21-31 January at HKU to introduce the SEM-EBSD technique, widely used in material science and engineering, to biology and medicine graduate students studying biomineralized structures such as marine shells, teeth and bones. Graduate students from HKU School of Biological Sciences, Faculty of Dentistry, Department of Orthopaedics, University of British Columbia and University of Auckland joined the workshop and Dr Meng Yuan, a mechanical engineer turned biologist from SWIMS taught data interpretation and theory of EBSD together with Kanmani.

SWIMS and Ocean Park Conservation Foundation Hong Kong

This year was the 15th Anniversary of the OPCF University Student Sponsorship Programme (USSP) originally initiated by SWIMS and OPCF. During this time the programme has included over 400 students from nine local tertiary institutions, including nearly 100 from SWIMS, HKU. The students have joined programmes in 15 different countries in the region, learning and working together with 90 different conservation groups. The USSP is a unique opportunity for our students as they get to meet students from different universities in Hong Kong and travel abroad to work on conservation projects where they learn that conservation is a real team effort.

This year, Leung Tung Ying, Natural and Tse Sheung Yee, Sherry traveled to Chengdu, Sichuan province in China where one can still locate Boulenger's Spiny Frogs, an endangered frog species. The days were long and the hikes to the creek sites often hard but pulling through made this experience even more rewarding. Their task was to study the habitat connectivity and morphological traits of *Rana boulengeri* and study the impacts of climate change on this species' populations.

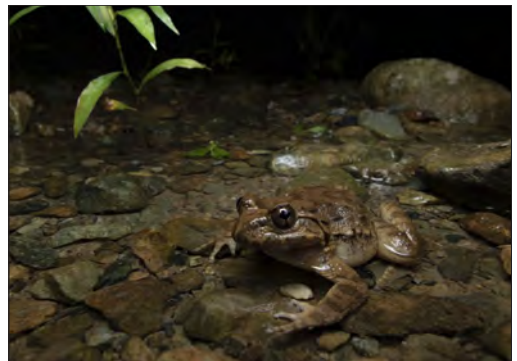
Two other students, Tam Sze Hon, Nicholas and Ng Sze On, Aaron; went southwards and landed in Bali, Indonesia. In collaboration with the Begawan Foundation they worked on understanding how to involve the local community in collaborations for successful conservation of the Bali starling. For this, the students set up their own study to investigate the effects of human populations on Starlings by providing easy food availability.

Last but not least, Ma Kwan Po, Michael and Wong Ka Yee, Kitty, made their way to Yushu, a very remote area of the Tibetan Province. While it was cold even in summer, they experienced a lot of the landscape and identified key protection areas for snow leopards. Due to climate change it is likely that the snow leopard distribution is changing, and the students were involved in questioning local inhabitants about the change in climate and how to protect the snow leopard while keeping livestock safe.

Being part of ongoing conservation efforts, and experiencing this firsthand, is an invaluable and eye-opening experience. We thank OPCF for making this possible and their initiatives in educating students about conservation needs and inspiring young adults to pursue this career path.



Gray with participants at the 15th Anniversary of the OPCF USSP



The endangered Boulenger's spiny frog



Kitty with teammates at Sanjiangyuan Region, one of the areas that still supports snow leopards

Staff Research

Gray A Williams



Gray on the shore with Farrag and students in Koh Lanta

Research into the ecology of extreme high shore molluscs was again a focus for Gray's work in 2019 with trips to Thailand, to Koh Sri Chang to continue work on *Isognomom* and *Echinolittorina* with long-term collaborator Monthon Ganmanee; and a new collaboration with Kringpaka Wangkulangkul, Prince Songkal University, to work on *Siphonaria* on Koh Lanta, Krabi. Preliminary data indicate the importance of metabolic depression as a convergent strategy between these different lineages and currently JD and Gray are collaborating to investigate the genomic pathways involved in this process. This work will progress further in 2020 as part of a new project funded by the RGC, where we shall investigate patterns on a wider scale from Japan to Singapore.

Bayden Russell



Bayden leading a snorkel trip on Orpheus Island, Great Barrier Reef, Australia

This year was about integrating the international collaborations and research of the Marine Futures Laboratory with the HK programme. Steven Wong and Bayden further expanded their oyster restoration research with The Nature Conservancy, finding some new species records for HK on their experimental reefs. Bayden also spent considerable time in Japan (Shimoda Marine Research Center), working on the thermal physiology of the black spined sea urchin, *Diadema atrementosum*, with Dr Ben Harvey where the early results are looking exciting! Overall a very productive year for the Lab which is now looking forward to its first PhD completion and papers from research in 2020!

Stefano Cannicci



The iMEco Lab attending the 5th Int'l Mangrove, Macrobenthos and Management Meeting in Singapore

This year was a turning point for the Integrated Mangrove Ecology Laboratory of SWIMS. The results of various ongoing research projects were accepted in International congresses such as The Crustacean Society Meeting and the 5th International Mangrove, Macrobenthos and Management Meeting. Some of the iMEco Lab Research Assistants were accepted in prestigious Master and PhD programs and Ying was the first RPG of the lab to submit her MPhil thesis, while a new lab website was launched. Stefano was also awarded a new project on the impact of heavy metals on the physiology and metabolism of mangrove fauna and described a new genus of mangrove crabs from Mai Po mangroves in Hong Kong.

Kenny Leung

In 2019, Kenny successfully led SWIMS staff to win a RGC Collaborative Research Fund of HK\$3.8 million for purchasing advanced stable isotope ratio (SI) mass spectrometry instruments which can analyse various kinds of biological and environmental samples, covering SI of C, H, N, O and S, and enable compound-specific SI analysis. As part of the Central Facilities of HKU's Science Faculty, these new facilities will be located in the School of Biological Sciences and be available to users from universities in Hong Kong, Mainland China and overseas. Kenny's research on ecologically engineered shorelines has been going well, and he has received a grant of HK\$1 million from the Development Bureau of HKSAR Government to commence another trial along the coast of Tsuen Wan.



Kenny as a guest in "Dining with Sing-Sing" hosted by Secretary for the Environment, Mr. Kam-sing Wong

V. ThiyagaRajan

This year, Rajan's group have successfully launched multiple-generation experiments to study transgenerational plasticity (TGP) and adaption potential, as well as the underlying mechanisms, and trade-offs to determine whether edible oysters can adapt to ocean acidification stress within a few generations. The first part of this long-term experiment, i.e. transgenerational (parents to offspring) exposure, has shown that oysters are able to adjust and improve their acclimation capacity to survive OA through TGP. This interdisciplinary project will help us to identify OA-tolerant TGP mechanisms that can be used as a molecular marker for the selective breeding of stress-tolerant strains to support the rapidly growing aquaculture industry in south China.



Oyster growers of Lee Kum Kee's oyster hatchery in Zhanjiang helping with Rajan's experiments

Moriaki Yasuhara

The Yasuhara Lab had substantial progress in northwestern Pacific paleoecology, and many projects with Moriaki's graduated students have been published, including those in Hong Kong (Yuanyuan Hong), Yangtze River estuary (Richard Cheung), Sea of Japan (May Huang), and Coral Triangle (Caren Shin). Anna Jöst's paper on the North Atlantic Gateway region showed a textbook example of deep-sea macroecology and biogeography and the utility of ostracods for these fields. Yasuhara Lab members had a great visit to Nanjing (Nanjing Institute of Geology and Palaeontology, CAS) and Beijing (China University of Geosciences) to start collaboration with Yaqiong Wang and Dangpeng Xi. Moriaki was also invited to be an Associate Editor of a CAS journal 'Palaeoworld'.



Moriaki with plenary speakers of the 13th International Conference on Paleooceanography in Australia



Dave with Prof Jed Sparks (Cornell) and the first cohort from our Stable Isotope Short Course

David Baker

In 2019, we welcomed Postdoc Dr Isis Guibert (France) to the MarineGEO team, and to lead new research on giant clams with collaborators in the Philippines. The lab celebrated newly minted PhD's; Dr Archana Anand, Dr Inga Conti-Jerpe, Dr Phil Thompson and Dr Jane Wong! We also welcomed a new honorary member, Malaika – Dr Geeraert's daughter - and wished the family well as they relocated to Belgium at the end of the year. 2019 brought new and exciting frontiers to the group with nascent projects in coral reef restoration and for MarineGEO- Hong Kong – and new responsibilities as Dr. Baker was appointed the Chair of the Partnerships committee within the MarineGEO global program, and the Directorship of the University Stable Isotope Lab.



Benoit giving a keynote presentation about climate change at an investor luncheon

Benoit Thibodeau

Benoit's group started multiple new projects this year with different collaborators: paleoceanography of the Labrador Sea using nitrogen isotopes in coralline algae (Dr Williams, Claremont Col.), fundamental nitrogen incorporation in coralline algae (Dr Kamenos, University of Glasgow) and nitrogen dynamics in high-latitude phytoplankton (Dr Lindemann, University of Bergen). Benoit has also been invited to share his research outside of academia to investors interested in learning about climate change and climate-related financial risk; and was one of the keynote speakers at a lunch workshop organized by BNP-Paribas and DBS.



Christelle at the HEAVEN symposium in Hong Kong

Christelle Not

This year, Christelle and her team continued to work on both paleoclimate reconstruction and plastic pollution. One part of the team continued their work on monitoring the plastic and microplastic variability in Hong Kong waters and its impact on the fauna. Christelle also started a collaboration with the Centre for Research and Development Hong Kong to test sensors to continuously monitor environmental parameters. Several lab members took place in more than 10 outreach activities with schools and the public to discuss the status of plastic pollution in Hong Kong. The other part of the group made progress on developing proxies to reconstruct paleotemperature and salinity of marine waters.

JD Gaitan-Espitia

The iBEER team grew with the arrival of Dr Gao Xu (Postdoc, seaweed ecophysiology), Zhenzhen Li (PhD student, phytoplankton evolution), Sheena Chung (Final year student, sea cucumber holobiome), Vivienne Tung (Final year student, bird gut microbiome), and Husna Safi (Visiting PhD student, seaweed/microbiome interactions). Bovern, our first PhD student, developed the first chapter of his thesis through an exchange program at Imperial College London and made great progress and has his first paper in the pipeline! JD was successful with two international grants, one in Australia and one in Chile, on projects which aim to understand physiological and evolutionary responses of seaweeds to climate change with part of this work in Antarctica!



JD with penguins at the Austral Summer Antarctic Campaign on King George Island, Antarctica

Celia Schunter

Celia's first year associated with SWIMS has passed - and what a year it has been! Celia travelled to the natural CO₂ seeps of the White Island in New Zealand to do field collections. Together with a collaborative team she did behavioural tests underwater and collected fish tissues to analyse the molecular acclimation of these fishes to living in acidic conditions. Celia is grateful that several new graduate students and Postdocs joined the lab this year and her team has started building projects together and she is looking forward to a lot of fun and exciting science in the next year.



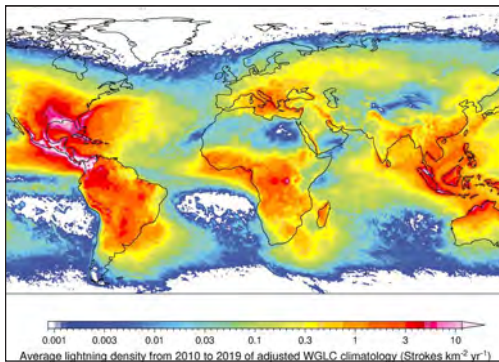
Celia's group looking forward to lots of great science and fun in 2020

Sean Crowe

Research in the Crowe lab in 2019 focused on ocean deoxygenation, past and present. Research in the modern oceans tested the response of marine microbial communities to declining ocean oxygen in an effort to improve numerical models that predict the impacts of ocean deoxygenation. Research in the past focused on reconstructing dynamics in seawater chemistry across a suite of ocean anoxic events (OAEs) and mass extinctions over the last 500 million years. Combining information from the modern and past oceans is enabling Sean's group to improve predictions of ocean change in the future.



RA Hamsun Chan and MPhil student Henry Cheung at Mai Po Nature reserve



An image from Jed's new WGLC lightning stroke dataset

Jed Kaplan

Jed joined HKU as Associate Professor in March and is currently building up his group. Jed's research develops and applies computer models of the earth system to understand past and future climate change, ecosystem dynamics and human-environment interactions. During the past year, Jed was joined by a Katie Lau, Research Assistant, and Dr Alexander Koch, Postdoc. Jed and Katie developed a new global dataset of lightning strikes that is being used in atmospheric and wildfire research. Jed and Moriaki initiated a new collaboration with the Laboratory for Paleoecology at Sun Yat-sen University, Guangzhou; while Jed and Alex worked on paleoclimate modeling. Jed was also appointed Editor-in-Chief of the journal *Global and Planetary Change*.



Nicole coring mangrove sediments in Singapore

Nicole Khan

Nicole moved to Hong Kong in July to become a new member of SWIMS. She uses sedimentary, microfossil and geochemical indicators to produce and synthesize records of present and past storms, floods and sea levels, and the extent of their geological and ecological impacts. These records provide means to assess future risk, reveal the spatial and temporal variability of coastal inundation and decipher the relationship of these events to global climatic changes. Her current research projects follow three broad areas: (1) local to global drivers of relative sea-level change to improve future projections; (2) the impact of extreme events (storms, floods, tsunamis) on coastal systems and evolution, and (3) quantifying processes of coastal change.



Philip presenting in a conference at Tianjin, China

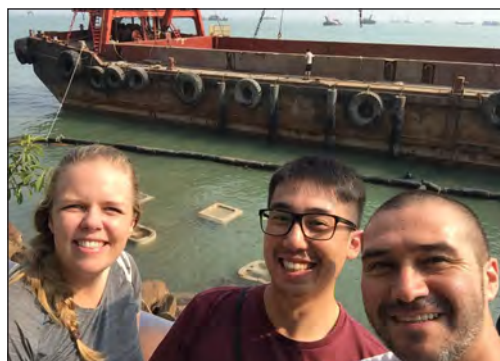
Philip Li

Philip is a new member of SWIMS from the Department of Chemistry. Since arriving, Philip's group has grown, recruiting 2 Postdocs, 3 PhD students, 3 RAs, and 1 UG student. During 2019, he got an Open Collaborative Research Fund from the Southern Marine Science and Engineering Guangdong Lab (Guangzhou). His group seeks to develop an integrated discovery approach to natural products from the marine microbiome by the combined use of AI-aided genome mining, metabolomics and synthetic biology. Applying this approach to the marine microbiome can not only increase the chance of identification of new drugs but also unlock unknown chemical languages encoded within the microbiome which shape the ocean ecosystem.

Post Doctoral Fellows

Juan Carlos Astudillo

Juan Carlos's research focuses on assessing marine biodiversity, the ecology of invasive species and environmental rehabilitation of artificial shorelines by eco-engineering. Currently, he is working on eco-engineered shoreline trials in Hong Kong to test if the retrofitted eco-engineered fixtures can effectively enhance marine biodiversity and ecosystem function of artificial shorelines. His work involves ecological design, implementation and assessment of the eco-engineered fixtures on seawalls in Hong Kong and Mainland China. Preliminary results indicate that the fixtures can increase the number and abundance of intertidal species.



