

# science@HKU 港理

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FACULTY OF SCIENCE NEWSLETTER

Research beyond Boundaries:  
Interdisciplinary  
collaboration in action



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Science

FACULTY OF SCIENCE  
THE UNIVERSITY OF HONG KONG  
香港大學理學院

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Research beyond Boundaries:  $x+y$

# Interdisciplinary collaboration in action

Check out the six Research Divisions



<https://bit.ly/2F4V4Zo>

Since the establishment of the Research Divisions in 2019, six Divisions have been set up, including Chemistry, Earth and Planetary Science, Ecology and Biodiversity, Mathematical and Statistical Science, Molecular and Cell Biology, and Physics and Astronomy.

In this issue, Professor Aleksandra DJURIŠIĆ, Associate Dean for Research and Graduate Studies, would give us a preliminary idea of how far these Divisions have gone, and highlight a handful of approaches for the Faculty to foster interdisciplinary research and collaborations across Divisions, Faculties and other tertiary institutes in the future.

We also got a chance to hear the thoughts of two of our new Research Division Directors (RDD) – the RDDs of Mathematical and Statistical Science as well as Physics and Astronomy, who have been recruited globally to be facilitators, champions and mentors to boost research performance, to share their vision how they are going to embark on their journey to drive research excellence.

Chief Editor

Starting from fall 2020, I am honoured to serve as the Chief Editor of the Newsletter of *Science@HKU*. It is my pleasure to be part of the editorial team and to share the latest developments of HKU Science to you every half year. This issue showcases the efforts incurred by the Faculty of Science to cement our leading roles in both scientific research and tertiary education around the globe.

The Faculty has recruited three new Research Division Directors (RDDs) recently. In the October issue, we are fortunate to invite the Associate Dean for Research and Graduate Studies and the two RDDs of Mathematical and Statistical Science as well as Physics and Astronomy Divisions, to share their visions on launching collaborative research programmes beyond boundaries. The Newsletter also highlights several success stories on how being innovative and diligent can lead to creative scientific solutions to current and future unsolved research challenges.

The world is changing, it is time for us to change too. COVID-19 has brought terrible disruptions to our lives. From social distancing to mask-wearing, people of all ages and from all backgrounds are affected. As an academic institution, HKU swiftly reacted and adapted to this unexpected pandemic. The Faculty has implemented proactive measures to maintain a holistic science education programme, so that our teaching and support staff are able to transit to e-learning platforms seamlessly and our students could adapt to virtual study mode in no time.

We will continue to improve our contents. Video interviews are conducted for the first time and further reading is available online for those who would like to know more about the Faculty.

A problem is a chance for you to do your best. It is only in our darkest hours that we may discover our true potential. We will continue to connect with all of you amidst this turbulent time with scientific thinking and method, that leads to better solutions for many challenging issues and creating a better world.

Yours Sincerely,

Dr Edmund Chun Ming TSE  
Chief Editor  
Assistant Professor,  
Department of Chemistry



Interview video:

<https://bit.ly/2lwWX2t>

The implementation of Division structure has been underway for more than a year since its inception. Building a system from the scratch is never easy. The novel approach is still new and needs polishing, and Professor Djurišić agreed that there is a need for more clear boundaries in responsibilities and roles between Departments and Divisions. Since existing administrative structure at university level has been tailored for Departments, it will take time to fix some minor administrative issues.

## Teamwork makes the dream work

The best collaborations create something bigger than the sum of individuals' contributions. The purpose of establishing Research Divisions is to enhance high-quality research by removing the barriers between Departments, facilitating more cross-fertilisation for interdisciplinary research within Divisions.

Professor Djurišić emphasised that the role of the Faculty is to be a facilitator which takes part in the coordination of research activities proactively, in the hope of maximising participation of Divisions. "Take climate change or environmental-related research topics as examples, they will inevitably touch the fields of earth sciences, ecology and biodiversity, and to some degree attach to chemistry, physics, mathematics and statistics. So what we envision for the future, is to have people doing interdisciplinary research with the concerted efforts of multiple Divisions."

Going beyond geographical boundaries is highly desirable in fostering collaborations. A lot of high-impact projects come from joint research teams with members around the world, yet it is also discipline-dependent. "I should point out that while interdisciplinary research is great, not all great research needs to go in this way. The same rule applies to collaborations – not all research needs to be collaborative. We should adopt a diversified approach of doing good science."

It is like how gears work. The Faculty would formulate the overall strategy with the input from the Divisions, solicit budget from the University and provide support to Divisions, while the Divisions would put strategies in action. At the Faculty level, there are different kinds of funding available for enhancing the competitiveness of projects, be it conventional type, supplementary type or travel grant.

Each Division is overseen by a Research Division Director, who will carry out their own strategies for the Divisions. "I am not a believer in micro-management, so I don't think at the Faculty level we should get involved in litigating matters in the absence of funding problems. It's up to the Directors to manage their own Divisions." In the past two years, the recruitment process for RDDs has been ongoing. Last summer, Professor Michael NG, the RDD of Division of Mathematical and Statistical Science was on board; this July, Professor Hoi Kwong LO, RDD of Division of Physics and Astronomy, left Canada for Hong Kong to join us, and Professor Juha MERILÄ, RDD of Division of Ecology and Biodiversity has also been just on board in October. While the hiring of RDDs for other Divisions are at different stages, the developments are all at the good hands of our Acting Division Directors.

"You don't need to push faculties to do more, because they actually want to – they believe their work conveys distinct value. They are doing good science, and it works pretty well so far."

Professor Aleksandra DJURIŠIĆ

Associate Dean for Research and Graduate Studies and  
Professor of Department of Physics

- 2012 Faculty of Science Knowledge Exchange (KE) Award (Group award received by the Junior Science Institute)
- 2006 HKU Outstanding Young Researcher Award

## Enhancing connections with industry and knowledge exchange

HKU Science is rich in its 80-year heritage and traditions, and our strong reputation is well regarded globally and in mainland China. Over decades, it has been seen as a research-oriented Faculty with strengths in basic research in particular. "While we need to maintain our strength in basic research, we also need to consider how to strengthen our knowledge exchange and establish closer connections with the industry," Professor Djurišić remarked.

In view of this, the Faculty has been bringing in business consultant to advocate knowledge exchange. "Since we do not have solid experience in this, and establishing startup companies here is not as common as in US and UK, we will be running more training programmes for the staff. We will also talk to the Technology Transfer Office, trying to identify the red tape barriers, streamline the process, and help interested parties to get involved."

In 2019, HKU partnered with TCL to set up the "HKU-TCL Joint Research Centre for AI", fostering research development in Artificial Intelligence (AI). Professor Djurišić saw it as a significant step forward. "It's quite important for the entire Faculty because this is the first time we had a centre at this scale, getting our researchers to collaborate with the industry. Undoubtedly, funding support from the industry would bring great benefits to our postgraduate students. I'd be glad to see more projects in the future."

In addition to HKU-TCL joint centre, the Faculty has also been successful in obtaining funding for two InnoHK projects, which will also be a significant contributor towards strengthening applications of our research.

Only self-motivated individuals would remain competent. "People are our greatest asset, and with these highly calibre faculties, I'm sure we can catch up with our benchmark universities soon," said Professor Djurišić. "Our staff have been quite proactive in pursuing research opportunities amidst the pandemic situation. Our chemists have been collaborating with LKS Faculty of Medicine to work out the possible treatment for COVID-19; we also have statisticians developing AI tools to screen suspected cases. So there are quite a lot of practical developments arising swiftly in response to the current situation," she added.

As traditionally, we mathematicians and statisticians are focused on individual research problems, but now we are ready to involve more in cross-disciplinary collaborations.

## Ready to step out of boundaries

### Professor Michael Kwok Po NG

Director of Research Division for Mathematical & Statistical Science and Chair Professor of Department of Mathematics

- **2020 - present** Chairman, HKU-TCL Joint Research Centre for AI
- **2019 - present** Director, Big Data Research Cluster, Faculty of Science, HKU
- **2017** Received Feng Kang Prize of Scientific Computing and was seleted as a SIAM Fellow
- **2014** Received HKBU President's Award for Outstanding Performance in Scholarly Work
- **2001** HKU Outstanding Young Researcher Award

### A mission to empower researchers

Professor Ng formulated some goal-orientated strategies which require substantial collaboration with researchers of diverse interests. "Win-win cooperation facilitates mutual benefits for collaborating parties — we have skills and expertise that help Divisions analyse a huge amount of data properly for disparate disciplines; on the other hand, we can also benefit from the findings and the process of developing new research applications. So it is all about collaboration."

