Standing on the Sturdy Oak and Scale High in Next Decade
Message from the Chief Editor

Professor Billy Kwok Chong CHOW
Chief Editor
Professor, Chair of Endocrinology

Dear Readers,

Science Family Achieving Excellence in Every Aspect

Research Excellence

Novel Pioneer to Create Impacts

Since second half of 2019, politics divergence in Hong Kong and outbreak of coronavirus have tested our endurance, our strength and our courage. Given our own challenges and concerns, how do we maintain our equilibrium in such trying times? It seems that most of us are feeling more isolated than ever. Are we still able to achieve our shared goals collectively? It may seem impossible in other times in history, yet now with our advancement in technology and communications, we can connect without pause or delay. Distance is no longer a barrier and our sharing and exchanges can continue. It may even possible that in this trying time, new synergy of ideas will arise and different channels of exchange might open up for all of us.

Reading this newsletter by our science family, I am sure you agree with me even more that the Faculty has reached a new level of achievement. We know our minds are compelling intricate instruments powered by will and determination. Our desire to achieve has never and will never be dwarfed by a few obstacles. In fact, when facing adversary, we work harder and learn to be better than ever before.

I remember in the beginning of planning for Faculty’s 80th Anniversary, we aspired to “Achieve, Connect and Educate”. We are glad that strong network has been built in the anniversary year. The list of our supporters in this newsletter is clear evidence of our connection. The resources will be used for educating the new generation of students and creating new knowledge. Looking at “Achieve, Connect and Educate”, we see that one fuels the other as a continuous cycle.

Let this be an opportunity for our mighty oak to expand and grow power previously unknown.

Yours sincerely,

Professor Billy Kwok Chong CHOW
Chief Editor
Professor, Chair of Endocrinology

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Science@HKU, a platform for intellectual minds to meet and exchange. In HKU Science, we strive for excellence in both teaching and research. We create knowledge and nurture generations of scientifically literate alumni to benefit mankind. Here at home of Science, the fire to pursue growth and excellence never ceases burning.

Oak Anniversary is an important time for us to reflect how far we have gone. After eight decades, we see the fruits of our passion and devotion. Research of our academics are internationally recognised and our students have grown into persons who excel in various fields and give back to society. Science provokes innovative ways of thinking and cultivates mentality to contribute to the world. The achievements of our academics and alumni inspire us to scale new height in next decade.

Let us know the stories of our faculties and distinguished alumni and have your passion stirred up.

Message from the Chief Editor

Science Family Achieving Excellence in Every Aspect

Spotlight – Research Excellence

Professor Chi Ming CHE
Zhou Guangzhao Professor in Natural Sciences; Head of Chemistry

Q1 What is your vision in leading the Laboratory for Synthetic Chemistry and Chemical Biology?

The Laboratory aims to promote interdisciplinary research in Synthetic Chemistry, Chemical Biology, and Medicines, and to develop strong international links between Hong Kong, UK, USA and mainland China. I hold the vision that it could be a Hong Kong premier research center in “Innovative Translational Chemistry for Health Science and Medicines”, and to become an incubation centre for innovative technology start-up companies in Hong Kong.

Q2 What is the significance of securing the funding? In what ways does it facilitate your research?

The funding is important to develop an ecosystem in Hong Kong for interdisciplinary research endeavour. With such, we can foster critical mass of talents who share the passion and similar views to do innovative, translational Chemistry and Biology with impactful applications in Health Science and Medicines, nurture the next generation of young scientists and establish the infrastructure faculty and platform for interactive collaboration and dialogues between academics and industry.

Q3 What do you wish to achieve in next decade in scientific research?

Hong Kong is a world-premier research centre in Translational Synthetic Chemistry and Chemical Biology. One of the impacts I want to achieve is to develop innovative medicines and new modalities for anti-cancer treatment. New platinum chemotherapy with selective targeting to cancer cells and relative non-toxic natural product compounds from traditional Chinese medicines for treatment of drug resistant and metastatized cancers, can be used in combination with precision radiotherapy and immunotherapy for cancer treatment to increase the survival outcome.

Q4 You once mentioned that your golden era has just arrived, how would you continue to innovate in scientific research?

Yes, I am entering my golden era of research; I would very much like to see and contribute to the quest of relative non-toxic medicines for treatment of cancer patients with improved survival outcome becoming a reality. I hope that with my experience and networks, I can help to promote Hong Kong chemistry in biological sciences and medicine, and to make impactful contributions to health science and to the society.