Eco-shoreline team (Thea Bradford, Chi Chio Lo and Juan Carlos) inspecting at Tuen Mun trial site

Shelby McIlroy

In 2019, Shelby's work on the MarineGEO-HK project really amped up with the retrieval and processing of over 40 ARMS settlement structures from across Hong Kong. A team of volunteers including secondary school, undergraduate and graduate students, and international scientists pitched in to identify and inventory Hong Kong's marine biodiversity and understand how it relates to water quality and ecosystem function. In other projects, our research on the physiology of Hong Kong corals provided a unique insight into how corals cope with seasonality. Shelby is looking forward to incorporating these lessons in ongoing collaborations to the population genetics of corals and urchins of the South China Sea, and in thinking ahead to coral range expansion under climate change.



Shelby in the field for MarineGeo

Tommy Hui

Tommy investigates how behavioural thermoregulation can be achieved via simple biophysical properties in intertidal gastropods. Rocky shore gastropods often have restricted locomotion when the rock surface dries up during low tides and, being effectively sessile, conduction from the rock becomes a major heat flux determining their body temperatures. Tommy has shown that a variety of intertidal species are able to reduce their foot areas when they cannot escape to thermal refuges, effectively reducing their rates of heat gain by $\sim 60\%$ through reduced conduction. Since the changes in foot area are often hard to observe directly on the shore, such a simple but effective behaviour could represent an underestimated thermoregulatory strategy in intertidal gastropods.



Tommy demonstrating heart rate measurement to Dr Kringpaka's team in Krabi, Thailand



Naomi and her colleagues at the XMAS symposium, Xiamen 2019

Naomi Geeraert

Naomi continued her work on the OCEAN-HK project where she looked at nitrate dynamics around Hong Kong by using stable isotopes of nitrate. She tackled the challenge of analysing and interpreting isotopically labelled nitrate samples and investigated the role of organic nitrogen in the coastal nitrogen cycle. A significant amount of her time was also invested in SIRMS, the stable isotope laboratory at HKU. She supported the expansion of the lab equipment and coordinated the first postgraduate short course in stable isotope ecology at HKU.



Ashley sampling for intertidal copepods in rockpools

Ashley Hemraj

Ashley's research investigates the multi-generational adaptation of organisms to global change. Currently, he is undertaking an experiment to identify the effects of ocean acidification on the physiology, genetic responses and fitness of an intertidal copepod over multiple generations. He has worked on refining RNA analysis protocols for copepods and has collected physiological data which will be used to explore the mechanisms involved in adaptation to ocean acidification. In 2019, Ashley successfully applied for two major grants (The Ecology and Biodiversity Division fund, and the Marine Ecology Enhancement Fund) and has co-authored two manuscripts currently under review.



Lily dissecting fishes for Stable Isotope Analysis

Lily Tao

Lily continued investigating the effect of the trawling ban on recovery of fisheries resources in Hong Kong. She used stable isotope techniques to test if the trawling ban could improve the marine food web. Lily also visited the UBC Institute for the Oceans and Fisheries and developed ecological models (Ecopath with Ecosim models) with Prof William Cheung and his team. These models aim to predict future changes of fishery resources in Hong Kong by integrating influences brought by different fishery management interventions (e.g. restriction of fish sizes and gears for fishing) and climate change scenarios (e.g. temperature rise, pH decline) to provide useful insights for local fisheries management and beyond.

Isis Guibert

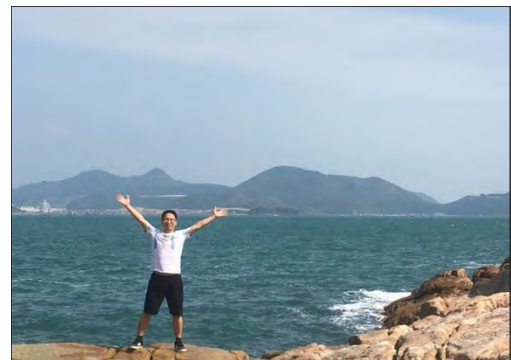
Isis is a new member of SWIMS as she moved to Hong Kong in February. She has been working on the MarineGEO Hong Kong project. This year, that work has included a lot of time in the lab working to extract and amplify DNA from the ARMS retrieval of January 2019. The MarineGEO team also retrieved 21 more ARMS in July. One of the highlights of 2019 was conducting a thermal stress experiment in the Philippines (Semirara Island) to understand the response of giant clam holobionts in the face of climate change.



Isis analyzing samples of giant clams from the Philippines

Jing-Liang Kang

Jing-Liang is a Postdoc in the Schunter lab since August. He investigates genetic responses to changes in the environment via computational analyses. Currently he focuses on understanding the underlying molecular responses of coral reef fishes to living in natural CO₂ seeps (a naturally low pH environment). In his first few months at SWIMS he started analyzing the data set that comprised of many terabytes of RNA sequencing data. He created high-quality and non-redundant reference transcriptomes for six coral reef fish species and will be using these references to study differential gene expression to understand what molecular pathways fish use to be able to live in low pH environments.



Jing-Liang enjoying his time with nature

Xu Gao

Xu joined SWIMS in August to work in the iBEER laboratory as a Postdoc. Before coming to SWIMS, Gao has been travelling around Asia during the last 10 years working in Japan and Korea on aspects of physiological responses of seaweeds to climate change. He also has great interest on technology improvements of seaweed aquaculture and marine forest restoration. Now, he will expand his work to new eco-evolutionary areas in Hong Kong and overseas.



Xu traveling with students in Macau in 2019



Natalia's study species, the common triplefin (Forsterygion lapillum)

Natalia Petit-Marty

Natalia joined SWIMS in August. She is an evolutionary biologist interested in the molecular mechanisms of adaptation. Her main research is the study of the effect of ocean acidification on fishes. She has been analyzing the differential expression of genes in the common triplefin fish living in natural CO₂ seeps (low pH), to infer the physiological and molecular changes that could be informative regarding the adaptive potential of this fish species to ocean acidification.

Research Assistant

Guang-Jie Zhou



Guang-Jie presenting his work at the NSFC-RGC Young Scholars Forum

At elevated concentrations, retinoic acids (RAs) and their metabolites can become teratogens and adversely affect larval development of marine organisms. Guang-Jie discovered that many species of marine algae and cyanobacteria can produce RAs, in particular during their blooms. He investigated how marine copepods respond to exposure of RAs. He found that all-trans-RA at environmentally relevant concentrations can delay the developmental time of copepods from larvae to adult, and reduce the fecundity of the F1 generation. He is currently studying the transcriptomes of the copepods upon exposure to various RAs as a way to reveal the molecular toxic mechanisms of these chemicals.



Martin is showing some mangrove species to the public during an outreach tour

Martin Cheng

The three-year Ting Kok+ project funded by the Environment and Conservation Fund gathered a huge collection of ecological data from intensive field surveys demonstrating the rich marine biodiversity in Tolo Harbour and Tolo Channel (The Tolo area). As a Research Assistant, Martin is now working on a project which is supported by the Agriculture, Fisheries and Conservation Department to establish a web-based education tool to visualize this biodiversity data. The education tool will enable the public to access, either on their computers or phones, species distribution information with identification guides for the common species in the Tolo area, and therefore stimulate interest in the marine biodiversity of the Tolo area.

Yuanyuan Hong

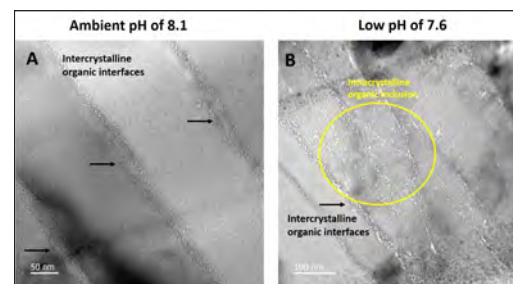
Microfossil Ostracoda are known as a sensitive indicator for anthropogenic impacts. But our knowledge of the autoecology of indicator species remains limited and commonly lacks robust statistical support and comprehensive comparison with environmental data. Yuanyuan analysed marine ostracod taxa at 52 sites in Hong Kong for which comprehensive environmental data are available and applied linear regression models to reveal relationships between species distribution and environmental factors to identify indicator species of environmental parameters. She also studies paleoecology based on ostracods to reveal natural -baseline biological communities before human-induced environmental modification in Hong Kong.



Yuanyuan demonstrating her sampling sites at a conference in Poland

Yuan Meng

The Pacific oyster is one of the most commercially important edible species in the world. In Yuan's research, she has found that the mineralization processes in Pacific oysters are resilient to ocean acidification. Therefore, she further evaluated the crystallization mechanism in this species at the nanoscale using advanced engineering facilities for crystallography characterization, such as focus ion beam (FIB) and transmitted electron microscopy (TEM). Her newest finding is that the intracrystalline organic inclusion in the Pacific oysters' shells is increased under ocean acidification, which is important for oysters to maintain the shell mechanical properties during stressful ocean acidification processes.



The oyster shell of Pacific oysters under ambient (A) and low pH conditions (B)

Phil Thompson

Phil recently completed his PhD where he studied coral physiology and has since become a local expert on identifying cryptic biodiversity on Autonomous Reef Monitoring Structures (ARMS). Phil is continuing his research on corals with Dave, testing whether diverse assemblages of restored corals will also promote higher overall biodiversity within communities. Utilizing 3D printing technology, terracotta restoration tiles have been fabricated as substrate to attach the coral fragments onto. He will combine these with ARMS as biodiversity samplers to compare species-diverse treatments with single-species treatments of restored coral communities in Hoi Ha Wan Marine Park.



Phil posing with his coral husbandry aquarium



Ronia and her examiners after her oral PhD defense

Ronia Sham

This year, Ronia fruitfully completed her PhD study on the evaluation of the contamination status of triphenyltin compounds (TPT) in the marine environment of Hong Kong. Through analysing environmental and biotic samples, she found that Hong Kong's marine environments were highly contaminated with TPT compounds and its degradants. Concentrations were especially high in tissues of the finless porpoise and the Indo-Pacific humpback dolphin with the trophic magnification factor of 3.47 and 3.39 for TPT, respectively. Her results suggest dietary intake is the major route of TPT uptake in marine mammals, and TPT can be biomagnified via the marine food chain.



Alicia with her supervisor Gray and labmates

Alicia Tan

Alicia successfully defended her PhD thesis and graduated this year. Her thesis presents the impact of climate change on the future life history traits of economically important bivalves along the China coast. With the application of mechanistic Dynamic Energy Budget models, she investigated the spatio-temporal change of life history traits of bivalves under two IPCC warming scenarios followed by a sensitivity analysis to simulate future trophic scenarios. Using this model Alicia was able to evaluate biogeographic changes for an invasive mussel and habitat suitability for oyster aquaculture along the China coastline under different temperature and food conditions.



LiCheuk interned at Q-quatics, Philippines

Li Cheuk Wing

LiCheuk has been fully dedicated to work on data mining, sorting, evaluation and encoding for SWIMS contribution to Fish and SeaLifeBase. Data mining is conducted using journal articles, theses, species guides, meeting proceedings and from special collections in the HKU library, with focus on studies carried out in Hong Kong and adjacent waters. Information on reproduction, feeding habits, population dynamics and distribution is located, extracted, evaluated and encoded. To date, she has located/collected more than 130 publications with more than 1800 records encoded, for at least 300 marine invertebrates and 253 fish species. Among them, about 60 out of 300 species recorded are new to Hong Kong on SeaLifeBase in terms of country records, and 33 are new for the 221 country records of fish.

Inga Conti-Jerpe

This year, Inga finalized a study that links a novel method to assess trophic strategy in corals to their morphology and bleaching resistance. Recently accepted in the journal *Science Advances*, Inga's work uses a Bayesian analysis of carbon and nitrogen stable isotopes to determine the trophic niche overlap between corals and their symbionts, and sets benchmark values that define autotrophy, heterotrophy, and mixotrophy. Inga and her colleagues found the overlap between the coral and symbiont niche was negatively correlated with polyp size and bleaching resistance, indicating that as oceans warm, autotrophic corals lose their competitive advantage and thus, are the first to disappear from coral reefs.



Inga in the field ready to photograph corals

Postgraduate Research

Making ends meet: the energy budget of Hong Kong littorinids

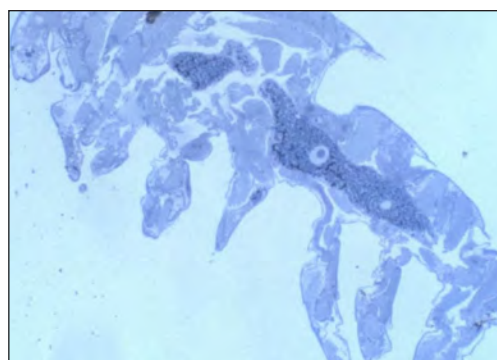
The activity of Hong Kong littorinids is temporally constrained by tides, as they feed and mate when awash and become inactive when emersed. As a result, their activity is confined to a narrow window when it is thermally benign, whereas they are inactive when temperatures are extreme. Such a mismatch in activity (i.e. gaining energy) and high temperatures thus incurs a massive imbalance in the energy budgets of these animals due to elevated metabolic costs at high temperatures. To elucidate how these snails manage this challenge, Sarah Lau has constructed an energy budget model for Hong Kong littorinids, which will help explain how they can survive in such a thermally harsh and dynamic environment.



Sarah sampling snails with collaborator Prof. Antonio Carvajal-Rodríguez from University of Vigo, Spain

Ecological risk of zinc oxide nanoparticles

Zinc oxide nanoparticles (ZnO-NPs) were ranked as the 7th most prevalent nanomaterials in commercial products and hence concerns have been raised over their potential risk to marine organisms. In a hazard evaluation of six zinc-associated chemicals including ZnO-NPs, Racliffe Lai found that different coatings can affect the physicochemical characteristics of ZnO-NPs, including agglomerate size, surface charge, ion dissolution and ROS production. These modulations could induce oxidative stress in the marine copepod, *Tigriopus japonicus*, and cause significant adverse effects at both the short-term individual level and long-term population level.



*A cross section of the copepod *T. japonicus* under the light microscope*



Derek at the World Marine Mammal Conference in Barcelona

Multi-faceted study of delphinid foraging ecology

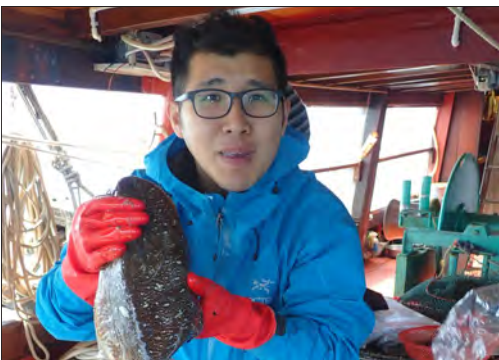
Derek Ho's project uses teeth of the Indo-Pacific humpback dolphin (*Sousa chinensis*) to study the dolphins' foraging ecology and environmental nitrogenous input in the Pearl River Estuary. Apart from food, dolphins ingest a variety of non-food items, including microplastics (<5mm) which originate from various sources, but large pieces of plastics (macroplastics) seem rare. Micro-Raman spectrometry results suggest that microplastic ingestion contributes higher proportions to the dolphins diet than previously thought. In a complementary study, using acoustic techniques, Derek found that the contribution of essential soundscape features within the dolphin habitat is site and season-specific and likely affects their foraging ecology.