Aiming at creating a thriving research environment, his first strategy is to mobilise and cross-fertilise expertise and facilitate knowledge sharing for core research areas. "Currently we have eight research groups with different interests and focus. Through fostering intellectual exchange, we strive to come up with more innovative research ideas, create more research frontiers, and be more competitive in attracting research funding."

While sharing of expertise can enhance both quality and versatility of research, networking can help apply research results into practical use and for the betterment of society. It is utmost essential that we can keep strengthening our network through research partnership and collaboration. "It is a global approach, not limited to local or regional, and beyond geographical areas, we would also like to connect the academic circle to the world of business and the community, incubate areas that demonstrate strong commercial potential and address societal needs like data science and artificial intelligence."

### Interdisciplinary approach in action

Aligning with the Faculty and the University strategy, interdisciplinary approach is one of the indispensable strategies that Professor Ng is going to adopt and expand. In the past year, he has already put this into practice. A PhD student has been participating in a machine learning project for the development and validation of prognosis model of mortality risk in patients with COVID-19 with medical doctors from Union Hospital, Wuhan and Beijing Chaoyang Hospital, Beijing; some experts from the Division are collaborating with the MTR Corporation in an interdisciplinary cooperation for condition-based monitoring systems and artificial intelligence for the operation of its railway network; internal collaborations involving cross-discipline experts have been carried out through the HKU-TCL Joint Research Centre for Artificial Intelligence and Big Data Research Cluster, and more joint positions

within divisions will be created to enhance these kinds of activities. "We will strive to enhance our engagement in more innovative research projects with other disciplines, in the hope of sparking more creative ideas with new attempts," said Professor Ng.

A photo taken in 1999 during team outing with colleagues at HKU  
Professor Ng was the first from the right.

### Achievements of Division members in recent years

- 2020 Second Prize of Hunan Natural Science Award: Professor Michael NG, Professor Wai Ki CHING and their PhD students
- 2019 Professor Ngai Ming MOK was elected as Fellow of the American Mathematical Society
- 2018 Professor Xiao Ming YUAN won the Higher Education Outstanding Scientific Research Output Awards
- Professor Jeff Jianfeng YAO was named Fellow by the Institute of Mathematical Statistics
- 2017 Professor Ngai Ming MOK was elected as Member of Hong Kong Academy of Sciences
- 1994 – 2019 HKU was ranked No.2 worldwide and No.1 in Asia based on research contributions from the top 4 actuarial journals (*Insurance: Mathematics and Economics*, *North American Actuarial Journal*, *ASTIN Bulletin*, and *Scandinavian Actuarial Journal*) amongst non-business schools over a 25-year period from 1994 to 2019.



Full story:  
<https://bit.ly/2H2UY50>

Interview video:  
<https://bit.ly/2lwWX2t>



## "Do physics", make a big impact

Professor Hoi Kwong LO has just entered a new chapter in his life – being appointed as the Director of Research Division of Physics and Astronomy. This is not only the first time he has taken up an administrative role in a university, but also the first permanent position that he has ever had in Hong Kong after 3 decades living abroad.

Professor Lo was born and raised in Hong Kong. His winning of the Prince Philip Scholarship in 1986 was a life-changing point for him, which allowed him to set sail and pursue his dreams in Cambridge. Since then, he started his prolonged journey in the UK and North America. "It's very exciting to be back to my home town. There's quite a change, but I'm happy to embrace the new chapter in my life. It's like 'give and take' – I won a scholarship to Cambridge for undergraduate studies, and now I've got a chance to contribute back in some way," said Professor Lo.

What you wear speaks for you. The subtle yet eye-catching quote "something different" imprinted on Professor Lo's tee on the interview day made a statement for him. "Yes, I want a change." As a top-notch scientist in the research domain of quantum information processing, he was among the first to demonstrate the impossibility of a whole class of quantum cryptographic protocols including quantum bit commitment, thus correcting an error that had been believed for a long time in the field. "I have achieved quite a bit throughout my research life, and now I hope I could make a bigger impact by influencing others."

### Formulating new strategies for scientific research

The Division has been traditionally strong in two strategic research areas: condensed matter physics and astrophysics. Under the new strategic direction, the Division will continue to retain its traditional strengths while expanding substantially in two new areas: quantum information science (QIS) and optics and photonics. "Physics is very diverse. Our four strategic areas do represent some of the most active areas of physics research today." QIS has become a strategic research initiative in many large firms, including IBM, Intel, Google, Microsoft and Alibaba, which are all investing heavily in quantum technologies including quantum computing. "Quantum computing not only can break standard encryption schemes such as Rivest-Shamir-Adleman (RSA), but also can lead to an exponential speed-up for some computational problems such as the simulations of quantum systems in quantum physics and quantum chemistry. Quantum cryptography, which is my own specialty, offers information-theoretic security (also known as the Holy Grail of communication security)." Besides the four strategic areas, the Division will also continue to investigate in nuclear physics and elementary particle physics through international collaborations.

Leveraging the Division's long-standing existing strength on the theoretical side, it plans to grow substantially on the experimental side in the next few years. "The primary mission of the Division as a research unit is to 'do physics'. Since many of our academic staff, postdocs, and graduate students are highly capable and talented, I hold the vision that our Research Division could be a premier research centre in physics and astronomy."

### Achievements of Division members in recent years

- 2020 Professor Wang YAO was elected as a fellow of American Physical Society and the Croucher Foundation Senior Research Fellowship
- Professor Shijie XU, Professor Mao Hai XIE and collaborators won the Ministry of Education Natural Science award (2<sup>nd</sup> class)
- 2017 Professor Xiaodong CUI was awarded the Croucher Foundation Senior Research Fellowship



Full story:  
<https://bit.ly/34Ycuj1>



Interview video:  
<https://bit.ly/2lwWX2t>

Professor Lo in Cambridge during the late 80's.

### Professor Hoi Kwong LO

Director of Research Division for Physics & Astronomy and Chair Professor of the Department of Physics

- **2019** Fellow of Optical Society (OSA)
- **2018** Fellow of American Physical Society (APS)
- **2003** Outstanding Young Researcher Award (OYRA) by the OCPA (Overseas Chinese Physicists Association)
- **2003** Premier's Research Excellence Award
- **1986 - 1989** Prince Philip Scholarship

### Interdisciplinary approach facilitates problem solving

The growing call for interdisciplinary research boosts synergy where cross-disciplinary knowledge can be integrated and broadened. Take Professor Lo as an example, he has been leading a career path highly related to interdisciplinary research. The power of interdisciplinarity is self-explanatory in Professor Lo's story. "I studied mathematics for my bachelor's degree, and physics for my PhD. During my postdoc years, I did research in theoretical computer science. For the 17 years at the University of Toronto, I held a joint appointment across two faculties. Owing to my own experience, I am a firm believer in interdisciplinary research."

One of the main growth areas will be quantum information science. The plan there is to establish an Institute of Quantum Science over the next few years, which combines the strengths in quantum matter (a part of condensed matter physics) and QIS. Moreover, it will include researchers in physics, chemistry, mathematics, computer science and engineering. In building up the Institute, the Division will need to reach out to other Divisions and Departments to explore joint appointments and collaborative projects. "So, to make a big impact, we may need to collaborate with others. If people from different disciplines work together, they are likely to solve bigger scientific problems."

As a leader of the Research Division, his mission is to create a good research atmosphere and maximise the potential of the Division. "I encourage our faculty members to think big and be ambitious in their research plans. This is the only key of making a difference to the society," Professor Lo added.

The Division is in a strong uptrend. Our success rate of the latest General Research Fund (GRF) grants is as high as about 93%. This is truly impressive!





## Enrich biodiversity: helping corals survive and thrive

Dozens of metres deep down the sea, there hides the habitat of coral reefs, stunning yet vulnerable. A group of dedicated marine scientists from The Swire Institute of Marine Science (SWIMS) and School of Biological Sciences are looking into the pressing issue via the following research projects.