Q5 Doing research will inevitably encounter obstacles and failures, what are the motto or philosophy reflecting your value to stay persistent?

Research to me is just experience; there is nothing called success and failure. It is a journey that I would like to get involved. With my age over 62, now apart from merely fulfilling my curiosity, I would also like to show the beauty of research to the society, that research could actually help and benefit the society. I hope I can achieve this point through this Health@InnoHK Programme.

Q6 What is your advice to young people who are interested in science and doing scientific research?

To do scientific research, one has to have your passion stirred up. To stay focused, always has self-reflection and tries to learn from the best, and be prepared to endure loneliness.
Q1 Being elected as a member of Chinese Academy of Sciences (CAS), what does it mean to you?
It is the biggest honour to me, recognising my academic achievements in Earth Sciences. Meanwhile it also implies more responsibilities and obligations I should undertake, especially in making strategic plans for the development of Earth Sciences and training young researchers in Hong Kong and mainland China.

Q2 How were you be inspired to become a scientist?
I made up my mind to become a scientist when I studied at junior high school in late 1970s. During that time the society was in the atmosphere of admiration toward scientists, for they contributed greatly to the advancement of the society. I was also deeply influenced by famous Chinese scientists at that time, who inspired me to pursue academic career.

Q3 How do you develop your research interests from a wide range of subject fields?
My current research focuses on the early Earth and supercontinents in Earth’s history, which stemmed from my curiosity to unknown geological phenomena and unresolved issues in Earth Sciences, of which the most interesting issues to me are how ancient continents formed at the early stage of Earth, and how and when old continents met together to form supercontinents.

Q4 What is the importance of doing Earth Sciences research?
Earth is our home and thus we should know how Earth was formed and developed from initial barren conditions to current habitable environments. Such knowledge is also important for exploring new energy materials and devices, in particular, organic light emitting diodes and solid state lithium ion battery. It comprises a lab space of 12,000 sq.ft. in Hong Kong Science Park.

Q5 What are the visions or impacts you would like to achieve via your research?
“Aim high, work hard, learning from failure, patience and persistence make an unbeatable combination for success.”

Q6 What are the visions or impacts you would like to achieve via your research?
“Seek solutions with both fundamental scientific and practical value.”

Q7 What is your advice to young people who are interested in science and doing scientific research?
Success takes time and do not give up when you make mistakes. Instead, you need to learn from failures and improve yourself. You may encounter many defeats, but you must not be defeated.

Q8 You may encounter many defeats, but you must not be defeated.
My goal is to establish a new geodynamic theory that can reasonably explain the origin of ancient continents, since current plate tectonics is unsuccessful on this respect. I also wish to set up an international research centre to foster international collaboration and accomplish this goal.

Q9 What is the importance of doing Earth Sciences research?
To me, the best contribution we can make as academics is to inspire the young like myself many years ago.

Q10 Inspire the young like you were inspired.
I was always curious to understand the nature, and physics is the most fundamental layer of it. My research interests lie in the physics of quantum degrees of freedom in condensed matter, with a current focus placed on exploring spin and valley pseudospin phenomena in atomically thin two-dimensional materials and their van der Waals heterostructures.

Q11 What is your future research goal?
The path to these research interests is, to certain extent, influenced by great people that I was influenced by.

Q12 “Put heart on what you can do; strive for what others cannot do; persist in what you like to do.”
My research interests are at the interface of synthetic chemistry, medicinal chemistry and chemical biology, ultimately aiming at developing novel therapeutics. Having synthetic chemistry as my research interest because I appreciate the power and beauty of creating things that do not exist in nature with chemistry.

Q13 Seek solutions with both fundamental scientific and practical value.
Over the past decade at HKU, our research lab has developed several in-house chemical tools to study biology. For the next decade, we will continue exploring biological territory beyond traditional biochemistry and recombinant technology, towards understanding and tuning of natural systems with synthetic biomolecules.

Q14 Put heart on what you can do; strive for what others cannot do; persist in what you like to do.
Fruits of research shall not be restricted in the lab. We are translating our fundamental scientific findings into applications. By doing so, we can use science to benefit the humankind.
The complexity and uniqueness of life has always fascinated me. My original training as an organic chemist has provided me with a unique perspective to view and solve problems in biology.

Working at the interface of chemistry and biology, I have developed chemical tools and approaches to address key questions in epigenetics. Our research is helping to improve our understanding of the link between errors in epigenetic regulation and the development of human diseases such as cancer.