The GC-C-IRMS used by Taihun in the SIRMS Laboratory

Fatty acid compound-specific stable isotopes (FA-CSIA) in coral reefs

Taihun Kim implemented a pulse-chase experiment, targeting carbon specific compounds, to investigate how much of photosynthetically fixed carbon is incorporated in fatty acids and exchanged between corals and their associated symbionts. In his fourth year of his PhD, he successfully analyzed $\delta^{13}\text{C}$ of each fatty acid from experimental coral samples using Gas Chromatography Combustion Isotope Ratio Mass Spectrometry (GC-C-IRMS). The results will contribute to a better understanding of fatty acid metabolism of the coral symbiosis system.



Jason sorting macrobenthos samples on-board a junk during a sampling trip

The effect of the trawling ban on molluscan assemblages

The HKSAR Government implemented a territory-wide trawling ban from 31 December 2012 to facilitate recovery of fisheries resources. Jason Yau has been tracking the status of subtidal molluscan communities through regular trawl surveys since 2012. He found that the molluscan assemblages in western waters before and after the trawl-ban were significantly different regardless of the season, while responses varied seasonally in other regions. Concurrently, he also employed stable isotope analysis to reveal local marine benthic food webs, and showed both concentrations of inorganic nitrogen and species richness of benthos significantly influenced food chain length and trophic diversity.

Do the benefits of herbivory outweigh the costs of bioerosion for corals

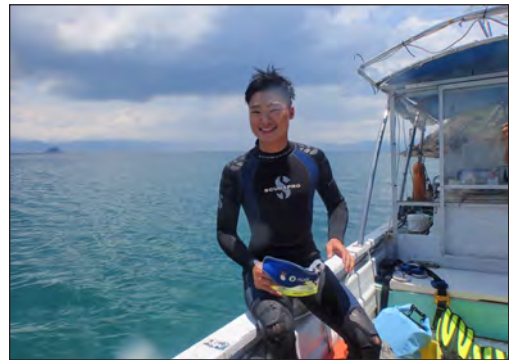
Herbivores play an integral role in maintaining coral reef health by suppressing algal growth. When densities are unnaturally high, however, urchins can have detrimental effects through bioerosion. Jake Dytnerki is estimating the importance of a dominant herbivore, the long-spined sea urchin, *Diadema setosum*, for coral communities in Hong Kong. A year-long *in situ* study revealed that when urchins were excluded, there was a 25 to 75-fold increase in algal growth dependant on season. Conversely, when urchins were present, two genera of coral, *Pavona* and *Porites* exhibited a two- and 16-fold increase in weight, respectively, suggesting that the presence of urchins is beneficial to coral communities.



Jake, Laura and Ying on the Tsitsikamma field course in South Africa

Productivity and growth of *Sargassum hemiphyllum* in Hong Kong

Marine macroalgae serve as both habitat and a food source in coastal ecosystems. Their growth and productivity are influenced by temperature and light intensity. Although photosynthesis seems to be most efficient at higher temperatures and irradiance, Rhyn Cheung has shown that optimal growth of *Sargassum hemiphyllum* occurs at lower temperatures. Hence, with increasing sea surface temperature, this species may have reduced growth even if productivity is theoretically enhanced. He is also interested in understanding how algal biomass flows through ecosystems by decomposition and visited the Shimoda Marine Research Center to collect decaying algal samples to understand how reduced future ocean pH will affect the decomposition of algal biomass.



*Rhyn enjoying the weather after measuring the productivity of *S. hemiphyllum**

Shark networks and models

Vicki Sheng spent a good part of this year in Santa Cruz learning how to model complex nonlinear dynamics using state-space reconstruction of time-series. Beyond equation-free methods, she is also setting up mechanistic models to simulate how overfishing of sharks (which act as nitrogen vectors and “capacitors”) could lead to eutrophication in coral reef systems. Her other ongoing projects include analyzing the structure and evolution of shark trade routes, as well as characterizing robustness and resilience of how the network topology rewires after targeted interventions. Vicki is also finishing up work on bulk isotope analysis of retail shark fins and sampling shark fins from a feeding experiment.



Shark street art in Santa Cruz near NOAA Southwest Fisheries Sciences Center



Jon taking a 6-meter coral reef sediment push-core during his fellowship in Panama

Stable isotopes and their use as historical indicators of change

Jonathan Cybulski is continuing to use stable isotopes to infer historical coral reef dynamics. His major finding in the past year was that although *Porites* sp. are mixotrophic, they obtain most of their nutrients via pathways through their symbiotic algae. This finding will help to accurately infer historical nutrient signatures found in the coral fossils throughout Hong Kong. 2019 also saw Jon in Panama working at the Smithsonian Tropical Research Institute as a visiting Fellow, where he aided a coring expedition looking for past changes in Tropical Eastern Pacific corals. Jon's final year at HKU will be focused on compound-specific stable isotope analysis, measuring amino acids to better understand coral metabolics.



Pedro demonstrating to undergraduates on a fieldcourse

Thermal performance of semi-terrestrial crabs and their physiological adaptations to land

During this year, Pedro Jimenez studied the patterns of physiological adaptation to the terrestrial environment and the physiological responses to temperature in different clades of semi-terrestrial crabs. His work shows that crabs from different clades have different physiological strategies to cope with the terrestrial environment and the temperature variability they face outside water. The results of Pedro's work suggest that different evolutionary paths characterise different clades of crabs invading the land. These different strategies may influence how these crabs interact with their ecosystem and, consequently, influence their roles in the intertidal zone.



Yan teaching the public about the local history of pearl cultivation

Revitalization of pearl cultivation in Hong Kong

To help local fishermen to reduce their operating costs, Wa-Tat Yan has been conducting experiments at fish rafts to find ways to control biofouling on pearl-oysters. As pearl powder obtained from the nacre of pearl-oyster shells is an expensive Traditional Chinese Medicine, Yan has scientifically examined the quality of pearl powders from local pearl-oysters. Yan has published his first article in an international journal to summarize the history of local pearl cultivation and discuss the reasons for its failure in the past.

Seasonal resource selection of African elephants in different ecosystems

Building upon his previous work on elephant spatio-behavioural patterns, Scott Chui constructed models of resource selection functions to investigate how various environmental factors affect elephant habitat-use patterns in nutrient-rich and nutrient-poor ecosystems. He found that while elephants frequently returned to surface water regardless of study sites, the seasonal effect of vegetation productivity varied between ecosystems. Scott's findings shed insights on the ecological processes underlying elephant space use patterns by revealing crucial factors in habitat selection, which will benefit management practices and conservation of habitat.



Scott conducting a photo-identification field survey in Pilanesberg National Park, South Africa

Physiological response and recovery capacity of key grazers to climate change

Jay Minuti is investigating the ecophysiology of key benthic grazers under climate change scenarios by assessing metabolic responses of sea urchins and gastropods to ocean acidification and heatwaves. Jay has found that urchins and gastropods react very differently to these stressors, despite sharing similar roles in their ecological niche. Jay has also found that heatwave conditioned urchins produce larger, faster growing progeny. However, there is an eventual trade-off resulting in high mortality. Jay's research highlights that whilst species may appear to be resilient due to physiological plasticity, it is important to assess other energetic trade-offs which may occur as a result of temporary physiological disruption.



Jay and Bayden looking at growth of brittlestars at SIMS, Australia

The role of crabs as bioturbators in intertidal wetlands and as an important mangrove food web link

This year Laura Agosto presented her research on the bioturbation potential of Hong Kong crabs and the use of nitrogen stable isotopes of amino acids to unravel mangrove benthic food webs at the 5th International Mangrove, Macrofauna and Management Meeting. She also presented an investigation on the burrow CO₂ flux of a salt marsh crab at the Ecological Society of America in Kentucky this summer. This last work emphasizes the importance of taking crab burrow density into account when performing large scale carbon budget assessments, and was featured in *Science* as a short online article.



Laura presenting at the 5th Int'l Mangrove, Macrofauna and Management Meeting in Singapore



Shannon undertaking her global warming experiments on coralline algae in Glasgow

The effect of global warming and ocean acidification on nitrogen uptake and assimilation in coralline algae

After receiving the HKU/Glasgow Early Career Mobility Fund Shannon Hanson travelled to the University of Glasgow. She spent four months at Glasgow researching the effect of global warming and ocean acidification on the nitrogen cycle in coralline algae. Algae were collected from the west coast of Scotland and brought back to Glasgow where they were exposed to different combinations of temperature and pCO₂ for six weeks. After this, incubation experiments were carried out to investigate the assimilation of nitrogen into coralline algae soft tissue and nitrogen uptake rates which Shannon is currently analyzing.



Kanmani receiving the best paper prize at GRAMMER'19 from Prof Sedlak, UC Berkeley

Oyster biomineralisation in acidifying oceans

Kanmani Chandra Rajan is a final year PhD candidate studying biomineralisation mechanisms in oysters (*Crassostrea hongkongensis*) under ocean acidification using techniques such as RNA seq, Methyl-RAD and SEM-EBSD. Because of her interest in knowledge exchange and teaching, she organised a two week symposium on Electron Backscatter Diffraction (EBSD) in January 2019, focusing on understanding calcareous marine shell crystallography. In her PhD research, Kanmani has discovered an increase in DNA methylation in oyster mantle tissue and reduced expression of various genes, which are signs of metabolic depression. Despite this depression and shell dissolution, however, oysters maintained their shell calcification rate.



Rebekah and Laura after a sampling trip in Ha Pak Nai

Investigating the extent of heavy metal pollution in Hong Kong mangroves

Rebekah Butler has been assessing the extent of heavy metal pollution in Hong Kong's mangroves and its potential influence on keystone organisms such as mangrove crabs. Her research has shown elevated heavy metal concentrations in four out of five mangrove sites surveyed and discovered higher concentrations in western mangrove sites, attributed to the influx of contaminated fresh water from the Pearl River Delta. Other research suggests that crab populations from polluted areas experience thermal stress at lower temperatures than those from pristine areas. Ongoing work aims to investigate the trophic transfer of metals in the mangrove food web and the translocation of heavy metals in mangrove plants.

Predator and prey in a warming ocean: their interactions, physiology and microbiome

Ocean warming is a major threat to marine species and healthy ecosystem function. Kevin Geoghegan is using a combination of mesocosm and field experiments to investigate the effects of present day and future thermal stress on the predatory rocky shore crab *Eriphia ferox*. He has found that *E. ferox* displays thermal plasticity in response to high temperatures and acclimation potential. Importantly, thermal stress alters prey choice (the mussel *Septifer virgatus*), with small prey being selected more often under warmer temperatures, which could negatively affect the mussel populations which are living at their thermal limit in Hong Kong.



Kevin doing fieldwork at Po Toi O, Clear Water Bay

Circulation and biogeochemistry of the past and future North Atlantic Ocean

This year, John Doherty has been heavily involved in setting up a new analytical method to measure isotopes of organic nitrogen preserved within calcium carbonate microfossils in the Stable Isotope Ratio Mass Spectrometry (SIRMS) Laboratory. These microfossils record information about the ocean they once inhabited, and tell stories of its chemistry and circulation patterns during geologically-warm periods. By analyzing geochemical data from a six-hundred-year-old coralline alga, John also made new discoveries about ocean-atmosphere interactions and nutrient supply to the Labrador Sea, and his work is currently in review for *Geophysical Research Letters*.



John and team at the K/Pg boundary in Gubbio, Italy, which marks the extinction of the dinosaurs

Messy mangroves mean more macroorganisms?

As part of her final year of research on the impact of macroplastic pollution on mangroves ecosystems, Ying Luo performed an experiment focused on the biodiversity and abundance of mangrove crabs and snails. She showed that the effects of additional debris coverage in controlled experimental quadrats had no significant effect on the mangrove faunal community. She concluded that especially the mangrove mollusc fauna is resilient to the presence of additional debris. Ying also presented her MPhil results as oral communications in four international conferences.



Ying presenting her work in Sri Lanka, at the ATBC-AP conference



*Katie collecting *Monodonta labio* in Tai Tam for toxicity testing of RAs*

Ecological risks of retinoic acids in urbanized coastal marine ecosystems

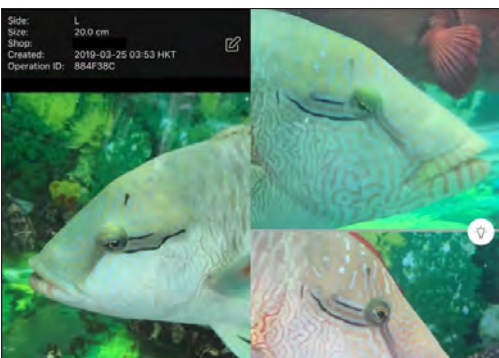
Retinoic acids (RAs) and their metabolites are well-known teratogens. Katie Yeung investigates their concentrations in coastal seawater and in sewage and sludge samples from sewage treatment plants of Hong Kong. She found that the sewage treatment processes can only partially remove RAs from wastewater, and hence the discharge of partially treated sewage effluents poses potential risks to coastal ecosystems. To comprehensively assess the ecological risk of RAs, Katie has been examining toxic effects of various RAs on marine organisms (e.g. gastropods and bivalves) and will examine their molecular toxic mechanisms in a marine copepod using transcriptomic approaches.



Qi is working on her study to track sources of microorganisms in environmental samples

Source tracking for environmental microbiomes

Apart from working on fish gut microbiome, Qi Huang also works on bioinformatic methods for tracking sources of different microorganisms in environmental samples. By combining the machine-learning classification ‘Source-Tracker’ and 16S RNA gene profiles of 15 diverse environmental sources (e.g. aerosols, animal faeces, human faeces, wastewater, surface waters etc.) from 3654 global-scale samples, Qi has developed a comprehensive model for identification of the uniqueness of each of the environmental sources in terms of its microbial composition, and prediction of the source of any unknown microbiome sample. Results of validation indicate that the sensitivity and specificity of the model’s prediction are 85% and >99%.



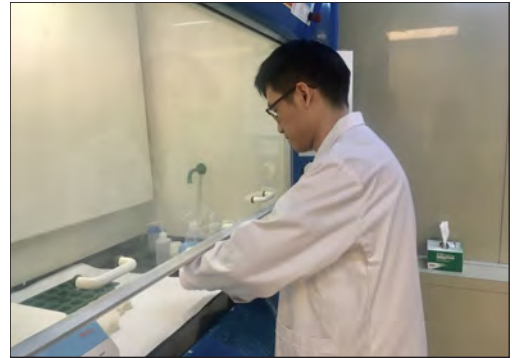
Interface of the mobile application that facilitates comparisons of facial markings of humphead wrasse

Facial recognition techniques to combat illegal trade of humphead wrasse in Hong Kong

Hong Kong is the trading hub of the huge, spectacular, but threatened and CITES-protected reef fish, the humphead wrasse, *Cheilinus undulatus*, popular in luxury seafood markets in Hong Kong and mainland China. Loby Hau has been collaborating with a local mobile application developer, *Corvidae*, to develop an application for facial recognition of individual humphead wrasse intended to assist enforcement by local government officials against illegal trade and support research in this species. Currently, the application facilitates recording and manual identification of distinctive and complex facial markings of the species and full development of the mobile app is now planned.