### Repopulating coral communities with novel 3D printed "reef tiles"

By **Dr David BAKER**, Associate Professor of School of Biological Sciences and The Swire Institute of Marine Science; Research Assistant **Dr Phil THOMPSON**; PhD Candidate **Ms Virko YU**; Associate Professor (Teaching) **Mr Christian Johannes LANGE**, and Assistant Lecturer **Ms Lidia RATOI** from the Department of Architecture

Regarding conservation of marine biodiversity as its top-priority mission, marine scientists led by Dr David BAKER joined hands with the Faculty of Architecture to co-develop a novel method for coral restoration, making use of specially designed 3D printed artificial "reef tiles" tailored for coral attachment to enhance their chance of survival in the waters of Hoi Ha Wan Marine Park. Conservation efforts are never trivial. It is hoped that this project would become a vital contribution to the ongoing global efforts to save the degraded coral reef systems.

為保護海洋生態，由 David BAKER 博士領導的海洋生物學家與建築系的學者聯手，利用 3D 設計和打印技術製成「珊瑚礁盤」，給碎落的珊瑚依附生長，並在海岸公園內選定三個地點放置應用，在海底總佔地約 40 平方米。珊瑚礁盤提供結構複雜的基礎，供珊瑚碎片附着穩固生長，給予它們第二次存活的機會。同時，珊瑚磚能減少沉積物堆積，藉以消除對珊瑚生長的其中一個主要威脅，提高珊瑚復育的成效。



Video of installing a reef tile:  
<https://youtu.be/RwYXjswjiU>



Read more:  
<https://bit.ly/32MQRBI>

Photo courtesy: AFCD

## Identifying areas of top priority for deep-sea monitoring

By **Dr Moriaki YASUHARA**,

Associate Professor of School of Biological Sciences and The Swire Institute of Marine Science, and  
**Professor Roberto DANOVARO**,  
Stazione Zoologica Anton Dohrn Napoli, Italy



Always ask those who excel. An international team comprising marine ecologists including Dr Moriaki YASUHARA, created an expert-led list of priorities by surveying the world's leading deep-sea scientists, shedding light on the key focus for future conservation and management strategies. This standardised monitoring framework can help highlight the priorities for monitoring, including large animals and habitat-forming species like deep-sea corals, and the impact of human activities on this vulnerable ecosystem.

太古海洋科學研究所及生物科學學院副教授安原盛明博士，與意大利拿波里 Stazione Zoologica Anton Dohrn 學院 Roberto DANOVARO 教授合作，向全球逾百名具影響力的深海生物學家以問卷方式調查，蒐集及分析他們對深海保育的意見，並制訂出一個對深海保育的優先次序列表。調查顯示應加強保育形成棲息地的物種，當中包括珊瑚；此外深海大、中型物種的生物多樣性監測工作亦十分重要。



Read more:  
<https://bit.ly/352vTB0>

A community of deep-sea animals. Photo courtesy: Lisa LEVIN

## Unlocking the secret of corals' tolerance to climate change: their diet

By **Dr Inga CONTI-JERPE**,  
Postdoctoral Associate of School of Biological Sciences and  
The Swire Institute of Marine Science

The research team led by Dr Inga CONTI-JERPE has developed a new method for determining what corals eat, and demonstrated that reliance on certain nutritional sources underpins their bleaching susceptibility in warming oceans. They compared the stable isotope "fingerprint" of hundreds of corals collected in Hong Kong to that of their associated algae. The results showed that some corals have isotopic fingerprints that match that of their algae, indicating the two partners share nutrients. Other corals have fingerprints distinct from their algae due to a diet based on the capture and consumption of prey particles in the water. These results have implications for how coral reefs will change as climate change progresses. They help us predict which coral species are more likely to survive as oceans warm, and provide a solid ground for us to review efforts to be spent on coral reef restoration so as to ensure the long-term success of reef rehabilitation.

在博士後研究員 Inga CONTI-JERPE 的帶領下，收集了本港數百種珊瑚和相關藻類的穩定同位素「指紋」，並將兩者進行比較，發現有些珊瑚具有與其藻類相匹配的同位素指紋，表示兩者共享營養，即這類珊瑚倚賴其寄生藻類進行光合作用而獲得養份。研究亦顯示，掠食性較強的珊瑚可承受更長的升溫時間。結果有助預測哪些珊瑚將首先消失，以及這將如何改變整個珊瑚礁生態系統。



Press Release:  
<https://bit.ly/31OUvLA>

The research group (Dr Conti-Jerpe is in the middle) overlooked corals recovering from bleaching in the coral farm at SWIMS.

Photo courtesy: Dr Jane WONG



## Tropical forests' carbon sink is already rapidly weakening

By **Dr Alexander KOCH**,

Postdoctoral Fellow of Department of Earth Sciences

The ability of the world's tropical forests to remove carbon from the atmosphere is decreasing, according to a study tracking 300,000 trees over 30 years, published recently as the cover story in *Nature*. An international team led by the University of Leeds, including Dr Alexander KOCH of HKU's Department of Earth Sciences, reveals that a feared switch of the world's undisturbed tropical forests from a carbon sink to a carbon source has begun. They measured the diameter and estimated the height of every individual tree in 565 patches of forest, returning every few years to re-measure them. By calculating the carbon stored in the trees that survived and those that died, the researchers tracked the changes in carbon storage over time. The speed and magnitude of change in these forests suggests that climate impacts in the tropics may become more severe than predicted.

一項橫跨 30 年、追蹤近 30 萬棵樹的研究發現，世界各地熱帶森林從大氣中清除碳排放的能力正逐漸下降。這項研究由英國里斯大學主導，率領環球 94 個研究單位，其中地球科學系博士後研究員 Alexander KOCH 亦參與其中。科學家團隊測量了 565 處森林範圍的樹木，記錄其直徑並估算樹木高度，然後每隔數年重新量度一次。研究人員通過分別計算存活和死亡樹木中的碳存量，估量該地段的碳存量變化。從熱帶森林變化的速度和幅度顯示，熱帶地區的氣候影響可能比預期的更為嚴峻。此研究論文榮登科學期刊《自然》（2020 年 3 月號）的封面故事。



Measuring trees in Lope National Park, Gabon.

Photo courtesy: Simon LEWIS, University of Leeds

Press release:  
<https://bit.ly/2QI6PqY>



Video of tree measurement:  
<https://bit.ly/3IJFkeD>



Above Ivindo National Park, central Gabon. Photo courtesy: Kath JEFFERY

## Earth Sciences Sea level could rise more than 1m by 2100

By **Dr Nicole KHAN**,  
Assistant Professor of Department of Earth Sciences



The sea level rise caused by global warming is of growing concern across the globe.

Photo courtesy: LEE Yiu Tung/Shutterstock.com



Sea-level rise is expected to continue. Dr Nicole KHAN found that global mean sea-level rise could exceed 1m by 2100 and 5m by 2300 with unchecked emissions. These projections were solicited from experts identified from a pool of the most active publishers of scientific sea-level studies. Dr Khan indicated that Hong Kong will likely be impacted. Its considerable population and infrastructure that occur in vulnerable, low-lying areas will be increasingly exposed to the effects of sea-level rise and coastal flooding if emissions targets are not met.

地球科學學系助理教授 Nicole KHAN 博士，參與一項國際研究時就全球平均海平面變化作出的估算，研究指出若不控制溫室氣體排放，全球平均海平面至 2100 年時將上升超過 1 米，在 2300 年甚至上升超過 5 米。Khan 博士是在次研究中負責挑選和聯絡專家，並設計調查項目。她表示香港作為其中一個主要的沿海城市，其人口和基礎設施處處脆弱的低窪地帶，如果達不到排放目標，將容易受到海平面上升和沿岸地區水浸的影響。



Read more:  
<https://bit.ly/3hPr8P6>

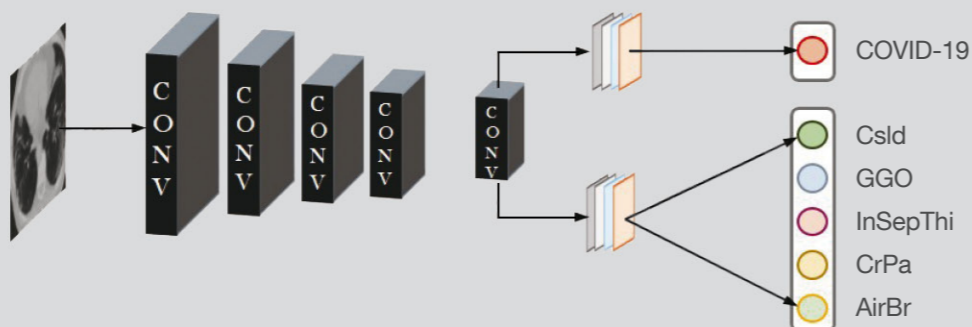
## Statistics & Actuarial Science

### A fast online COVID-19 diagnostic system with AI technology

By **Professor Guosheng YIN** (on the left), Head of Department of Statistics and Actuarial Science, and **Dr Bin LIU**, Assistant Professor of Centre of Statistical Research, School of Statistics, Southwestern University of Finance and Economics (currently Post-doctoral Fellow at HKU)



As discovered in radiological research, CT scanning may serve effectively in testing for COVID-19, particularly amongst those with no symptom or minimal symptoms. A research team led by Professor Guosheng YIN, and Postdoctoral Fellow Dr Bin LIU, has developed a publicly available online COVID-19 diagnostic system by integrating AI technology, allowing individuals to understand the probability of contracting the disease. It is accurate, easy to use and fast, requiring only chest CT image to show the diagnostic result immediately. This work was accepted by the AI for COVID-19 session and presented at Health Day KDD 2020 Conference.