^{230}Th s- and ^{231}Pa s- rich sediment intervals in Arctic Ocean cores

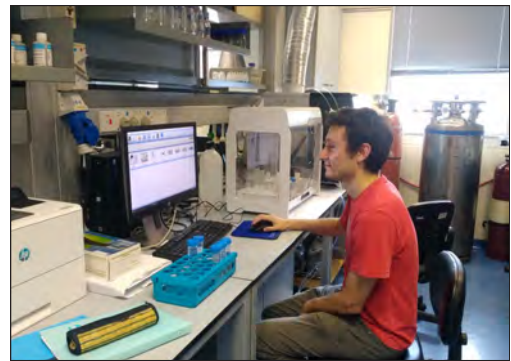
Elevated concentrations of excess ^{230}Th and ^{231}Pa in Arctic sediments (scavenged from seawater into sediments) have been used as indicators of deglacial/interglacial intervals due to their high particle flux. By comparing ^{230}Th s and ^{231}Pa s data with other sedimentological and geochemical properties in sediment cores from the western Arctic Ocean, Oliver Xu has found that ^{230}Th s- and ^{231}Pa s- rich sections are closely related to meltwater influxes. In particular, coinciding with low coarse fraction and depleted $\delta^{18}\text{O}$ signals, ^{230}Th s- and ^{231}Pa s- rich sediment intervals of deglacial sections in western Arctic cores may result from enhanced scavenging by fine-grained particles released from melting ice.



Oliver pretreating sediment samples

Two new paleo-proxies for shallow marine environments

Paleo-environmental reconstructions can help us to identify the potential impacts of climate change on marine ecosystems. E/Ca ratios of ostracod shells have been used as proxy of ocean parameters, such as Mg/Ca to reconstruct water temperature. Max Rodriguez is studying the chemistry of two Asian endemic species present in Hong Kong coastal waters. His study demonstrates that Mg/Ca of these two species can be used to reconstruct water temperature and Sr/Ca may be linked to salinity variations in Hong Kong waters. Max's work will allow us to perform better paleo-reconstructions of shallow marine environments in Asia, giving new clues about past marine conditions.



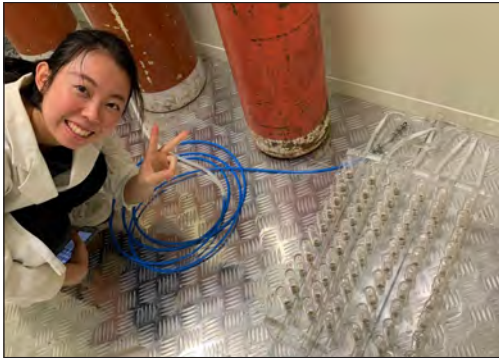
Max using ICP-MS to measure trace elements of ostracod shells in the School of Biological Sciences

Science-informed coral restoration

Reef restoration is gaining considerable attention amongst marine conservation practitioners. Yet, little is known about the science behind, as well as the adaptability, of overseas approaches in a local context, particularly in China and Southeast Asia, hindering the success and effectiveness of restoration efforts. Vriko Yu's research aims to form a biological and sociological scientific foundation in order to inform and execute restoration practices. Specifically, during her PhD, Vriko will investigate the population structure and connectivity of corals in the South China Sea; the physiological tradeoffs of micro-fragmentation; and evaluate the sustainability and adaptiveness of restoration practices in the region.



Acropora, a genus of staghorn corals which is an important reef architect yet globally threatened



Yvonne using the denitrifier bacteria method to look into the $\delta^{15}\text{N}$ and $\delta^{18}\text{O}$ of nitrate

Nitrogen isotope fingerprints from atmospheric deposition

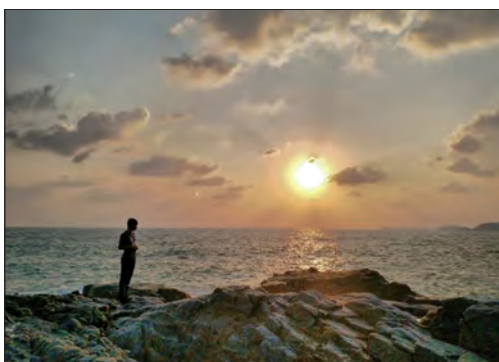
Atmospheric N deposition is a non-negligible source of nutrient supply from the land to coastal waters. Yvonne Yau collected precipitation and dry deposition samples from June 2018 to October 2019 in Hong Kong to estimate the inorganic nitrogen flux to Hong Kong coastal waters. $\delta^{15}\text{N}$ and $\delta^{18}\text{O}$ of nitrate of rain samples were analyzed to trace the potential sources of nitrogen. The $\delta^{15}\text{N}$ of NO_3^- in rain ranged from -4.1‰ to $+3.0\text{‰}$. The low $\delta^{15}\text{N}$ and high NO_3^- concentration from the air masses originating from the continent suggest a dominant influence of local gasoline and diesel combustion from Hong Kong and/or Shenzhen.



Cheryl sampling sea cucumbers in Tolo Harbour

The role of sea cucumbers in benthic nutrient cycling in subtropical ecosystems

Many species of sea cucumbers are overexploited in the wild meaning that our understanding of the ecological role of holothurians is generally lacking. Cheryl Chu is studying the role of sea cucumbers on nutrient cycling in nutrient enriched systems using *Holothuria leucospilota* as a model species. Results so far suggest that sea cucumbers might be capable of reducing organic loads in the sediment, even in highly eutrophic systems. Cheryl's study provides valuable insights into the important function of sea cucumbers in soft-sediment systems and the value of maintaining wild populations in Hong Kong.



Adrian standing on the rocky shore at Cape d'Aguilar

Thermal tolerance strategies of tropical high shore limpets

The tropical rocky shore is often considered one of the most physically stressful habitats, experiencing intense solar radiation when emersed. As a result, tropical intertidal organisms are often subject to intense heat and desiccation stresses. The limpet, *Lottia dorsuosa*, however, can persist at the highest levels of tropical rocky shores, splashed by the waves where the rocks are always emersed. To investigate how *L. dorsuosa* survives under such extreme conditions, Adrian Wong has assessed the cardiac performance and habitat usage of this limpet. Adrian has discovered that these limpets potentially suppress their metabolism at high temperatures to reduce energy expenditure and, as a result, increase their chance of post-stress survival.

Trophic ecology of terrestrial crabs of Hong Kong

Many crab species of marine origin are living in terrestrial environments, from mangroves to terrestrial forests. Christine Cheng is interested in the adaptations and ecology, especially trophic ecology, of terrestrial crabs. She will evaluate the diets and habitats of the two Hong Kong native forest dwelling crabs, namely the Red-clawed Crab (*Chiromantes haematocheir*) and the endemic *Pseudosesarma patshuni*. Christine is undertaking extensive fieldwork as well investigating the roles of symbiotic microorganisms in the digestion and assimilation of food. Her results will be useful in conserving these spectacular animals.



A male Chiromantes haematocheir climbing a tree in a Hong Kong coastal forest

Study of respiratory adaptations of terrestrial Brachyurans of Hong Kong

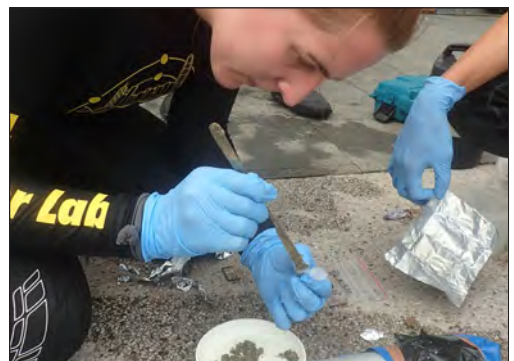
Terrestrialization refers to the process of aquatic animals gradually adapting to the terrestrial lifestyle, giving rise to the wide range of representatives of terrestrial groups, including Brachyuran crabs. This process shapes morphological and physiological changes, such as better respiratory performances in air. In theory, true crabs from a more terrestrial family are expected to breathe better in air than those with a lower level of terrestriality. Yet, Ka-Hei Ng's preliminary results show that the species belonging to the semi-terrestrial family Sesarmidae have a higher arterial oxygen content than the intertidal Ocypodidae when they breathe in air. To follow up this interesting finding the hemocyanin structure of the two families will be investigated using molecular approaches.



Ka Hei and Pedro studying the morphology of crab's gills under the microscope

Integrating sedimentary DNA into historical reconstructions of coral communities

Recent success metabarcoding ancient environmental DNA (aeDNA) preserved in coral reef sediments has introduced a new potential for identification of soft-bodied taxa previously undetectable in the historic record. This year, Alison Corley collected sediment cores from Hong Kong to pilot and refine the DNA extraction and amplification protocols she will be using to reconstruct historic baselines for Southern Taiwan. She ultimately hopes to use specific primers to target taxa of interest, such as coral and macroalgae. In the coming year, Alison will also be running controlled experiments to test the effect of environmental conditions and sediment characteristics on DNA preservation in marine sediments.



Alison sampling a core collected from San Wan to be used for DNA extractions



Skye with SWIMers on the field course in Okinawa

Ostracod responses to environmental changes during the PETM

The Paleocene-Eocene Thermal Maximum (PETM) is one of the most abrupt warming events in the Earth's history, and may be the best partial analog to future anthropogenic warming. The massive injection of carbon from unknown sources led to a global temperature rise of 5-8 °C. Focusing on this transient hyperthermal event, Skye Tian is studying two marine sediment cores from Maryland, USA and documenting prominent perturbations of the shallow-marine benthic ecosystem. Using the relatively well-preserved microfossils (i.e. ostracods and foraminifera), Skye has shown an abrupt faunal turnover associated with negative carbon isotope excursion at the Paleocene-Eocene boundary. Extreme warming and bottom water deoxygenation caused extinction during the peak PETM.



James sorting and distributing ocean acidification-induced F1 juveniles of Hong Kong oysters in the field

Oyster larvae display adaptive plasticity

Unlike most edible species, the Hong Kong oyster is quite resilient to ocean acidification (OA) thanks to its highly varying pH environment in estuarine habitats. This year, James Lim found that environmentally-induced DNA methylation contributes to explain the resilience of Hong Kong oyster larvae to OA at the time of their metamorphosis. The identified methylated genes and their related molecular pathways help explain the higher larval settlement rate and the capability of the larvae to choose and settle on a suitable habitat based on chemical cues from the biofilm. James is currently integrating RNA-seq and epigenome data to decipher adaptive plasticity of oysters to OA using multiple-generation experiments.



Bovern at the MRC Centre for Molecular Bacteriology and Infection, Imperial College London

Understanding eco-evolutionary dynamics of microorganisms in changing environments

To adapt in diverse environments, microorganisms have evolved different mechanisms to cope with varying challenges. Despite having substantial evidence of this, we still know relatively little of how they survive and persist in environments that are constantly changing. Furthermore, what are the consequences of environmental change on the interactions between microbes in a community and their associated host? Bovern Arromrak's PhD aims to address these questions using different systems, ranging from a simple single bacterial species such as *E. coli* up to a more complex system such as the host-associated microbial community to understand how these model systems respond and adapt to the ever-changing oceanic environment.

Enhancing ecological values of artificial seawalls via eco-engineering

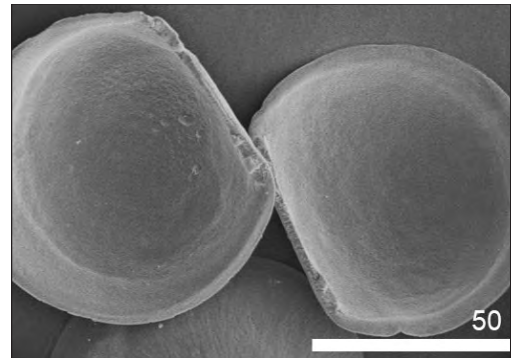
Because of the shortage of land supply, reclamation has been one of the major strategies to acquire land for development in Hong Kong and other urbanized coastal cities. However, artificial shorelines built with vertical and rip-rap sloping seawalls do not provide suitable habitats for intertidal marine organisms. This problem can be mitigated by installation of eco-engineered fixtures onto seawalls. Chi-Chiu Lo is investigating design criteria for various eco-engineered fixtures with a view to enhance biodiversity and ecosystem function (e.g. biofiltration and carbon storage) along artificial shorelines. So far, he has found that the eco-engineered fixtures with water retention and grooved surfaces can significantly increase marine biodiversity on seawalls.



Chi undertaking fieldwork at the eco-engineered shorelines

Evolution of bivalve shell formation under ocean acidification

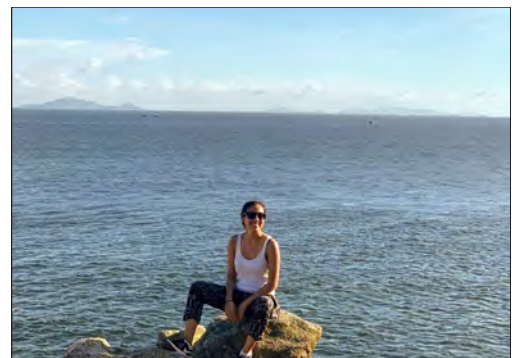
Shell matrix proteins are occluded within bivalve shells and play key roles in biologically controlled mineralization. Since information is lacking regarding shell proteins in the most sensitive larval stages, this year, Alessia Carini focused on the very first larval shell formation in the Hong Kong oyster. Alessia carried out artificial fertilization of adult oysters and cultured embryos until formation of the first larval shells under ambient and ocean acidification conditions. She then designed a methodology for preparing larval shells prior to shell proteomics and microstructural investigation. She will look for evolutionary conserved mechanisms and species-specific adaptations to ocean acidification in these early oyster life history stages.



A SEM of the interior Hong Kong oyster larval shell after removal of tissue

High-throughput molecular characterization of cooperative cleaning interactions under normal and climate change conditions

Sandra Ramirez's research aims to understand the molecular mechanisms of cleaning behaviour in marine fish and how environmental changes affect this cooperative interaction. Her model organisms are the cleanerfish *Labroides dimidiatus* and its client *Acanthurus leucosternon*. She will identify the molecular pathways involved in the cleaning behaviour and how these pathways might be affected with a change in environmental conditions (such as temperature and pH) by investigating differential gene expression patterns among brain regions. These results will help us understand the neurological underpinnings of this cooperation as a disruption can potentially have large-scale effects on the coral reef ecosystem.



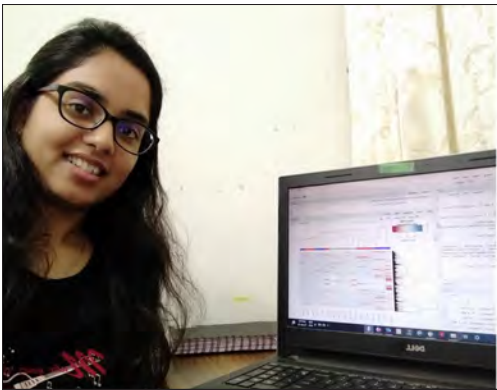
Sandra enjoying the sunshine during fieldwork



Arthur collecting fish specimens from a local twilight market

Impacts of mercy releases on local populations and the ecosystem

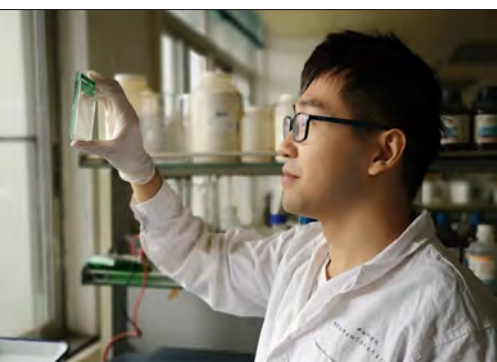
The hybrid grouper, a crossbreed between Tiger grouper (*Epinephelus fuscoguttatus*) and Giant grouper (*E. lanceolatus*), is now frequently being released into the wild through religious practices. It is speculated that this introduced species could have already established its own population and could impact the local ecosystem. It is also a concern that potential backcross of this hybrid with unknown origin to its parental species in the wild may be polluting the native genetic pool. To tackle this knowledge gap, Arthur Chung is going to analyse the wild population structure of the hybrid grouper within the South China Sea, and compare it with both parental species.



Sneha investigate differential gene expression response of Spiny Chromis to ocean acidification

Molecular mechanisms of intergenerational acclimation of marine organisms to ocean acidification

Ocean acidification, the decrease in the pH of oceans worldwide, is caused by the uptake of excess atmospheric CO₂ by oceans. This change in the ocean chemistry has significant consequences to the development and survival of marine organisms. However, several marine organisms have developed various mechanisms to cope with changing ocean pH. Sneha Suresh's research focuses on understanding the molecular mechanisms that enable organisms to acclimate to their changing environment and also investigating whether parental exposure can influence the offsprings' response to similar conditions. She mainly focuses on the transcriptomic and epigenetic basis of intergenerational acclimation.



Xin is checking the protein PAGE gel for western blot

Oyster immune responses to ocean acidification

Global climate change and anthropogenic degradation of coastal ecosystems have a profound impact on pathogen distribution in marine hosts, especially in the edible oyster. Our understanding of the interaction of the changing environment, microbial communities and host dynamics is pivotal but far from complete. Xin Dang is probing into the metabolic physiology, altering bacterial communities and anti-apoptotic immune armour in the oyster, as well as developing autophagy as a vital role in pathogenic defense. This research will illuminate physiological and immunological responses to diverse natural conditions in the oyster as an important species linked to human health and the economy.

Understanding mechanisms of phytoplankton acclimation and adaptation to environmental stress

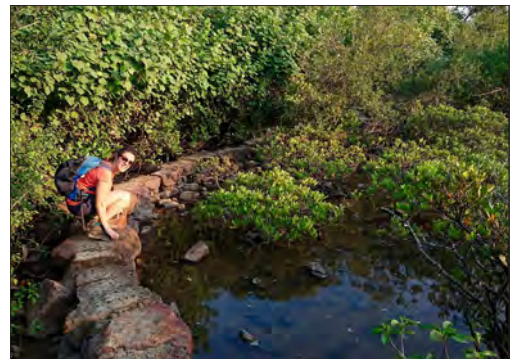
Phytoplankton contribute around 40% of global primary production due to their fast growth and quick responses to environmental change. Due to climate change, more attention is being placed on studying the ability and mechanisms of phytoplankton to respond to environmental stress. However, the gap between phenotypic plasticity and evolutionary adaptation has not been clearly demonstrated. Therefore, Zhenzhen Li's project will focus on revealing the mechanisms and effects of the plasticity and adaptive evolution of phytoplankton responding to environmental stress, especially thermal stress. Through his research, he will provide insights into the mechanisms and trade-offs of evolutionary adaptation of phytoplankton to environmental stress.



Zhen collecting samples of macroalgae at Nanao Island in Shantou, China

Role of environmental conditions and microbial communities on carbon cycle and storage in wetlands

Laetitia Allais joined SWIMS as a PhD candidate in September to work in the Environmental & Geochemistry research group. Her research investigates the role of environmental conditions and microbial communities on the carbon cycle and carbon storage in wetlands. Currently, she is undertaking fieldwork in different wetlands around Hong Kong. She will use techniques in stable isotopes and microbiology to assess the composition and function of the sediment microbial community and its interaction with the geochemical cycles of carbon and sulphur.



Laetitia surrounded by mangrove trees in Hoi Ha Wan, Hong Kong

Conservation

SWIMS and Reef Check

Thanks to the financial support from SWIMS and the passion from our volunteers to promote marine conservation, we made our 19th participation of the Reef Check program run by AFCD this year. A group of 15 volunteers conducted surveys on coral coverage with the abundance of fish and invertebrate species at Siu Long Ke. Our team recorded a 37% coral coverage with a nice diversity of fishes and invertebrates. Data will contribute towards the long-term monitoring of coral health in Hong Kong run by the Reef Check Programme. Many thanks to the hard work from our volunteers and we look forward to seeing you all on board next year as a member of the SWIMS Reef Check team.



SWIMS Reef Check team 2019



A tower of littorinid snails at low water in Thailand

Research Opportunities

Research Visitors

The Swire Institute of Marine Science offers three major sources of funding to support researchers wanting to visit SWIMS to undertake research. For enquiries, please contact the Director, Gray A Williams.

The Laurence Caplin Scholarship in Marine Biology

Established in memory of Laurence Caplin by his widow, Mrs E Caplin and daughter, Mrs J Woodford, to bring young people to SWIMS to undertake research in marine biology with a resident staff member.

The Intertidal Trust Fund

Established in 1982 with profits from the book 'The Seashore Ecology of Hong Kong', grants from the Intertidal Trust Fund can be made to overseas students and scientists who wish to undertake research on intertidal ecology at SWIMS.

Cape d'Aguilar Trust Fund

Established in 1995 with profits from the book 'An Introduction to the Cape d'Aguilar Marine Reserve, Hong Kong', grants from the Cape d'Aguilar Trust Fund can be made to local or overseas students and scientists who wish to undertake marine biological research on the Cape d'Aguilar Marine Reserve at SWIMS.

Higher Degrees (M.Phil / Ph.D)

Students who are interested in undertaking a research postgraduate degree (M.Phil or Ph.D) in marine biology and ecology should directly contact SWIMS academic staff for more information regarding individual projects.

Student Research Assistantships/Internships

Undergraduate students holding a permanent Hong Kong identity card are encouraged to apply to work as volunteer student research assistants during the semester breaks/summer holidays. Undergraduate students from both local and overseas institutions who are enrolled in a degree programme, which requires the completion of an internship, may also contact us to discuss how we can facilitate that requirement. Interested students should contact SWIMS Secretary, Ms Sylvia Yiu.



Aerial view of the Old Residence and Cape d'Aguilar Lighthouse

Accommodation

SWIMS residential blocks are situated on top of the Cape d'Aguilar cliffs. Accommodation at the Residence is available for students, researchers and visitors working at SWIMS. Those interested in booking the accommodation should contact SWIMS Secretary, Ms Sylvia Yiu.

SWIMS Publications (Jan - Dec 2019)

- ArchaeoGLOBE Project (2019). Archaeological assessment reveals Earth's early transformation through land use. *Science* 365: 897-902
- Bann S, Ballantine R, McCallion C, Qian PY, Li YX, Cochrane SA (2019) Chemical-intervention strategy to circumvent peptide hydrolysis by D-Stereoselective peptidases. *Journal of Medicinal Chemistry* 62: 10466-10472
- Bellino A, Mangano MC, Baldantoni D, Russell BD, Mannino AM, Vizzini S, Mazzola A, Sarà G (2019) Seasonal patterns of biodiversity in Mediterranean coastal lagoons. *Diversity and Distributions* 25: 1512-1526
- Bonebrake TC, Guo F, Dingle C, Baker DM, Kitching RL, Ashton LA (2019) Integrating proximal and horizon threats for conservation. *Trends in Ecology & Evolution* DOI: 10.1016/j.tree.2019.04.001
- Bray MS, Wu J, Padilla CC, Stewart FJ, Fowle DA, Henny C, Simister RL, Thompson KJ, Crowe SA, Glass JB (2019) Phylogenetic and structural diversity of aromatically dense pili from environmental metagenomes. *Environmental Microbiology Reports*. DOI:10.1111/1758-2229.12809
- Burkpile DE, Shantz AA, Adam TC, Munsterman KS, Speare KE, Ladd MC, Rice MM, McIlroy SE, Wong JCY, Baker DM, Brooks AJ, Schmitt RJ, Holbrook SJ (2019) Nitrogen source drives differential impacts of nutrients on coral bleaching prevalence, duration, and mortality. *Ecosystems* DOI: 10.1007/s10021-019-00433-2
- Byrne P, Gaitan-Espitia JD, Silla A (2019) Genetic benefits of extreme sequential polyandry in a terrestrial-breeding frog. *Evolution* 73: 1972-1985
- Cannicci S, Mostert B, Fratini S, McQuaid C, Porri F (2019) Recruitment limitation and competent settlement of sesamid crab larvae within East African mangrove forests. *Marine Ecology Progress Series* 626: 123-133
- Carini A, Koudelka T, Tholey A, Appel E, Gorb SN, Melzner F, Ramesh K (2019) Proteomic investigation of the blue mussel larval shell organic matrix. *Journal of Structural Biology*. DOI: 10.1016/j.jsb.2019.09.002
- Chan HSH, Dingle C, Not C (2019) Evidence for non-selective ingestion of microplastic in demersal fish. *Marine Pollution Bulletin* 149: 110523
- Chapman ASA, Beaulieu SE, Colaço A, Gebbruk AV, Hilario A, Kihara TC, Ramirez-Llodra E, Sarrazin J, Tunnicliffe V, Amon DJ, Baker MC, Boschen-Rose RE, Chen C, Cooper IJ, Copley JT, Corbari L, Cordes EE, Cuvelier D, Duperron S, Du Preez C, Gollner S, Horton T, Hourdez S, Krylova EM, Linse K, LokaBharathi PA, Marsh L, Matabos M, Mills SW, Mullineaux LS, Rapp HT, Reid WDK, Rybakova (Goroslavskaya) E, Thomas TRA, Southgate SJ, Stöhr S, Turner PJ, Watanabe HK, Yasuhara M, Bates AE (2019) sFDvent: A global trait database for deep-sea hydrothermal-vent fauna. *Global Ecology and Biogeography* 28: 1538-1551
- Chaste E, Girardin MP, Kaplan JO, Bergeron Y, Hély C (2019) Increases in heat-induced tree mortality could drive reductions of biomass resources in Canada's managed boreal forest. *Landscape Ecology* 34: 403-426
- Chen J, McIlroy SE, Archana A, Baker DM, Panagiotou G (2019) A pollution gradient shapes the microbiome, functionome and resistome in marine sediments. *Microbiome* 7: 104
- Cheung RCW, Yasuhara M, Iwatani H, Wei CL, Dong YW (2019) Benthic community history in the Changjiang (Yangtze River) mega-delta: damming, urbanization, and environmental control. *Paleobiology* 45: 469-483
- Connell SD, Verges A, Nagelkerken I, Russell BD, Shears N, Wernberg T, Coleman MA (2019) The past and future ecologies of Australasian kelp forests. In: *Interactions in the Marine Benthos – global patterns and processes*. Hawkins SJ, Bohn K, Firth LB, Williams GA (eds), Vol 87 Systematics Association, Cambridge University Press. pp.414-430
- Crickenberger S, Hui TY, Landry Yuan F, Bonebrake TC, Williams GA (2019) Preferred temperature of intertidal ectotherms: broad patterns and methodological approaches. *Journal of Thermal Biology* 102468
- De Grande FR, Cannicci S, Costa TM (2019) Can fiddler crabs detect underwater predators? A laboratory test with *Leptuca thayeri*. *Ethology Ecology & Evolution* 31: 86-97
- Di Martino E, Taylor PD, Fernando AGS, Kase T, Yasuhara M (2019) First bryozoan fauna from the middle Miocene of Central Java, Indonesia. *Alcheringa* 43: 461-478
- Donelson JM, Sunday JM, Figueira W, Gaitan-Espitia JD, Hobday AJ, Johnson C, Leis J, Ling S, Marshall D, Pandolfi JM, Pecl G, Rodgers GG, Booth D, Munday PL (2019) Understanding interactions between plasticity, adaptation and range shifts in response to marine environmental change. *Philosophical Transactions of the Royal Society B* 374: (1768), 20180186
- Duprey NN, Wang XT, Kim T, Cybulski JD, Vonhof HB, Crutzen PJ, Haug GH, Sigman DM, Martínez-García A, Baker DM (2019) Megacity development and the demise of coastal coral communities: evidence from coral skeleton $\delta^{15}\text{N}$ records in the Pearl River estuary. *Global Change Biology* DOI: 10.1111/gcb.14923
- Firth LB, Bohn K, Williams GA, Hawkins SJ (2019) Introduction. In: *Interactions in the marine benthos – global patterns and processes*, Hawkins SJ, Bohn K, Firth LB, Williams GA (eds), Vol 87 Systematics Association, Cambridge University Press. pp.1-6
- Fitzer SC, Chan VBS, Meng Y, Chandra Rajan K, Suzuki M, Not C, Toyofuku T, Falkenberg Laura, Byrne M, Harvey BP, De wit P, Cusack M, Gao KS, Taylor P, Dupont S, Hall-Spencer J, Thiyagarajan V (2019) Established and emerging techniques for characterising the formation, structure and performance of calcified structures under ocean acidification. *Oceanography and Marine Biology: an Annual Review* 57: 89-126
- Fox JR, Donelson JM, Schunter C, Ravasi T, Gaitan-Espitia JD (2019) Beyond buying time: the role of plasticity in phenotypic adaptation to rapid environmental change. *Philosophical Transactions of the Royal Society B* 374: 20180174
- Fratini S, Cannicci S, Porri F, Innocenti G (2019) Revision of the *Parasesarma guttatum* species complex reveals a new pseudocryptic species in south-east African mangroves. *Invertebrate Systematics* 33: 208-224
- Gaitan-Espitia JD, Gonzalez-Wevar C, Poulin E, Cardenas L (2019) Antarctic and sub-Antarctic *Naella* limpets reveal novel evolutionary characteristics of mitochondrial genomes in Patellogastropoda. *Molecular Phylogenetics and Evolution* 131: 1-7
- Gilgen A, Wilkenskjeld S, Kaplan JO, Kühn T, Lohmann U (2019) Effects of land use and anthropogenic aerosol emissions in the Roman Empire. *Climate of the Past* 15: 1885-1911
- Grenier M, François R, Soon M, Rutgers van der Loeff M, Yu X, Valk O, Not C, Moran SB, Edwards RL, Lu Y, Lepore K, Allen SE (2019) Changes of circulation and particle distribution in the Amerasian Basin of the Arctic Ocean inferred from geochemical radioactive and radiogenic tracers measured over the last three decades. *Journal of Geophysical Research: Oceans* DOI: 10.1029/2019JC015265
- Han G, Cartwright SR, Ganmanee M, Chan BKK, Adzis KAA, Hutchison N, Wang J, Hui TY, Williams GA, Dong Y (2019) High thermal stress responses of *Echinolittorina* snails at their range edge predict population vulnerability to future warming. *Science of the Total Environment* 647: 763-771
- Hau CY, Sadovy de Mitcheson Y (2019) A facial recognition tool and legislative changes for improved enforcement of the CITES Appendix II listing of the humphead wrasse, *Cheilinus undulatus*. *Aquatic Conservation: Marine and Freshwater Ecosystems* 29: 2071-2091
- Hawkins SJ, K Bohn, Lemasson AJ, Williams GA, Schiel DR, Jenkins SR, Firth LB (2019) Overview and synthesis. In: *Interactions in the Marine Benthos – global patterns and processes*. Hawkins SJ, Bohn K, Firth LB, Williams GA (eds), Vol 87 Systematics Association, Cambridge University Press. pp.488-505
- Ho NHE, Not C (2019) Selective accumulation of plastic debris at the breaking wave area of coastal waters. *Environmental Pollution* 245: 702-710