很多放射科影像學研究發現，CT 電腦掃描檢測對早期無症狀的新冠肺炎病人有很好的篩查效果。由統計及精算學系系主任尹國聖教授以及博士後劉斌博士所率領的研究團隊，基於新冠肺炎 CT 電腦掃描數據庫，研發出網上 COVID-19 診斷系統。團隊結合了 AI 技術，利用胸部 CT 掃描圖像對疑似新冠病人進行篩查。只須上傳胸部 CT 電腦掃描圖像，便立刻顯示快速診斷結果，而且操作簡易，並供免費使用。



Read more:  
<https://bit.ly/3jBp39N>



COVID-19 diagnostic system:  
<https://www.covidct.cn>

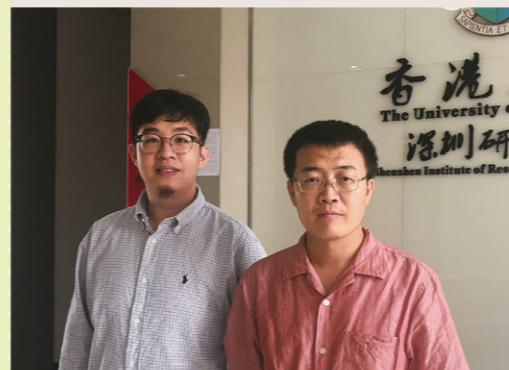


AI for COVID-19 - 3<sup>rd</sup> Annual Health Day at the KDD Conference:  
<https://bit.ly/3kID5x5>

## Mathematics

### Robust structure-preserving schemes for computing effective diffusivity

By **Dr Zhiwen ZHANG**, Assistant Professor of Department of Mathematics (on the right), and **Dr Zhongjian WANG**, PhD Graduate (currently a William H Kruskal Instructor at the University of Chicago)



Computing effective diffusivity for particles moving in chaotic and stochastic flows is a fundamental problem in studying diffusion enhancement phenomenon in fluid advection. Its applications can be found in many physical and engineering sciences, including atmosphere science, ocean science, chemical engineering, and combustion. For instance, when there is an oil spill in an ocean, it is important to estimate the spread speed of the pollution. Many existing works use numerical methods (e.g. FEMs and spectral methods) to solve a convection-diffusion type corrector problem to compute effective diffusivity, which becomes extremely time-consuming and resource-expensive when the diffusion coefficient is small and/or flows are in 3D space. The research group developed robust structure-preserving schemes in Lagrangian framework to compute effective diffusivity for chaotic flows (including 3D ABC flow and Kolmogorov flow) and provided a sharp and uniform-in-time error estimate for the numerical schemes. Their work is the first one in the literature to develop Lagrangian numerical schemes to compute effective diffusivity in 3D chaotic flows.

在研究流體的對流擴散增強現象時，必須破解一個根本的問題，就是計算粒子在混沌流和隨機流中移動時的有效擴散係數。此課題可應用在許多物理和工程科學上，包括大氣科學、海洋科學、化學工程和

燃燒學。例如，當海洋上發生原油洩漏事故後，研究污染物（原油粒子）的有效擴散速度便非常重要。許多現有的研究都運用數值方法（例如有限元方法和譜方法），通過求解對流——擴散型偏微分方程來計算有效擴散係數。可是，當方程的擴散係數較小且／或流向三維空間時，會令研究成本變得極其昂貴。有見及此，研究小組在拉格朗日框架下開發了非常有效的「保結構演算法」，並且以較低的成本成功計算出三維混沌流（例如 ABC 流和 Kolmogorov 流）的有效擴散係數，並為數值演算法提供了準確和均一的誤差估算。這是文獻中第一個成功以拉格朗日保結構演算法來計算出三維混沌流的有效擴散係數的研究成果。



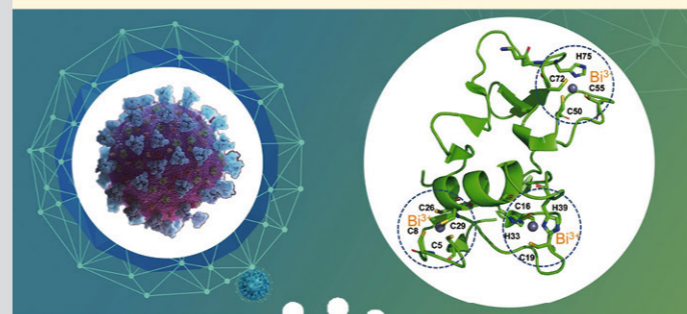
## Chemistry

### NOVEL antiviral strategy for treatment of COVID-19 using existing metallodrugs

By **Professor Hongzhe SUN**, Norman & Cecilia Yip Professor in Bioinorganic Chemistry, Department of Chemistry, and **Professor Kwok Yung YUEN**, Henry Fok Professor in Infectious Diseases, Department of Microbiology, Li Ka Shing Faculty of Medicine

A research team led by Professor Hongzhe SUN and Professory Kwok Yung YUEN has discovered a novel antiviral strategy for treatment of COVID-19.

They discover a class of metallodrugs currently used in the treatment of other infectious diseases is showing efficacy to potently suppress SARS-CoV-2 replication and relieve viral-associated symptoms in an animal model. The findings provide a new and readily available therapeutic option with high clinical potential for infection with SARS-CoV-2. This ground-breaking work has been published online in a top-class scientific journal *Nature Microbiology*. A related patent has been filed in the US.



Proposed structure of Bi-bound zinc-binding domain of SARS-CoV-2 helicase. Through kicking out the crucial zinc(II) ions in the zinc-binding domain of SARS-CoV-2 helicase, RBC demonstrated its ability to potently suppress the replication of SARS-CoV-2.



Read more:  
<https://bit.ly/373WNK7>



A photo of the key members of the research team taken before the press conference. From the right: Dr Jasper F W CHAN, Dr Shuofeng YUAN, Dr Runming WANG, Professor Hongzhe SUN, Dr Hong Yan LI, and Miss Suyu WANG.

Historically, metal compounds have found use as anti-microbial agents, but their antiviral activities have rarely been explored. Their new findings identify ranitidine bismuth citrate (RBC), a commonly used anti-ulcer drug for the treatment of *Helicobacter pylori*-associated infection, through a primary screening over a set of metallodrugs and related compounds, as a potent anti-SARS-CoV-2 agent, both in vitro and in vivo. This study provided potential metallodrug-based drugs for fighting the raging COVID-19 pandemic.

理學院化學系葉志成范港喜基金教授（生物無機化學）孫紅哲，以及李嘉誠醫學院微生物學系霍英東基金教授（傳染病學）袁國勇共同領導的研究團隊，發現了一類已作廣泛臨床應用的含金屬抗菌藥物，能有效抑制新型冠狀病毒。

這類含金屬藥物在動物測試中，證明能顯著降低新冠病毒的載量，並同時緩解與病毒相關的炎症。由於有關藥物針對其他病症已通過臨床審批，有望為治療冠狀病毒感染，提供安全有效的替代性策略。此項突破性研究成果已於國際頂級科學雜誌《自然微生物》發表，並已申請美國專利。

研究團隊針對新冠病毒其中一個主要蛋白質即病毒解旋酶，當中含有起著關鍵作用的鋅離子，而金屬藥物透過獨特的金屬置換機制，能不可逆轉地剝奪這些鋅離子，從而令病毒解旋酶失去活性，並抑制新冠病毒的繁衍複製。是項研究提出金屬藥物可作為有效治療新型冠狀病毒感染的潛在藥物。



# HKU's "Lobster-Eye" X-ray Satellite

By **Professor Quentin PARKER**, Director of the Laboratory for Space Research and Professor of Physics, and  
**Dr Meng SU**, Associate Professor of Department of Physics



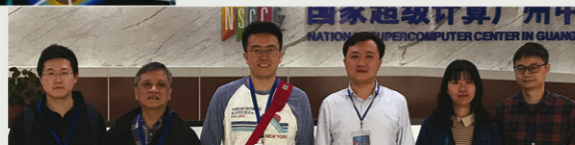
The Lobster-Eye X-ray Satellite undergoing final test before launching.