- Hong Y, Yasuhara M, Iwatani H, Mamo M (2019) Baseline for ostracod-based northwestern Pacific and Indo-Pacific shallow-marine paleoenvironmental reconstructions: ecological modeling of species distributions. *Biogeosciences* **16**: 585-604
- Huang HHM, Yasuhara M, Iwatani H, Yamaguchi T, Yamada K, Mamo B (2019) Deep-sea ostracod faunal dynamics in a marginal sea: biotic response to oxygen variability and mid-Pleistocene global changes. *Paleobiology* **45**: 85-97
- Hui TY, Wong KJH (2019) Tropical sand-bubblers heading north? First discovery of *Scopimera curtelsona* Shen, 1936 (Crustacea: Decapoda: Dotillidae) populations in Hong Kong: possible range expansion from Hainan, China. *Zootaxa* **4652**: 520-532
- Hui TY, Landry Yuan F, Bonebrake TC, Williams GA (2019) Multifunctional behaviour in a sandy shore crab enhances performance in extreme intertidal environments. *Oecologia* **189**: 79-89
- Jöst AB, Yasuhara M, Wei CL, Okahashi H, Ostmann A, Martínez Arbizu P, Mamo B, Svavarsson J, Brix S (2019) North Atlantic Gateway: test bed of deep-sea macroecological patterns. *Journal of Biogeography* **46**: 2056-2066
- Kaplan JO, Lau H-K (2019) The WGLC global gridded monthly lightning stroke density and climatology. *PANGAEA*. DOI: 10.1594/PANGAEA.904253
- Kay AU, Fuller DQ, Neumann K, Eichhorn B, Höhn A, Morin-Rivat J, Champion L, Linseele V, Huysecom E, Ozainne S, Lespez L, Biagetti S, Madella M, Salzmann U, Kaplan JO (2019) Diversification, intensification and specialization: changing land use in Western Africa from 1800 BC to AD 1500. *Journal of World Prehistory*. DOI:10.1007/s10963-019-09131-2
- Khan NS, Horton BP, Engelhart S, Rovere A, Vacchi M, Ashe EL, Törnqvist TE, Dutton A, Hijma MP, Shennan I (2019) Inception of a global atlas of sea levels since the Last Glacial Maximum. *Quaternary Science Reviews* **220**: 359-371
- Lachs L, Mohd Johari NA, Le DQ, Bachok Z, Mohd Safuan CD, Tanaka K, Baker DM, Duprey NN, Ory NC, Kochzius M, Hong TC, Shirai K (2019) Effects of tourism-derived sewage on coral reefs: isotopic assessments identify effective bioindicators. *Marine Pollution Bulletin* **148**: 85-96
- Lai NLS, Kwok KY, Wang XH, Yamashita N, Liu GJ, Leung KMY, Lam PKS, Lam JCW (2019) Assessment of organophosphorus flame retardants and plasticizers in aquatic environments of China (Pearl River Delta, South China Sea, Yellow River Estuary) and Japan (Tokyo Bay). *Journal of Hazardous Materials* **371**: 288-294
- LaRoche CK, Goldstein BR, Cybulski JD, Raymundo LJ, Aoki LR, Kim K (2019) Decade of change in *Enhalus acoroides* seagrass meadows in Guam, Mariana Islands. *Marine and Freshwater Research* **70**: 246-254
- Lau ETC, Leung KMY, Karraker NE (2019) Native amphibian larvae exhibit higher thermal tolerance but lower performance than their introduced predator *Gambusia affinis*. *Journal of Thermal Biology* **81**: 154-161
- Leung JYS, Russell BD, Connell SD (2019) Adaptive responses of marine gastropods to heatwaves. *One Earth* **1**: 374-381
- Levin LA, Wei C-L, Dunn DC, Amon D, Ashford O, Cheung W, Colaço A, Escobar E, Guilloux B, Harden-Davies H, Drazen JC, Gjerde K, Ismail K, Jones D, Johnson D, Le J, Lejzerowicz F, Mitarai S, Morato T, Mulow S, Snelgrove P, Sweetman AK, Yasuhara M (2019) Climate change considerations are fundamental to sustainable management of deep-seabed mining (Policy brief). Deep Ocean Stewardship Initiative (DOSI)
- Lim Y-K, Keng FS-L, Phang S-M, Sturges WT, Malin G, Abd Rahman N (2019) Effect of irradiance on the emission of short-lived halocarbons from three common tropical marine microalgae. *PeerJ*. DOI: e6758. DOI: <https://doi.org/10.7717/peerj.6758>
- Lui Y, Not C, Jiao JJ, Liang W, Lu M (2019) Tidal induced dynamics and geochemical reactions of trace metals (Fe, Mn, and Sr) in the salinity transition zone of an intertidal aquifer. *Science of the Total Environment* **664**: 1133-1149
- Macreadie PI, Anton A, Raven JA, Beaumont N, Connolly RM, Friess DA, Kelleway JJ, Kennedy H, Kuwae T, Lavery PS, Lovelock CE, Smale DA, Apostolaki ET, Atwood TB, Baldock J, Bianchi TS, Chmura GL, Eyre BD, Fourqurean JW, Hall-Spencer JM, Huxham M, Hendriks IE, Krause-Jensen D, Laffoley D, Luisetti T, Marbà N, Masque P, McGlathery KJ, Megoñigal PJ, Murdiyarso D, Russell BD, Santos R, Serrano O, Silliman BR, Watanabe K, Duarte CM (2019) The future of Blue Carbon science. *Nature Communications* **10**: 3998
- McDonald K, Hobday A, Gaitan-Espitia JD (2019) Inter-disciplinary, multi-scale science to support society to adapt under global change. *Marine and Freshwater Research* **70**: 1-15
- McIlroy SE, Cunnig R, Baker AC, Coffroth MA (2019) Competition and succession among coral endosymbionts. *Ecology and Evolution* **9**: 12767-12778
- McIlroy SE, Thompson PD, Landry Yuan F, Bonebrake TC, Baker DM (2019) Subtropical thermal variation supports persistence of corals but limits productivity of coral reefs. *Proceedings of the Royal Society B* **286**: 20190882
- Meng Y, Guo Z, Yao H, Yeung KWK, Thiagarajan V (2019) Calcium carbonate crystal unit realignment acts as compensatory physiological mechanism for acidification tolerance in the estuarine edible oyster species. *Marine Pollution Bulletin* **139**: 141-149
- Meng Y, Li C, Li H, Shih K, He C, Yao H, Thiagarajan V (2019) Recoverable impacts of ocean acidification on the tubeworm, *Hydroides elegans*: implication for biofouling in future coastal oceans. *Biofouling* **35**: 945-957
- Morris RL, Heery EC, Loke LHL, Lau ETC, Strain EM, Airoidi L, Alexanders KA, Bishop MJ, Coleman RA, Cordell JR, Dong YW, Firth LB, Hawkins SJ, Heath T, Kokora M, Lee SY, Miller JK, Perkol-Finkel S, Rella A, Steinberg PD, Takeuchi I, Thompson RC, Todd P, Toft JD, Leung KMY (2019) Design options, implementation issues and evaluating success of ecologically-engineered shorelines. *Oceanography and Marine Biology: an Annual Review* **57**: 169-228
- Munday P, Schunter C, Allan B, Nicol S, Parsons D, Pether S, Ravasi T, Setiawan A, Smith N & Domingos J (2019) Testing the adaptive potential of yellowtail kingfish to ocean warming and acidification. *Frontiers in Ecology and Evolution* **7**: 253
- Ng TPT, Rolan-Alvarez E, Saltin Dahlen S, Davies MS, Estévez D, Stafford R, Williams GA (2019) The causal relationship between sexual selection and sexual size dimorphism in marine gastropods. *Animal Behaviour* **148**: 53-62
- Perkins MJ, Mak YKY, Law CSW, Tao LSR, Yau JKC, Leung KMY (2019) Length-weight relationships of 79 marine fish species from the coastal waters of Hong Kong. *Journal of Applied Ichthyology* **35**: 779-788
- Schunter C, Macpherson E, Raventos N, Garriga J, Garza JC, Bartumeus F, Pascual M (2019) A novel integrative approach elucidates fine-scale dispersal patchiness in marine populations. *Scientific Reports* **9**: 10796
- Schunter C, Ravasi T, Munday PL, Nilsson G (2019) Neural effects of elevated CO₂ in fish may be amplified by a vicious cycle. *Conservation Physiology* DOI: 10.1093/conphys/coz100
- Shin CP, Yasuhara M, Iwatani H, Kase T, Fernando AGS, Hayashi H, Kurihara Y, Pandita H (2019) Neogene marine ostracod diversity and faunal composition in Java, Indonesia: Indo-Australian Archipelago biodiversity hotspot and the Pliocene diversity jump. *Journal of Crustacean Biology* **39**: 244-252
- Stark JS, Peltzer ET, Kline DI, Queirós AM, Cox TE, Headley K, Gaitan-Espitia JD, Kirkwood W, Gattuso JP (2019) Free Ocean CO₂ Enrichment (FOCE) experiments: scientific and technical recommendations for future *in situ* ocean acidification projects. *Progress in Oceanography* **172**: 89-107
- Tanaka H, Lelièvre Y, Yasuhara M (2019) *Xylocythere sarrazinae*, a new cytherid ostracod (Crustacea) from a hydrothermal vent field on the Juan de Fuca Ridge, northeast Pacific Ocean, and its phylogenetic position within Cytheroidea. *Marine Biodiversity* **49**(6): 2571-2586

- Trowbridge CD, Little C, Plowman CQ, Williams GA, Pilling GM, Morrill D, Rivera Vázquez Y, Dlouhy-Massengale B, Cottrell DM, Stirling P, Harman L, McAllen R (2019) No 'silver bullet': multiple factors control population dynamics of European purple sea urchins in Lough Hyne Marine Reserve, Ireland. *Estuarine and Coastal Shelf Science* **226**: 106271
- Vellwock AE, Fu J, Meng Y, Thiyagarajan V, Yao H (2019) A data-driven approach to predicting the attachment density of biofouling organisms. *Biofouling* **35**: 832-839
- Wang Z, Ho KKY, Zhou GJ, Yeung KKY, Leung KMY (2019) Effects of silver and zinc on tropical freshwater organisms: implications on water quality guidelines and ecological risk assessment. *Chemosphere* **225**: 897-905
- Wang Z, Kwok KWH, Leung KMY (2019) Comparison of temperate and tropical freshwater species' acute sensitivities to chemicals: an update. *Integrated Environmental Assessment and Management* **15**: 352-363
- Wang Z, Lui GCS, Burton GA Jr, Leung KMY (2019) Thermal extremes driven by climate change can intensify chemical toxicity to freshwater organisms and hence impact their communities. *Chemosphere* **224**: 256-264
- Weiberg E, Hughes RE, Finné M, Bonnier A, Kaplan JO (2019) Mediterranean land use systems from prehistory to antiquity: a case study from Peloponnese (Greece). *Journal of Land Use Science* **14**: 1-20
- Williams GA, Chan BKK, Dong Y-W (2019) Rocky shores of mainland China, Taiwan and Hong Kong: past, present and future. In: *Interactions in the Marine Benthos – global patterns and processes*. Hawkins SJ, Bohn K, Firth LB, Williams GA (eds), Vol 87 Systematics Association, Cambridge University Press. pp.360-390
- Wong CWM, Conti-Jerpe IE, Raymundo LJ, Dingle CE, Ponzo A, Baker DM (2019) Whale shark ecotourism: impacts on coral reefs in the Philippines. *Environmental Management* **63**: 282-291
- Wong J, Gaitan-Espitia JD, Hofmann G (2019) Transcriptional profiles of early stage red sea urchins (*Mesocentrotus franciscanus*) reveal differential regulation of gene expression across development. *Marine Genomics* **48**: 100692
- Yan WT, Lau CP, Leung KMY, Davies SNG (2019) Problems and prospects of revitalizing marine pearl cultivation in highly urbanized coasts: a case from Tolo Harbour in Hong Kong. *Regional Studies in Marine Science* **31**: 100756
- Yasuhara M, deMenocal PB, Dwyer GS, Cronin TM, Okahashi H, Huang HHM (2019) North Atlantic intermediate water variability over the past 20,000 years. *Geology* **47**: 659-663
- Yasuhara M, Hong Y, Tian ST, Chong WK, Okahashi H, Littler K, Cotton L (2019) Eocene shallow-marine ostracods from Madagascar: southern end of the Tethys? *Journal of Systematic Palaeontology* **17**: 705-757
- Yasuhara M, Hunt G, Okahashi H (2019) Quaternary deep-sea ostracods from the north-western Pacific Ocean: global biogeography and Drake-Passage, Tethyan, Central American and Arctic pathways. *Journal of Systematic Palaeontology* **17**: 91-110
- Yasuhara M, Rabalais NN, Conley DJ, Gutiérrez D (2019) Palaeo-records of histories of deoxygenation and its ecosystem impact. In: *Ocean deoxygenation: everyone's problem – causes, impacts, consequences and solutions*. Laffoley D, Baxter JM (eds), IUCN, Gland. pp.213-224
- Zhang AQ, Zhou GJ, Lam MHW, Leung KMY (2019) Toxicities of Irgarol 1051 derivatives, M2 and M3, to two marine diatom species. *Ecotoxicology and Environmental Safety* **182**: 109455
- Zhang AQ, Zhou GJ, Lam MHW, Leung KMY (2019) Toxicities of the degraded mixture of Irgarol 1051 to marine organisms. *Chemosphere* **225**: 565-573
- Zhou GJ, Lai RWS, Sham RCT, Lam CS, Yeung KKY, Astudillo JC, Ho KKY, Yung MMN, Yau JKC, Leung KMY (2019) Accidental spill of palm stearin poses relatively short-term ecological risks to a tropical coastal marine ecosystem. *Environmental Science and Technology* **53**: 12269-12277
- Zhou GJ, Li XY, Leung KMY (2019) Retinoids and oestrogenic endocrine disrupting chemicals in saline sewage treatment plants: removal efficiencies and ecological risks to marine organisms. *Environment International* **127**: 103-113

Other Contributions from SWIMS

David Baker

Director, HKU Stable Isotope Ratio Mass Spectrometry Laboratory (SIRMS)

Chairman, MarineGEO Partnerships Committee

Associate Editor, *Frontiers in Ecology & Evolution; Coevolution*

Stefano Cannicci

Member, IUCN SSC Mangrove Specialist Group

Fellow, Royal Institute of Navigation

Member, Biodiversity Strategy and Action Plan (BSAP) Marine Biodiversity Working Group, HKSAR

Member, Mai Po Management Committee, HKSAR

Member, Italian Union of Zoologists

Member, Italian Society of Ethology

Kenny Leung

Member, Biology and Medicine Panel (Joint Research Schemes), Research Grants Council

Member, Institute Council, Technological and Higher Education Institute of Hong Kong

Chairman, Nature Conservation Sub-Committee under Advisory Council on the Environment

Member, Professional Liaison Group for Tung Chung New Town Extension, Civil Engineering and Development Department