太空研究實驗室 (LSR) 參與研製的「龍蝦眼 X 射線探測衛星」，已於 7 月 25 日在山西太原發射中心成功發射。它的其中一個重要任務，是在太空搜尋暗物質。此衛星由 LSR 及南京大學等科研團隊合作研製，是國際上首顆在軌執行任務時配有龍蝦眼聚焦 X 光技術的太空探測衛星。它將會完成數個空間 X 光探測實驗，尤其對 X 光能段的暗物質信號開展深度探測。

## Physics

## Quantum Material research discovered better materials that benefit our society

Spin texture and vortex in quantum magnet TMGO when the material is inside the topological KT phase.



Quantum materials are becoming the cornerstone for the continuous prosperity of human society. Dr Ziyang MENG and his collaborators achieved accurate model calculations by using the world's fastest supercomputers (Tianhe-I, Tianhe-II and Tianhe-III prototype at National Supercomputer Center of China), revealing the comprehensive properties of a rare-earth magnet TmMgGaO<sub>4</sub> (TMGO). They found that the material, under the correct temperature regime, could realise the long-sought-after two-dimensional topological Kosterlitz-Thouless (KT) phase, which completes the pursuit of identifying the KT physics in quantum magnetic materials for half a century. The joint team also set up the protocol of modern quantum material research, which will certainly lead to more profound and impactful discoveries in quantum materials.



Read more:  
<https://bit.ly/3jACh1J>

## Chemistry

## Ordering small rings in a Molecular necklace in different sequences

By **Ho Yu AU-YEUNG**,  
Associate Professor of Department of Chemistry

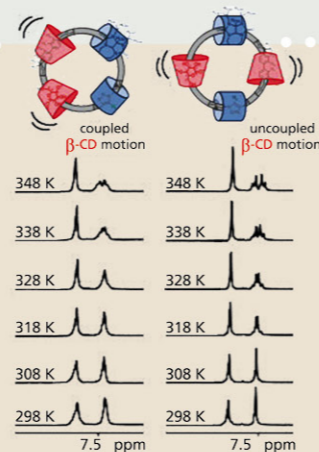


Macroscopic chains consist of small metal rings that are joined together by passing through each other like a metal rope that is flexible and strong with many applications, such as bicycle lock, door chain and roller chain for power transfer. The key to transform the hard and stiff metal pieces into a flexible rope while maintaining the high mechanical strength of the metal is the interlocked arrangement of the small metal rings. What if cyclic molecules are interlocked in a similar way as a metal chain? Would there be any new mechanical properties at the molecular scale due to the interlocking of the cyclic molecules?

Dr Ho Yu AU-YEUNG's team is interested in the chemistry of catenanes – molecular chains consist of cyclic units that are joined together by passing through each other's central cavity. Recently, the team has succeeded in the synthesis of a pair of catenane with four molecular rings threaded through one larger cyclic molecule in two different sequences, with the structures of the catenanes reminiscent of a pearl necklace. Interestingly, these molecular necklaces were found to display different dynamic motions because of the different sequence of how the "pearls" are threaded, despite they are constituted of the same chemical components. This discovery could pave the way towards the design of next-level molecular machines, just as how chains are used in macroscopic world.

在宏觀世界中，由許多金屬小環相互連接而成的金屬鏈條，就像金屬繩一樣，非常牢固且具有柔韌性。這類金屬鏈條在許多環境下被用於進行能量的傳遞，如單車鎖、門鎖、轆鏈中的傳動鏈條。鏈條中的金屬小環以互鎖的排列的方式連接在了一起，正是將剛性的金屬零件化成柔性長鏈並保持金屬高機械強度的關鍵。從這個角度出發，如果環狀的小分子也像上述金屬鏈條一樣以互鎖的方式連接，會發生甚麼樣的情況呢？這樣的結構會不會由於環狀小分子的互鎖而在分子層面具備新的機械性質呢？

歐陽灝宇博士及其研究團隊致力於對索煙化學的研究。索煙是指環狀基本單元經由穿過彼此的中心空腔從而相互連接，組成分子鏈條。該研究團隊成功合成了一對結構為一個大環以不同順序穿過四個環狀分子的索煙，這樣的結構讓人聯想到了一串珍珠項鍊。有趣的是，雖然這兩種分子項鍊由相同的化學組分構成，由於環狀分子「珍珠」的排列順序不同，這兩種分子項鍊展現出了不同的動力學運動模式。就像金屬鏈條在宏觀世界的作用一樣，該發現為設計下一代的分子機器創造了條件。



Isomeric molecular necklaces show sequence-dependent dynamic behaviour

The "Lobster-Eye X-ray Satellite" was successfully launched, riding the Long March 4B lift rocket.



Read more:  
<https://bit.ly/3gR52KP>



Video footage of the launch:  
<https://bit.ly/3h1TPNn>

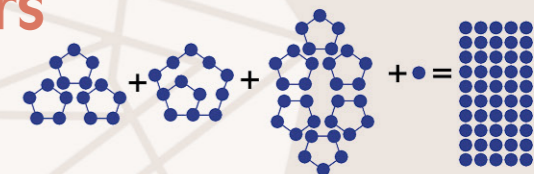
## Mathematics

## Sums of polygonal numbers and partial theta functions

By **Dr Benjamin KANE**, Associate Professor of Department of Mathematics and Former Postdoctoral Fellow Min-Joo JANG, and  
**Professor Kathrin BRINGMANN** from Mathematical Institute of University of Cologne



In mathematics, polygonal numbers refer to integers which can be arranged in the shape of regular polygons (such as equilateral triangles and squares). Among them, triangular numbers and square numbers are the most well-known ones. Fermat claimed in 1638 that every positive integer may be written as the sum of at most  $m$   $m$ -gonal numbers. After some progress on the problem by Lagrange, Legendre and Gauss, Cauchy finally proved that this was true in 1813. Dr KANE, in joint collaboration with Dr Min-Joo JANG and Professor Kathrin BRINGMANN, has been investigating sums of this type where at most four of the  $m$ -gonal numbers are different. The current standard approach to the problem for sums of squares (the  $m=4$  case) is to use the theory of modular forms, but a certain symmetry is broken in the general case. This work circumvents the problem by taking advantage of a recently-found connection to a mathematical object known as a quantum modular form, showing that "most" integers can be written as a sum of at most four such numbers.



$$3p_5(2) + p_5(3) + 6p_5(2) + p_5(1) = 58$$

$$3p_5(x) + p_5(y) + 6p_5(z) + p_5(w) = n$$

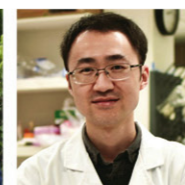
數學上，多邊形數是可以排成正多邊形（例如正三角形和正方形）的整數，當中以三角形數和正方形數（平方數）最為熟悉。在 1638 年，費馬 (Fermat) 提出了「每個正整數均可表示為「最多  $m$  個  $m$ -邊形數之和」的猜想；最終柯西 (Cauchy) 在 1813 年證明了費馬猜想的定理。Dr KANE、Dr Min-Joo JANG 與及 Dr Kathrin BRINGMANN 共同研究上述  $m$ -邊形數之和的表達式中，哪些正整數可使用最多四個不同的  $m$ -邊形數來表達。現時研究平方和問題（即  $m=4$  的情況）的標準方法是採用模形式 (modular forms) 的技巧，但在一般情況下這技巧並不適用，因此研究團隊創出新方法，從而證明了「大多數」整數在寫成最多  $m$  個  $m$ -邊形數之和時，當中只須用到最多四個不同的  $m$ -邊形數。

## Accomplishments

## Awards External Awards



**Professor Zheng Xiao GUO**, Associate Dean for China & Global of Faculty of Science and Professor of Departments of Chemistry and Mechanical Engineering, was elected as the **Foreign Member of Academia Europaea** (The Academy of Europe) under the Chemical Sciences Section for his distinguished achievements in the discipline in 2020.



Young researchers at HKU have achieved outstanding results in the exercise of **Excellent Young Scientists Fund (Hong Kong and Macau) for 2020**. In which, two of them are from HKU Science, including Associate Professor **Dr Timothy BONEBRAKE** (on the left) from the School of Biological Sciences, and Assistant Professor **Dr Yufeng WANG** from the Department of Chemistry. The Fund is highly competitive with only 25 projects in total funded across Hong Kong and Macau this year. Each project will receive funding of RMB1.2 million over a maximum period of three years.



**Wang YAO**, Chair Professor of Department of Physics has been elected as a **Fellow of the American Physical Society (APS) 2020** upon nomination by the Division of Condensed Matter Physics, in recognition for his "pioneering contributions to valley optoelectronics by laying down the theoretical foundation for versatile control of valley and spin in 2D semiconductors and their heterostructures".



**Dr Janet Kit Yan CHAN**, Lecturer from School of Biological Sciences, was honoured the Faculty's **Award for Teaching Excellence 2019-2020** for her high-quality dedication to teaching.

## Internal Awards

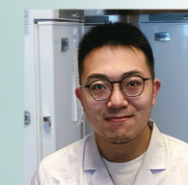
**Dr Angela Mai Yan YUEN**, Lecturer of Department of Chemistry, received the Faculty's **Award for Teaching Innovations in E-learning 2019-2020** for her remarkable efforts in enhancing students' learning experiences.



Faculty's **Award for Outstanding Professional Services Staff 2019-2020** went to Technical Manager **Mr Donald Chi Chuen MAK** from the Department of Chemistry for his excellent performance in teaching and technical support.



**Professor Xiang David LI** from the Department of Chemistry and his collaborators were awarded the **Faculty Research Output Prize 2018-2019** with their journal paper "Structure-guided development of YEATS domain inhibitors by targeting  $\pi$ - $\pi$  stacking".



**Mr Yinan SONG**, PhD Candidate from Department of Chemistry was awarded the Faculty's **Excellent Teaching Assistant Award 2019-2020** for his enthusiasm in providing teaching support in classes.

# The New Normal for E-learning

COVID-19 has necessitated immediate online solutions to regular face-to-face teaching at HKU. This has been challenging at all levels of the University, but the Faculty has responded positively in a number of ways to equip our teachers with the e-learning tools they need to overcome the challenge. This includes the creation of the Faculty e-learning team who launched the Faculty E-learning Portal and e-learning help service, the organisation of workshops, and the sharing of useful tips via messages to Faculty members regularly.

COVID-19 has caused a boom in online learning worldwide. With a sudden shift from the classroom to remote learning in many parts of the globe, our Assistant Dean for e-learning **Dr Michael PITTMAN** noted that the coronavirus has accelerated the development of e-learning, and the practice will most likely continue in the post-pandemic period. "E-learning will develop into a strong tool to complete face-to-face learning, that has made it a substantial component of many top-tier universities even pre-COVID," he said.

E-learning relates very well with our online-native students and has a number of important benefits. A common benefit is the chance for flipped classrooms. Pre-recorded lectures can free up active face-to-face learning opportunities and can be watched outside a lecture slot, can be reused and easily updated if done well. "We should look to retain the benefits of recorded lectures that students can process at their own speed and easily revisit. This will allow more time for questions and clarification during face-to-face time. We should not underestimate the power of the social interactions we have during face-to-face teaching." Furthermore, e-learning can be more scalable and global, involving larger audiences, teachers and students based in other places or countries.

## A virtual field trip: flying around by Google Earth

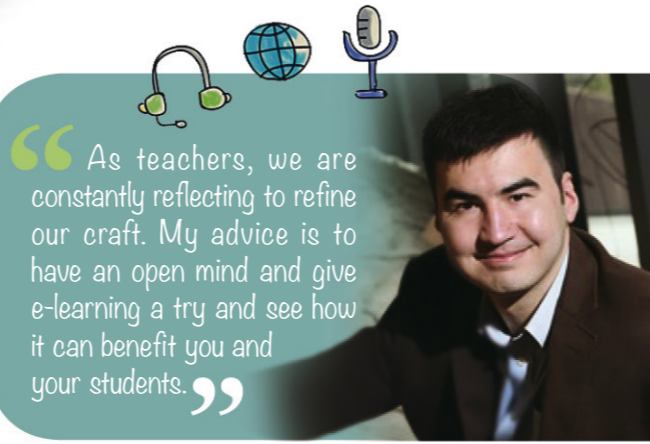
**Dr Jess KING**, Co-ordinator of the Geology Major in the Department of Earth Sciences, has just finished running a virtual field camp for the Geology capstone course Integrated Field Studies. The field camp, usually run in June out of the Indiana University Geologic Field Station in Montana, USA, was forced to go virtual, as were almost all major UG geology field camps globally, due to tight travel restrictions as part of pandemic countermeasures this summer.

Along with three colleagues of the Indiana University team, Jess began field camp filming in Montana, in mid June. In an effort to replicate the field experience, along with short instructional videos, she filmed short clips of actual rock outcrops, which combined with topographic maps and Google Earth Pro, enabled students to 'fly around', and examine the rock features of each field stop. Students then compiled this information onto maps, in order to synthesise the geologic history of this area of the US.

Geology is the study of rocks, and although it is crucial for students to physically participate in field work, the virtual experience can bring students to see bigger pictures of geology. "As the student cannot physically get on the ground, they do miss out the chance to be able to look up at a mountain or down a slope - to feel the scale, but in the virtual world they can zoom in and out using Google Earth Pro functions, flying high up, above the exposures, to see how the general landscape compares to down on the ground where I am in the video. This helps students look at the big features first, then progressively go into the finer details, which help them avoid fixating about small things, and missing the bigger picture!"

It is true that the production of e-learning materials is time-consuming and labour-intensive, but she still thinks it is worth doing. Jess also adds, "Even when we go back to face-to-face classes, I plan to pre-record lectures because I've been moving towards a flipped classroom over the last few years as I feel it affords more time for in class practical activities. It's also really helpful to students as not everyone learns at the same pace."

E-learning can complement and enhance the traditional face-to-face learning by using innovative tools. "This pandemic experienced has given us that opportunity to find ways to remotely access remote places, so that students can experience them without physically being there, and it is a very powerful thing to do."



"As teachers, we are constantly reflecting to refine our craft. My advice is to have an open mind and give e-learning a try and see how it can benefit you and your students."

## Transforming learning experiences

Some might challenge that particular learning experiences might not be able to translate into e-learning. However, many e-courses have succeeded in conveying lab components across most subjects. "You can see examples ranging from field surveys to chemistry experiments. These learning experiences are challenges for e-learning that require innovation, but it can be very rewarding to teachers and students. For example, my own online teaching involves fieldwork in the Gobi Desert and in Patagonia, and visits to overseas museums, places that I normally cannot take my students," Dr Pittman explained.

It can be harder to engage with students across a screen, teaching needs to be e-learning specific. Dr Pittman stresses that it is a worthwhile learning opportunity despite the additional effort. "It is not possible to recreate many tactile learning experiences via e-learning despite innovations like virtual reality and holographic projections," he added.

## Comprehensive measures

The Faculty E-learning Portal is constantly being updated as a one-stop shop that curates e-learning related information from across the university including Technology-Enriched Learning Initiative (TELI), Information Technology Services (ITS), and

Centre for the Enhancement of Teaching and Learning (CETL). Training materials, equipment and facilities information, and a help section are the key portal features. Newer features include quickstart guides, a listing of upcoming HKU e-learning events, as well as an event digest that includes recordings and PowerPoint slides of past events. The portal's navigation and curation has been streamlined based on teachers' feedback.

"Some students prefer or learn better online. As teachers, we are constantly reflecting to refine our craft. My advice is to have an open mind and give e-learning a try and see how it can benefit you and your students. It might work well in some course aspects but not in others. However, there are compelling reasons to experiment, especially with more faculty colleagues available to share their e-learning experience and the increasing number of e-learning success stories in the faculty to draw on," concluded Dr Pittman.

# Retired Trailblazing Ecologist: A Lifelong Inspiration

For a newly retired professor, little seems to have changed for **Professor David DUDGEON**. In his office, folders and documents populated the shelves that line the well-lit room. We began the interview in his home away from home for the past 30 years, and from across his desk, Professor Dudgeon let out a reminiscent sigh as he took a trip down memory lane while recounting his beginnings with Ecology and Conservation.