Member, International Scientific Advisory Committee of the Chinese Research Academy of Environmental Sciences, China

Co-Editor-in-Chief, *Regional Studies in Marine Science*

Subject Editor and Founding Editorial Board Member, *Integrated Environmental Assessment and Management*

Subject Editor, *Environmental Science and Pollution Research*

Member of Editorial Board, *Marine Pollution Bulletin*, *Canadian Journal of Zoology, Toxicology and Environmental Health Sciences*, and *Ocean Science Journal*

Member, Advisory Council on the Environment, HKSAR Government

Member, Advisory Council on Food and Environmental Hygiene, HKSAR Government

Chairman, Marine Mammal Conservation Working Group, HKSAR Government

Chairman, Marine Parks Committee, HKSAR Government

Member, Country and Marine Parks Board, HKSAR Government

Member, Board of Directors of the Ocean Park Corporation

Trustee, Ocean Park Conservation Foundation Hong Kong

Chairman, Fisheries Enhancement Fund Management Committee

Member, Steering Committee for the Marine Ecology and Fisheries Enhancement Fund

Member, Town Planning Appeal Board Panel

Member, Red Tide/Harmful Algal Bloom Expert Advisory Group, HKSAR Government

Member, The Outstanding Young Persons' Association

Examiner and Founding Fellow, Hong Kong Institute of Qualified Environmental Professionals

Founder and Adviser, Environmental Management Association of Hong Kong

Coordinator, Joint University Consortium on Biodiversity, Ecology and Conservation of Marine Ecosystems (BECOME), Hong Kong

Member, Management Committee of State Key Laboratory of Marine Pollution

Honorary Adviser, The Hong Kong Union of Youth Leaders

Bayden Russell

Academic Editor, *PLoS ONE*
Editor, *Oceanography and Marine Biology: an Annual Review*
Lead Editor, *Marine Ecology Progress Series* Theme Section
Chair, Scientific Research Sub-Committee, Hong Kong Marine Ecological Association
Member, Steering Committee, Hong Kong Marine Ecological Association

V ThiyagaRajan

Council Member, Hong Kong Proteomics Society
Academic Editor, *PLoS ONE*
Editor (Review), *Aquatic Biology*
Contributing Editor, *Aquaculture Environment Interactions*
Academic Member, State Key Laboratory of Marine Pollution
Founder and Chairman of symposium series, Interdisciplinary Symposium on Ocean Acidification and Climate Change (ISOACC)

Gray A Williams

Guest Professor, The University of Xiamen
Chairman, International Advisory Committee of the Dongshan Swire Marine Station (D-SMART)
Visiting Lecturer, Zoology Fieldcourse to Tsitsikamma Marine Reserve, 4-10 Mar 2019, University of Johannesburg, South Africa
Visiting Professor, 9-13 Dec 2019, Prince Songkla University Thailand
Editorial Board Member, *Journal of Thermal Biology*
Subject Editor, *Zoological Studies*

Moriaki Yasuhara

The 20th Biwako Prize for Ecology
Chair, International Research Group on Ostracoda (IRGO)
Scientific Committee Member, bioDISCOVERY, Future Earth
Member, Global Ocean Oxygen Network (GO2NE),
IOC-UNESCO Trustee, the Deep-Sea Biology Society
Vice Chair, Society of Friends of IRGO (SF*IRGO)
Editorial Board Member, *Global and Planetary Change; Marine Micropaleontology; Open Quaternary*
Associate Editor, *Palaeeoworld; Marine Biodiversity; Paleontological Research*
Editor, *Plankton and Benthos Research*

Conferences and Workshops

David Baker

Oral Presentation; 4th Xiamen Symposium on Marine Environmental Sciences, 6-9 Jan 2019, Xiamen, China.
Participant; The 11th UCAS Postgraduate Symposium, 24-29 Mar 2019, Kaohsiung, Taiwan.
Participant; MarineGEO Meeting, 2-5 Apr 2019, Virginia, USA.
Participant; ISOCAMP, 10 -21 Jun 2019, Utah, USA.
Instructor; Stable Isotope Short Course, 13-18 Aug 2019, HKU, Hong Kong.
Participant; American Geophysical Union, 9-13 Dec 2019, San Francisco, USA.

Stefano Cannicci

Organizing Committee and Oral Presentation; The Crustacean Society Mid-Year Meeting, 26-30 May 2019, CUHK, Hong Kong.
Scientific Committee and Oral Presentation; 5th International Mangrove, Macrobenthos and Management Meeting, 1-5 Jul 2019, Singapore.
Participant; Post-MMM5 Workshop, 7-11 Jul 2019, Pulau Tioman, Malaysia.

Sean Crowe

Keynote Lecture; Gordon Research Conference on Applied and Environmental Microbiology, 14-19 Jul 2019, South Hadley, USA.
Keynote and Invited Lecture; Goldschmidt Meeting, 18-23 Aug 2019, Barcelona, Spain.

JD Gaitan-Espitia

Oral Presentation; 4th Global Ocean Acidification Observing Network International Workshop, 14-17 Apr 2019, Hangzhou, China.
Oral Presentation; Species on the Move, 22-26 Jul 2019, Kruger National Park, South Africa.

Naomi Geeraert

Oral Presentation; 4th Xiamen Symposium on Marine Environmental Sciences, 6-9 Jan 2019, Xiamen, China.
Poster Presentation; What Can We Learn From N₂O Isotope Data, 23 -24 Oct 2019, Dübendorf, Switzerland.

Isis Guibert

Invited Speaker; Marine Molecular Ecology Gordon Research Symposium, 13-19 Jul 2019, HKUST, Hong Kong.
Poster Presentation; 1st Gordon Research Conference on Marine Molecular Ecology, 21-26 Jul 2019, HKUST, Hong Kong.
Participant; Stable Isotope Ecology Postgraduate Short Course, 7-11 Oct 2019, HKU, Hong Kong.

Ashley Hemraj

Organizing Committee and Oral Presentation; 12th International Temperate Reef Symposium, 6-10 Jan 2019, HKU, Hong Kong.

Yuanyuan Hong

Oral Presentation; 9th European Ostracodologists' Meeting, 19-22 Jul 2019, Gdansk, Poland.
Invited Seminar; Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, 8 Oct 2019, Nanjing, China.
Invited Seminar; China University of Geosciences, 11 Oct 2019, Beijing, China.

Tommy Hui

Organizing Committee and Oral Presentation; 12th International Temperate Reefs Symposium, 6-10 Jan 2019, HKU, Hong Kong.

Jed Kaplan

Invited Participant; Large Scale Behavioral Models of Land Use Change, 9-11 Sep 2019, Tempe AZ, USA.
Invited Speaker; Make Our Planet Great Again Kickoff Conference, 30 Sep-1 Oct 2019, Paris, France.

Nicole Khan

Organizing Committee and Oral Presentation; Paleo Constraints on Sea Level Meeting, 21-23 Jul 2019, Dublin, Ireland.
Session Convener and Poster Presentation; 20th Congress of the International Union for Quaternary Research, 25-31 Jul 2019, Dublin, Ireland.
Invited Oral Presentation; American Geophysical Union Annual Meeting, 9-13 Dec 2019, San Francisco, USA.

Kenny Leung

Invited Speaker; 2019 International Symposium on Chemical Risk Prediction and Management cum 6th National Ecotoxicology Conference, 26-29 Apr 2019, Guangzhou, China.
Invited Speaker; American Society of Civil Engineering (ASCE) Annual Symposium on Reclamation and Resilience in Civil Engineering, 31 May 2019, Hong Kong Polytechnic University, Hong Kong.
Chairman of the Organizing Committee and Invited Keynote Speaker; 9th International Conference on Marine Pollution and Ecotoxicology, 10-14 Jun 2019, HKU, Hong Kong.
Invited Speaker; 3rd Annual Forum of the University-Government-Industry Consortium for Sustainable Urban Development, 22 Jun 2019, Hong Kong Polytechnic University, Hong Kong.

Invited Speaker; Aoshan Symposium: Joint Symposium on Marine Pollution and Sustainable Development, 3-5 Jul 2019, Qingdao, China.

Invited Keynote Speaker; 5th Korea-China Symposium on Environmental Health and Ecological Safety cum Yellow Sea Ecosystem Symposium 2019, 17-20 Jul 2019, Shantou, China.

Vice Chair and Discussant; 1st Gordon Research Conference on Integrative Urbanization, Water and Food Security, 21-26 Jul 2019, HKUST, Hong Kong.

Invited Speaker; 5th International Conference on Environmental Pollution and Health, 4-6 Aug, 2019, Harbin, China.

Leader of Hong Kong Delegation and Invited Plenary Speaker; NSFC-RGC Young Scholars Forum on Frontiers in Ecology and Environmental Science and Green Development, 24-27 Sep 2019, Guangxi, China.

Invited Keynote Speaker; 11th Micropol & Ecohazard Conference, 20-24 Oct 2019, Seoul, South Korea.

Oral Presentation; 8th IWA-ASPIRE Conference: Smart Solutions for Water Resilience, 31 Oct-2 Nov 2019, Hong Kong.

Invited Speaker; Joint CEDD-HKIE International Conference: Intelligent & Sustainable Development from Reclamation and Beyond, 2 Dec 2019, Hong Kong.

Philip Li

Oral Presentation; Synthetic Biology Young Scholar Forum, 16-17 Aug 2019, Tianjin, China.

Oral Presentation; Chemical Biology and Drug Discovery-Cold Spring Harbor Asia, 28-31 Oct 2019 Suzhou, China.

Shelby McIlroy

Oral Presentation; 54th European Marine Biology Symposium, 25-29 Aug 2019, Dublin, Ireland.

Participant; Stable Isotope Ecology Postgraduate Short Course, 7-11 Oct 2019, HKU, Hong Kong.

Yuan Meng

Participant; Hands-on Training Workshop - Understanding Calcifiers Using Electron Back Scatter Diffraction, 21-31 Jan 2019, HKU, Hong Kong.

Christelle Not

Oral Presentation, The 25th International Symposium on Polar Sciences, 13-15 May 2019, Incheon, Korea.

Oral Presentation, Processes and Paleo-Environmental Changes in the Arctic: From Past to Present, 20-24 May 2019, Poznan, Poland.

Oral Presentation, 9th International Conference on Marine Pollution and Ecotoxicology, 10-14 Jun 2019, HKU, Hong Kong.

Poster Presentation; 13th International Conference on Paleooceanography, 2-6 Sep 2019, Sydney, Australia.

Invited Oral Presentation; Reimagining Food Packaging in Hong Kong (Greenpeace), 9 Oct 2019, HKU, Hong Kong.

Invited Oral Presentation; Transdisciplinary Research on Complex Environmental Health Problems Symposium, 21-22 Oct 2019, Baptist University, Hong Kong.

Invited Oral Presentation; APEC Workshop on Marine Debris and Microplastics and on Sustainable Utilization of Marine Resources, 3-5 Dec 2019, Xiamen, China.

Bayden Russell

Organizing Committee; 12th International Temperate Reefs Symposium, 6-10 Jan 2019, HKU, Hong Kong.

Invited Talk; National University of Singapore, 21 Mar 2019, Singapore.

Celia Schunter

Poster Presentation; Marine Molecular Ecology Gordon Research Symposium, 13-19 Jul 2019, HKUST, Hong Kong.

Oral Presentation; Causes and Consequences of Inclusive Inheritance, 6-8 Nov 2019, Plon, Germany.

Ronia Sham

Participant; 9th International Conference on Marine Pollution and Ecotoxicology, 10-14 Jun 2019, HKU, Hong Kong.

Lily Tao

Poster Presentation; 9th International Conference on Marine Pollution and Ecotoxicology, 10-14 Jun 2019, HKU, Hong Kong.

Participant; 1st Gordon Research Conference on Integrative Urbanization, Water and Food Security, 21-26 Jul 2019, HKUST, Hong Kong.

Benoit Thibodeau

Oral Presentation; 4th Xiamen Symposium on Marine Environmental Sciences, 6-9 Jan 2019, Xiamen, China.

Invited Oral Presentation; Earth System Science Seminar Series, 22 Feb 2019, CUHK, Hong Kong.

Poster Presentation; Gordon Research Conference on Polar Marine Science, 17 Apr 2019, Luca, Italy.

Invited Oral Presentation, Symposium on Ocean Circulation, Ecosystem, Hypoxia and Consequences (OCEAN_HK) 2019, 13 Jun 2019, Hong Kong.

Oral Presentation; 20th Congress of the International Union for Quaternary Research, 25-31 Jul 2019, Dublin, Ireland.

Poster Presentation; 13th International Conference on Paleooceanography, 2-6 Sep 2019, Sydney, Australia.

Invited Oral presentation; Seminar Series at IPMA (Portugese Institute of Marine and Atmospheric Sciences), 15 May 2019, Lisbon, Portugal.

V ThiyagaRajan

Invited Keynote Talk; 9th International Conference on Marine Pollution and Ecotoxicology, 10-14 Jun 2019, HKU, Hong Kong.

Invited Keynote Talk; UNCW Global Marine Science Summit, 9-11 Oct 2019, Wilmington, USA.

Invited Keynote Talk; 8th International Oyster Symposium, 5-8 Nov 2019, Qingdao, China.

Gray A Williams

Organizing Committee; 12th International Temperate Reefs Symposium, 6-10 Jan 2019, HKU, Hong Kong.

Guest Speaker; University Student Sponsorship Programme 15th Anniversary Celebration cum Alumni Party; 13 Jan 2019, Ocean Park, Hong Kong.

Officiating Guest; Tolo Appreciation Kick Off Ceremony, 17 Mar 2019, Island House, AFCD, Hong Kong.

Invited Talk; National University of Singapore, 21 Mar 2019, Singapore.

Mentor and Discussion Leader; Ocean Youth Conservation Summit 28-29 Jun 2019, Hong Kong.

Officiating Guest; Kick of Ceremony of the Hong Kong Marine Biodiversity Roving Exhibition 2019, 29 Jun 2019, AFCD, Hong Kong.

Public Lecture; Prince Songkla University Thailand, 10 Dec 2019, Thailand.

Moriaki Yasuhara

Oral Presentation; The 9th Biennial Conference of the International Biogeography Society at the Palacio de Ferias y Congresos de Málaga, 8-12 Jan 2019, Malaga, Spain.

Workshop and Invited Lecture; bioDISCOVERY and bioGENESIS Joint Workshop, 2-4 Apr 2019, New York, USA.

Workshop; World Ocean Assessment II Authors' Meeting, 15-16 May 2019, New York, USA.

Symposium Organizer and Oral Presentation; The Crustacean Society Mid-Year Meeting, 26-30 May 2019, CUHK, Hong Kong.

Workshop; Deep Ocean Climate Connections Workshop 4-6 Jun 2019, California, USA.

Workshop; Global Ocean Oxygen Network Annual Meeting, 13-14 Jun 2019, Paris, France.

Symposium Organizer and Oral Presentation; The 11th North American Paleontological Convention, 23-27 Jun 2019, California, USA.

Award Lecture; The 20th Biwako Prize for Ecology, 3 Jul 2019, Kyoto, Japan.

Invited Keynote Lecture; 9th European Ostracodologists' Meeting, 19-22 Jul 2019, Gdansk, Poland.

Invited Keynote Lecture; 20th Congress of the International Union for Quaternary Research, 25-31 Jul 2019, Dublin, Ireland.

Invited Plenary Lecture; The 13th International Conference on Paleocyanography, 2-6 Sep 2019, Sydney, Australia.

Invited Seminar; Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, 8 Oct 2019, Nanjing, China.

Invited Seminar; China University of Geosciences, 11 Oct 2019, Beijing, China.

Invited Seminar; Sun Yat-sen University, 16 Oct 2019, Guangzhou, China.

Invited Lecture; International Symposium on Coastal Ecosystem Change in Asia: Hypoxia, Eutrophication, and Nutrient Conditions, 14-15 Nov 2019, Ehime, Japan.

Workshop Organizer and Lecture; Paleobiology as the Synthetic Ecological, Evolutionary and Diversity Science, 21-25 Nov 2019, Okinawa, Japan.

Invited Lecture; Demographic Change and the Spread of Rice Agriculture in Southeastern Asia During the Late Holocene, 16-18 Dec 2019, Guangzhou, China.

Guang-Jie Zhou

Oral and Poster Presentations; 9th International Conference on Marine Pollution and Ecotoxicology, 10-14 Jun 2019, Hong Kong.

Invited Oral Presentation; Aoshan Symposium: Joint Symposium on Marine Pollution and Sustainable Development, 3-5 Jul 2019, Qingdao, China.

Oral Presentation; Frontiers in Ecology and Environmental Science and Green Development, NSFC-RGC Young Scholars Forum, 24-27 Sep 2019, Nanning, China.

Oral and Poster Presentations; 8th IWA-ASPIRE Conference and Exhibition, 30 Oct-2 Nov 2019, Hong Kong.

Postgraduates

Laura Augusto

Poster Presentation; 4th Xiamen Symposium on Marine Environmental Sciences, 6-9 Jan 2019, Xiamen, China.

Oral Presentation; The Crustacean Society Mid-year Meeting, 26-30 May 2019, CUHK, Hong Kong.

Oral Presentation; 5th International Mangrove, Macrobenthos and Management Meeting, 1-5 Jul 2019, Singapore.

Oral Presentation; The Ecological Society of America, 11-16 Aug 2019, Kentucky, USA.

Bovern Arromrak

Oral Presentations; The 11th UCAS Postgraduate Symposium, 24-29 Mar 2019, Kaohsiung, Taiwan.

Participant; Empowering Agricultural Research Through (Meta) Genomics 2019, 24-28 Jun 2019, Bangkok, Thailand.

PhD Student Exchange; 2 Sep 2019-28 Feb 2020, Imperial College London, UK.

Rebekah Butler

Oral Presentation; The Crustacean Society Mid-Year Meeting, 26-30 May 2019, CUHK, Hong Kong.

Participant; 9th International Conference on Marine Pollution and Ecotoxicology, 10-14 Jun 2019, HKU, Hong Kong.

Poster Presentation; 5th International Mangrove, Macrobenthos and Management Meeting, 1-5 Jul 2019, Singapore.

Alessia Carini

Oral Presentation (3rd prize); The 1st Graduate Symposium on Marine Environmental Research, 12 Mar 2019, City University of Hong Kong, Hong Kong.

Poster Presentation; 4th Global Ocean Acidification Observing Network International Workshop, 14-17 Apr 2019, Hangzhou, China.

Poster Presentation; 15th International Symposium on Biomineralization, 9-13 Sep 2019, Munich, Germany.

Participant; Pearls of Wisdom: Synergising Leadership and Expertise in Molluscan Genomics, 16-17 Sep 2019, Northampton, UK.

Participant; Stable Isotope Ecology Postgraduate Short Course, 7-11 Oct 2019, HKU, Hong Kong.

Alison Corley

Oral Presentation; The 11th UCAS Postgraduate Symposium, 24-29 Mar 2019, Kaohsiung, Taiwan.

Poster Presentation; 1st Gordon Research Conference on Marine Molecular Ecology, 21-26 Jul 2019, HKUST, Hong Kong.

Inga Conti-Jerpe

Participant; 4th Xiamen Symposium on Marine Environmental Sciences, 6-9 Jan 2019, Xiamen, China.

Participant; Stable Isotope Ecology Post-Graduate Short Course, 7-11 Oct 2019, HKU, Hong Kong.

Jon Cybulski

Poster Presentation; 4th Xiamen Symposium on Marine Environmental Sciences, 6-9 Jan 2019, Xiamen, China.

Oral Presentation; 11th North American Paleontological Conference, 23-27 Jun 2019, California, USA.

Panelist Speaker; Lui Che Woo - Prize for World Civilization Public laureate Lecture, 4 Oct 2019, HKU, Hong Kong.

Xin Dang

Oral Presentation; 8th International Oyster Symposium, 5-8 Nov 2019, Qingdao, China.

Jake Dytnerski

Oral Presentation; 12th International Temperate Reef Symposium, 6-10 Jan 2019, HKU, Hong Kong.

Kevin Geoghegan

Poster Presentation; 12th International Temperate Reef Symposium, 6-10 Jan 2019, HKU, Hong Kong.

Poster Presentation; The Crustacean Society Mid-year Meeting, 26-30 May 2019, CUHK, Hong Kong.

Poster Presentation; The British Ecological Society Annual Meeting, 10-13 Dec 2019, Belfast, UK.

Qi Huang

Poster Presentation; 9th International Conference on Marine Pollution and Ecotoxicology, 10-14 Jun 2019, HKU, Hong Kong.

Oral Presentation; Aoshan Symposium: Joint Symposium on Marine Pollution and Sustainable Development, 3-5 Jul 2019, Qingdao, China.

Derek Ho

Participant; WWF Pearl River Estuary Chinese White Dolphin Workshop, 8 Aug 2019, Hong Kong.
Workshop Instructor; Aquatic Soundscape Workshop. 23-25 Sep 2019, Cebu, Philippines.
Participant; Distance Sampling Surveys of Marine Mammal Density and Abundance: From Introductory Ideas to Latest Developments, 7 Dec 2019, Barcelona, Spain.
Oral Presentation; World Marine Mammal Science Conference. 9-12 Dec 2019, Barcelona, Spain.

Pedro Jimenez

Oral Presentation; The Crustacean Society Mid-Year Meeting, 26-30 May 2019, CUHK, Hong Kong.
Poster Presentation; 5th International Mangrove, Macrobenthos and Management Meeting, 1-5 Jul 2019, Singapore.

Taihun Kim

Oral Presentation; 9th International Conference on Marine Pollution and Ecotoxicology, 10-14 Jun 2019, HKU, Hong Kong.
Poster Presentation; 17th Euro Fed Lipid Congress, 20-23 Oct 2019, Seville, Spain.

Racliffe Lai

Poster Presentation; The Crustacean Society Mid-Year Meeting, 26-30 May 2019, CUHK, Hong Kong.
Best Oral Presentation; International Conference on Marine Pollution and Ecotoxicology, 10-14 Jun 2019, Hong Kong.
Oral Presentation (2nd Runner-up); Aoshan Symposium: Joint Symposium on Marine Pollution and Sustainable Development, 3-5 Jul 2019, Qingdao, China.

Sarah Lau

Oral Presentation; 12th International Temperate Reefs Symposium, 6-10 Jan 2019, HKU, Hong Kong.

James Lim

Poster Presentation; 12th International Temperate Reefs Symposium, 6-10 Jan 2019, HKU, Hong Kong.
Participant; Technical Workshop on “Application of Scanning Electron Microscope - Electron Backscatter Diffraction for Studying Biomineralized Structures”, 21-31 Jan 2019, HKU, Hong Kong.
Oral Presentation (3rd prize); The 1st Graduate Symposium on Marine Environmental Research, 12 Mar 2019, City University of Hong Kong, Hong Kong.
Oral Presentation; The 11th UCAS Postgraduate Symposium, 24-29 Mar 2019, Kaohsiung, Taiwan.

Chi-Chiu Lo

Poster Presentation; International Conference on Marine Pollution and Ecotoxicology, 10-14 Jun 2019, HKU, Hong Kong.
Outstanding Oral Presentation; Aoshan Symposium: Joint Symposium on Marine Pollution and Sustainable Development, 3-5 Jul 2019, Qingdao, China.

Ying Luo

Oral Presentation; The 11th UCAS Postgraduate Symposium, 24-29 Mar 2019, Kaohsiung, Taiwan.
Oral Presentation; International Conference on Marine Pollution and Ecotoxicology, 10-14 Jun 2019, HKU, Hong Kong.
Oral Presentation; 5th International Mangrove, Macrobenthos and Management Meeting, 1-5 Jul 2019, Singapore.
Oral Presentation; Association for Tropical Biology and Conservation - Asia Pacific Chapter Meeting, 10-13 Sep 2019, Sri Lanka.

Jay Minuti

Oral Presentation; 12th International Temperate Reefs Symposium, 6-10 Jan 2019, HKU, Hong Kong.
Award: Global Young Scientists Summit, 20-25 Jan 2019, Nanyang Technological University, Singapore.
Research Postgraduate Scheme: International Research Experience, HKU at the University of Sydney.

Ka Hei Ng

Oral Presentation; The 11th UCAS Postgraduate Symposium, 24-29 Mar 2019, Kaohsiung, Taiwan.
Poster Presentation; The Crustacean Society Mid-year Meeting, 26-30 May 2019, CUHK, Hong Kong.
Poster Presentation; 5th International Mangrove, Macrobenthos and Management Meeting, 1-5 Jul 2019, Singapore.

Kanmani Rajan

Organiser; Technical Workshop on “Application of Scanning Electron Microscope - Electron Backscatter Diffraction for Studying Biomineralized Structures”, 21-31 Jan 2019, HKU, Hong Kong.
Organising Committee and Oral Presentation (Best Paper Award); The 1st Graduate Symposium on Marine and Environmental Research, 12 Mar 2019, City University of Hong Kong, Hong Kong.
Oral Presentation, BiominXV - International Symposium on Biomineralisation, 9-13 Sep 2019, Munich, Germany.

Max Rodriguez

Poster Presentation; The European Geoscience Union General Assembly, 7-12 Apr 2019, Vienna, Austria.

Vicki Sheng

Visiting Researcher; Ecogeochemistry Lab, 21-23 Jan 2019, California, USA.
Visiting Researcher; Nonlinear Dynamics and Evolutionary Ecology Lab, NOAA/SWFSC and University of Santa Cruz, 16 Jun-31 Dec 2019, California, USA.

Skye Tian

Oral Presentation; 9th European Ostracodologists' Meeting, 19-22 Jul 2019, Gdansk, Poland.

Adrian Wong

Poster Presentation (1st Runner-up); 12th International Temperate Reefs Symposium, 6-10 Jan 2019, HKU, Hong Kong.
Oral Presentation; The 11th UCAS Postgraduate Symposium, 24-29 Mar 2019, Kaohsiung, Taiwan.

Oliver Xu

Poster Presentation; 13th International Conference on Paleooceanography, 2-6 Sep 2019, Sydney, Australia.
Reaching Out Award, Hong Kong Government, 2019.

Jason Yau

Oral Presentation; 9th International Conference on Marine Pollution and Ecotoxicology, 10-14 Jun 2019, HKU, Hong Kong.
Professor John Gray Memorial Award for the Best Marine Pollution Study Associated with Benthic Ecology.

Yvonne Yau

Oral Presentation; Symposium on Ocean Circulation, Ecosystem, Hypoxia and Consequences (OCEAN_HK) 2019, 13 Jun 2019, Hong Kong.

Katie Yeung

Oral and Poster Presentations; 9th International Conference on Marine Pollution and Ecotoxicology, 10-14 June 2019, HKU, Hong Kong.

Visitors to SWIMS

As we have moved out of SWIMS due to the expansion, no formal visitors were recorded for 2019.

Many thanks to all the following for their cheerful and excellent help: Ms. Charlotte Crane, Ms. Tan Ke En, Ms. Tan Kay Wai, Mr. Wong Man Wai & Ms. Cheung Cheuk Yiu.

Student Graduations

Ph.D

Anand, Archana (2019) - Uncovering nitrogen pollution sources and transformations with associated impacts on the sediment microbiome and ecosystem multifunctionality.

Campanati, Camilla (2019) - Impacts of ocean acidification on an intertidal predator-prey system: a multiple life-stages perspective.

Chan, Chiu Yin (2019) - Demography and socio-ecology of Indo-Pacific humpback dolphin (*Sousa chinensis*) metapopulation in the Pearl River estuary.

Conti-Jerpe Inga Elizabeth (2019) - Niche flexibility in corals: understanding and applying variation in coral trophic dynamics using stable isotope analysis.

Huang, Huai-Hsuan (2019) - Deep-sea ostracoda faunal dynamics across evolution of the Cenozoic climate.

Sham, Chung Tin Ronia (2019) - Contamination and distribution of organotin compounds in the marine environment of Hong Kong.

Tan, Lee Sian (2019) - Impact of climate change on the future life history traits of economically important bivalves along the China coast.

Thompson, Philip Douglas (2019) - Physiological responses to seasonality in five species of subtropical coral.

Wong, Ching Yan (2019) - Clash of dinoflagellates: nitrogen competition among coral-hosted Symbiodiniaceae.

M.Phil

Man, Ho Lai Hilary (2019) - Paleoclimate reconstruction of the Chukchi Plateau in Arctic Ocean over the last climatic cycles based on trace element ratio of ostracods.

Staff Training

Mr. Kong Chi Kau has attended the Registered Minor Works Contractors (Individual) Class III Training Course at VTC on 14 May 2019 (Night time).

Ms. Cecily Law has attended the First Aid Course and Examination on 20 May 2019 & 3 June 2019.

Mr. Kong Chi Kau has attended the safety course for air-conditioners organized by Panasonic on 25 October 2019

Acknowledgements

Mr. Pat Healy and Ms. Tina Chan, The Swire Group of Companies

Prof. Xiang Zhang, President and Vice-Chancellor, HKU

Prof. PKH Tam, Provost and Deputy Vice-Chancellor, HKU

Dr. SJ Cannon, Executive Vice-President, HKU

Prof. IM Holliday, Vice-President and Pro-Vice-Chancellor, HKU

Prof. Andy Hor, Vice-President and Pro-Vice-Chancellor, HKU

Prof. Matthew Evans and staff, Faculty of Science, HKU

Prof. Matthew Evans and staff, School of Biological Sciences, HKU

Mr. KL Tam, Director, Estates Office, HKU

Mr. John Sung, Assistant Director, Estates Office, HKU

Mr. EKS Yiu and staff, Estates Office, HKU

Dr. Edmund KM Hau and staff, Safety Office, HKU

Ms. SSM Lo and staff of Finance and Enterprises Office, HKU

Ms. Bernadette Tsui and staff, Development and Alumni Affairs Office, HKU

Ms. Katherine Ma and staff, Communication and Public Affairs Office, HKU

Ms. Isabella Wong and Ms. Winnie Lai, China Affairs Office, HKU

Directors and staff, WWF HK

Dr. SF Leung, Director, AFCD

Mr. Alan Chan, AFCD

Mr. WK Chow, AFCD

Dr. YM Mak and staff, AFCD

Ms. HY Lee, AFCD

Ms. Maisie Cheng, Director, EPD

Mr. Cheng and staff, PCCW Cape d'Aguiar Station

Mr. Shun Chi-Ming and staff, the Hong Kong Observatory

Mr. Michael Boos and staff, Ocean Park Conservation Foundation Hong Kong

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