**Professor David DUDGEON**  
Professor Dudgeon has spent almost 40 years at HKU. While at HKU, Professor Dudgeon has served, inter alia, as Department Head (repeatedly), Science Faculty Board Chairman, and Associate Dean. He was Director of the School of Biological Sciences from 2015 to 2018.

Although it was not his original plan, he found himself reading Zoology at university which led him into an exciting career in Ecology. His passion for this area lay in championing for nature: "Nature is silent, it's mute". Looking back at the time when the development of the Chek Lap Kok Airport was still underway, Professor Dudgeon remembered the resultant decline in Chinese White Dolphin populations. "We repeatedly hear this talk about balance, and eventually, our poor dolphins will be 'balanced' into extinction because they cannot speak up for themselves!" Professor Dudgeon always sustains his unfazed determination as it is an important quality that ecologists and conservationists should bring. "We have a role to make people aware of and be a spokesperson for the environment, because nature cannot speak for itself."

"A lecturer has to be entertaining to an extent, and to have a story to present. A boring lecture for 40 students is 40 hours wasted. The point of the lecturer is to try and inspire the students to feel they want to learn more about the subject themselves."



Student Reporter:

## A role model of students

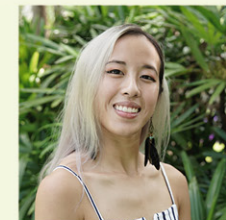
If you have ever had the opportunity to take one of Professor Dudgeon's courses, you would be blown away by the intricacies of each and every lecture. "A lecturer has to be entertaining to an extent, and to have a story to present. A boring lecture for 40 students is 40 hours wasted. The point of the lecturer is to try and inspire the students to feel they want to learn more about the subject themselves."

Professor Dudgeon, with over three decades of research and teaching experience at HKU under his belt, dished out some simple yet valuable advice to our students. "I always say to my students, what's the 'so what' question here? You might be studying koalas, and you might say not very much is known about koalas, but I'd say so what? Not very much is known about a lot of things." The humorous professor knows how to keep students' attention. "Or the worst-case scenario, you're in the Knowles Building trapped in the lift with the President and he asks why you're studying that you're studying, you had better have a good reason!"

## Kengie TANG

Major in Biological Sciences, Minor in Education

"I was beyond grateful to be given the opportunity to sit down with Professor Dudgeon for this interview. His contributions towards conservation is undoubtedly remarkable, and his advice truly resonated with me as I hope it would for other students. Leaving the interview, I have newfound motivation to dig deep into my passions as I continue my journey at HKU. It was truly an honour to speak with someone with as much wisdom and passion as Professor Dudgeon, and I sincerely wish him a well-deserved retirement!"



## Dr Adela Sau Mui LAU

Lecturer of Department of Statistics & Actuarial Science

**Teaching areas:** big data analytics and risk management, social media analytics and intelligent marketing, business/health informatics, knowledge management and IS adoption, e-business strategies and applications

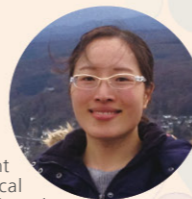
"Happy to be back to the HKU big family! You can call me Adela. I love teaching and applied research, and obtained several awards in teaching, research, and services before. Teaching and research cannot be separated. I always do applied research with my students and industries for innovations. Applied research trains students' on critical thinking, innovation creation, market leadership, effective industrial communications, and how to be leaders and innovators. My goal in HKU is to develop innovative industrial applications with my students."

## Dr Guanglian LI

Assistant Professor of Department of Mathematics

**Research interests:** multiscale modeling and analysis, high-dimensional approximation

"I am happy to join the Science family. My career vision is to design and implement efficient numerical algorithms for challenging practical applications. My research lies in numerical analysis and scientific computing in a broad sense. Particularly, I am interested in multiscale modelling and analysis, and high-dimensional approximation, with many practical applications, including porous media, metamaterial and uncertainty quantification."



## Professor Hoi Kwong LO

Chair Professor of Department of Physics; Research Division Director of Physics and Astronomy

**Research interests:** quantum information, quantum computing, quantum cryptography, and quantum internet

"I was born and raised in Hong Kong, but have lived overseas for over 30 years. So, I am excited to return to Hong Kong. I have been working in interdisciplinary research throughout my career and I look forward to bringing my research expertise and network to Hong Kong to make an impact. Prior to joining HKU, I worked at the University of Toronto for 17 years, and was a tenured Full Professor there since 2009."



## Dr Zhiqiang ZHANG

Lecturer of Department of Statistics & Actuarial Science

**Teaching areas:** time series analysis, extreme value theory, insurance risk modelling, AI models with applications in time series

"It is my pleasure to rejoin HKU as a Lecturer 18 years after I graduated from the University. It is also a big challenge to teach students in this big data era the knowledge on both classical statistics and modern data science."



## New Staff



## Food & Nutritional Science students serving the community under COVID-19

The protracted COVID-19 situation has put an unprecedented strain on food supply chains globally. While the community has been finding ways to step up to the challenges imposed by the fallout, 10 science students were also committed to foster food sustainability and help reduce food waste in the community by taking part in the Food & Nutritional Science Internship Scheme at NGOs.

Without any hesitation to contribute towards a more sustainable food environment, Year 3 student **Ms Tsz Kiu WONG** (third from the right) whose major is Food & Nutritional Science, got a 3-month internship in Feeding Hong Kong last summer, where she worked as an operation intern in the food sourcing team, assisting in identifying prospective food donors by placing cold-calls and sending cold-emails.



### Turning difficulties into opportunities

The universal work-from-home practice made it exceptionally challenging to promote food donation, especially when potential donors are generally less incentivised to do so under the pressure of economic turmoil. Nonetheless, difficulties and adversity make one grow, Tsz Kiu paid extra efforts in liaising with donors and took the opportunity to familiarise herself with the software "Salesforce", a cloud-based platform for customer relationship management which she has been learning to use in classes. She also compiled reports on potential food donors, amount of food donated, as well as the prediction of their future growth.

Being a helper of entire logistics process, from donation pitching to food collection and sorting, Tsz Kiu realised that the internship was a golden opportunity for her to get acquainted with how the food donation chain works. Other than hands-on working skills, she also learnt to be more patient and caring after making numerous phone calls and working with people in need.

### ABOUT Food & Nutritional Science Internship Scheme

Among the 77 students participating in the Food & Nutritional Science Internship Scheme, 10 of them were with NGOs. The scheme aims to offer students the opportunities to gain authentic discipline-related working experience in the industry. Students have to take at least 160 hours of internship work, either within or outside the University, then compile a report and give a brief presentation upon completion.



## PhD Student discovered a solid evidence of formerly elusive abrupt sea-level jump

### Solving the puzzle of second largest meltwater pulse

A study conducted by **Ms Skye Yunshu TIAN**, PhD student of School of Biological Sciences and Swire Institute of Marine Science, was published in *Quaternary Science Reviews*, revealing a robust evidence of formerly elusive abrupt sea-level jump event during the climatic warming from the last ice age to the current climate state.

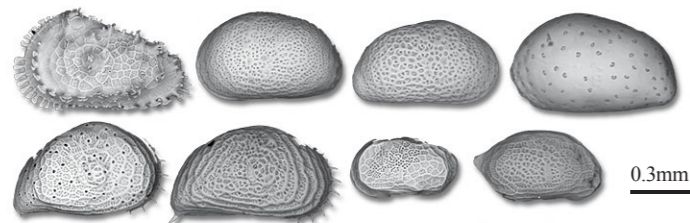


Image 2: Scanning Electron Microscopy image of typical shallow-marine (neritic) ostracod species from the study sites

The research study was under the supervision of **Dr Moriaki YASUHARA**, Associate Professor of School of Biological Sciences and his Postdoctoral Fellow **Dr Yuan Yuan HONG**, in collaboration with scientists at HKU and UiT The Arctic University of Norway. It was developed from Ms Tian's undergraduate final year project in the Ecology & Biodiversity Major.

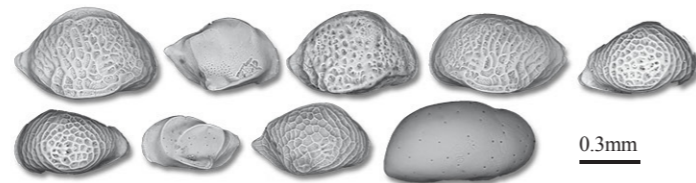


Image 1: Scanning Electron Microscopy image of typical deep-sea (bathyal) ostracod species from the study sites

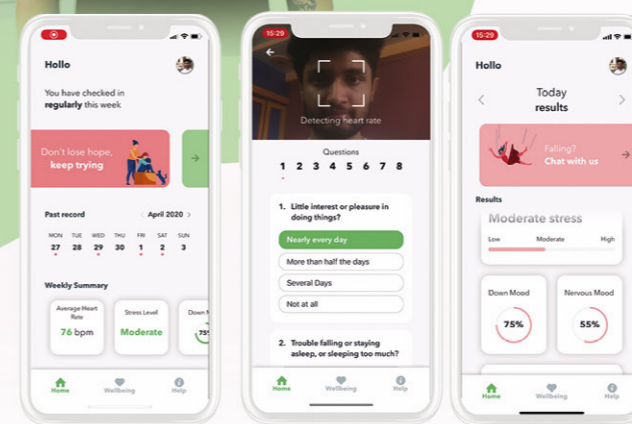
The study presented evidence of abrupt sea level change between 11,300 – 11,000 years ago of 40m – 80m in Svalbard, the Arctic Ocean. High time-resolution fossil records indicate a sudden temperature rise due to the incursion of warm Atlantic waters and consequent melting of the covering ice sheets. Because of the rebound of formerly suppressed lands underneath great ice load, the sedimentary environment changed from a bathyal setting (Image 1) to an upper-middle neritic setting (Image 2) at the study sites. This is the first solid evidence of relative sea-level change of meltwater pulse 1B discovered in ice-proximal areas.



The paper "Deglacial-Holocene Svalbard paleoceanography and evidence of meltwater pulse 1B" is published in *Quaternary Science Reviews* in April 2020: <https://bit.ly/3hCwIE6>

## Science student's team won 2020 Microsoft Imagine Cup World Champion

With an interactive mobile app to aid mental health care for youth



The design layout of the mobile app.



Video sharing by Cameron: <https://bit.ly/32JGGxB>

**Mr Cameron van BRENDA**, Year 4 BSc student majoring in Molecular Biology & Biotechnology, won the 2020 Microsoft Imagine Cup World Champion with some likeminded students in a team that they co-formed called "Hollo". It is the first time a Hong Kong team took home the Cup, which is often called the "Olympics of student tech competitions".

The team noticed that mental health aid was not reaching the younger generations effectively and envisioned a future of tech-based, accessible, and comprehensive mental health management tools. With this in mind, the team developed an interactive mobile app for users and a comprehensive case management dashboard for therapists & NGOs; it also presents a collaborative and scalable mental health platform which aims to cut the heavy cost of mental health care for youth and make support more accessible.



Cameron van BRENDA (on the right) with his teammate Ajit Krishna NAMAKKAL RAGHAVENDRAN.

Over 28,000 students from more than 200 countries registered to take part in the Microsoft Imagine Cup and only 10 teams were selected for the Asia Regional Final. In winning the World Champion, the team won USD100,000, a mentoring session with Microsoft CEO Satya Nadella, and USD50,000 in Azure grants.



<https://hollo.hk>

## Students' Awards and Developments

**Mr Huaqing JIN** (on the left) and **Mr Chenyang ZHANG**, PhD students from the Department of Statistics & Actuarial Science, received the Finalist Award of the SCT Thomas Chalmers Student Scholarship by the Society for Clinical Trials. The papers they presented at The Virtual 2020 Annual Meeting of SCT in May online were "Bayesian Nonparametric Analysis for Restrict Mean Survival Time" and "Bayesian Enhancement Two-Stage Design With Error Control for Phase II Clinical Trials" respectively.



**Mr Zhongjian WANG**, PhD graduate of Department of Mathematics, got the William H Kruskal Instructor position at The University of Chicago and will start his position in the fall of 2020. He was supervised by **Dr Zhiwen ZHANG**, Associate Professor of Department of Mathematics, and his chosen field of study including Applied and Computational Mathematics and Uncertainty Qualification for Stochastic Differential Equations (SDEs).

PhD candidate **Ms Kanmani Chandra RAJAN** of School of Biological Sciences got the Online People's Choice Award at the HKU Three Minute Thesis (3MT) Competition 2020, where postgraduate students competed in communicating their research to a layman audience in only three minutes. Her thesis title was "How to save oysters from ocean acidification", explaining the effect of ocean acidification on calcifying organisms.



Revisit Kanmani's presentation at: <https://bit.ly/34X0b8C>



Kanmani (second from the right) won the Online People's Choice Award in 3MT, her primary supervisor is **Dr Thiyagarajan VENGATESEN** (second from the left), Associate Professor of The Swire Institute of Marine Science and School of Biological Sciences



## Summer Leadership Forum

2020  
August  
11



**Professor Matthew Evans**  
Dean, Faculty of Science

Dean of Science **Professor Matthew EVANS** and four young alumni from the Faculty shared their insights on how scientific mindset helps nurture leaders and create impacts at our Summer Leadership Forum, which were live-streamed on social media outlets.

“The long-term success of a business hinges on the objective analysis rather than subjective insights, therefore, using a data-driven approach to make evidence-based decisions can always help in growing your leadership skill.”



**Mr Desmond CHU**

BSc in Risk Management  
Director of Procter & Gamble (P&G)



**Dr Kenneth LAI**

BSc in Animal and Plant Biotechnology  
Founder & Executive Director of Novus Life Science

“Logical thinking can help identify problems, while recruiting a pool of talents with diverse backgrounds can amplify the synergy and solve many of them.”

**Ms Vesta ERESTA JAYA**

BSc in Molecular Biology & Biotechnology  
Regional Brand Manager of Astellas Pharma Inc

“Leadership requires a combination of both science and business, and all the politics behind it.”



**Dr Data NG**

(BSc in Physics, PhD in Positron Physics & Biophysics)  
Co-founder of Printact and BioX

**Dr Data NG**

BSc in Physics, PhD in Positron Physics & Biophysics  
Co-founder of Printact and BioX

“Leaders with science backgrounds should humanise the science, and solve our problem with the help of technology.”



**Ms Vesta ERESTA JAYA**

(BSc in Molecular Biology & Biotechnology)  
Regional Brand Manager of Astellas Pharma Inc

**Why Science Matters in Nurturing Leaders**  
August 11 (Tue) 5:30pm  
**Professor Matthew Evans**  
Dean, Faculty of Science

**Alumni from Faculty of Science**

- Mr Desmond CHU**  
(BSc in Risk Management)  
Director of Procter & Gamble (P&G)
- Dr Kenneth LAI**  
(BSc in Animal and Plant Biotechnology)  
Founder & Executive Director of Novus Life Sciences
- Dr Data NG**  
(BSc in Physics, PhD in Positron Physics & Biophysics)  
Co-founder of Printact and BioX
- Ms Vesta ERESTA JAYA**  
(BSc in Molecular Biology & Biotechnology)  
Regional Brand Manager of Astellas Pharma Inc

**Live on Facebook @HKU 100 / Twitter @HKUniversity**

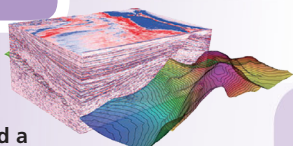


Revisit the Summer Leadership Forum:  
<https://bit.ly/2HXJ64Q>

## News & Events

### News

The Faculty **received a large donation of geological exploration software from Petroleum Experts Ltd.**, of which its full monetary value is equivalent to roughly HKD 21.2 million. The donation includes ten sets of the MOVE suite of programmes for exploration of crustal development in three-dimensions-plus-time, allowing geologists in the Department of Earth Sciences to characterise complex geologies in 3D, and will be benefited tremendously from its capacity for rapid generation of highly detailed kinematic reconstructions.



### Event highlights

2020  
October

One-stop Platform for Science Undergraduate Admissions is officially launched. It is a comprehensive platform with all our programme information with no boundaries. You will get to know our undergraduate programmes as well as the diverse learning experiences of our students, and have a taste of studying with us through our science talks, demonstrations and virtual tours. Check it out and plan your university studies ahead of time!

Read more: <https://bit.ly/352Uy6W>



2020  
October  
31

The **HKU Virtual Information Day** is a brand new experience for you to shop around our programmes through webinars, live chat, videos and information hub. Everything is readily available just at your fingertips.

Read more:  
<https://bit.ly/36CZBO8>



## Acknowledgements

We would like to express gratitude to our donors for their recent support, which is paramount for us to grow and scale new heights. (in alphabetical order)

### Individual donors

Professor C M CHE  
Dr Ivan K CHU  
Mr Lam KAN  
Ms Oi Lin LEE

### Corporate donors

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