I believe that a scientist should not be bound by current knowledge and previous experience, but always be ready to take new challenges to explore an unfamiliar field. With our team’s relentless effort, I hope that our research will lead to new and improved therapeutic strategies.

Dr Jin WU
Assistant Professor of School of Biological Sciences

Space exploration is one of the greatest human achievements, driven by curiosity. Space weather poses impacts on our GPS navigation and radio communication, etc., and on the design and operations of satellite missions to other planets.

As a theorist, my research focuses on exploring the changing environmental conditions beyond planetary lower atmospheres, aka space weather, which involves the use of some of the world’s most powerful supercomputers. They will also be useful in the design of future space missions by creating “virtual space weather systems” for planetary missions.

Space exploration is borderless. My goal as a teacher is to educate the general public about the fantastic part of learning space science, and also to train the next generation of space scientists.

Dr Binzheng Zhang
Assistant Professor of Department of Earth Sciences

"Impact the world with research and education.”

In view of contemporary environmental challenges tied to global warming, I am inspired to understand how ecology of global plant community can be an important and integral part of Earth’s climate, with an ultimate goal to help mitigate global warming and build a more secure future that can increase our natural ecosystem’s resilience and adaptability to climate change.

In retrospect, I was greatly inspired by my teachers who instilled in me their passions and enthusiasm. Now, as a teacher, I believe that higher education should equip students with self-learning and problem-solving skills, and instill in them a broad vision of the subjects and its connections with the society. I hope my teaching can help students to develop critical thinking and strong skillsets, prepare necessary mindsets that will benefit them for life.

Dr Zhi Xing LI
Assistant Professor of Department of Chemistry

"Embrace the complexity of life and keep exploring.”

"On top of solid understanding, creativity is the key.”

As a chemist, I have always been fascinated by the beauty and diversity of structures of molecules, crystals, and even DNA, but realize that such structures are rare for particles. To address this problem, one of my team’s key strategies is to chemically synthesize LEGO-like particles. We focus on colloidal self-assembly, the aim of which is to put together colloids – particles one hundredth the width of human hair – to form 3D superstructures and therefore create new materials. Our effort and discovery will make an impact on emerging applications including photonic, printing, drug-delivery and nano-machinery, etc.

In pursuing scientific goals, I emphasize “conceptual novelty”, which often leads to big leaps in scientific progress, and therefore creates new materials. Our effort and discovery will make an impact on emerging applications including photonic, printing, drug-delivery and nano-machinery, etc.

Dr Yufeng WANG
Assistant Professor of Department of Chemistry

"Space exploration is borderless, so as curiosity and imagination.”

"Professional Excellence Award" is the highest recognition that the University confers on staff members. It is a competitive and prestigious award presented annually to individuals who have shown outstanding contributions in their respective fields.

Dr Joseph R MICHALSKI, Associate Professor of Department of Earth Sciences, received the Professional Excellence Award 2018 -19.

Ms Joyce Sok Fan LEI, Clerk of Department of Mathematics, received the Excellent Teaching Assistant Award 2018 -19.

Mr Ayon Ahmed HASSAN, PhD student of Department of Biological Sciences, received the Outstanding Young Researcher Award 2018 -19.

Mr Cody Lee COLLEPS, PhD student of Department of Earth Sciences, received the University Outstanding Teaching Award 2019.

Professor Pauline CHIU, Professor of Department of Chemistry, received the Research Output Prize 2018 -19.

Professor Vivian Wing Wah YAM, Philip Wong Wilson Wong Professor in Chemistry and Energy of Department of Chemistry, was conferred the Foundation Lectureship Award 2019 by the Federation of Asian Chemical Societies (FACS), which comprises over 30 chemical societies across Asia. With one Foundation Lectureship awarded every two years among many brilliant chemistry academics across Asia, the fellowship is naturally competitive and prestigious.

Professor Vivian Wing Wah YAM
Philip Wong Wilson Wong Professor in Chemistry and Energy of Department of Chemistry

Dr Ormiaki YASUHARA, Associate Professor of School of Biological Sciences, was awarded the 20th Biwako Prize for Ecology by the Ecological Society of Japan, recognizing his outstanding research achievements and societal contributions in the field of aquatic ecology.

Dr Ormiaki YASUHARA
Associate Professor of School of Biological Sciences

"External Accomplishments"

"Internal Awards"

University Awards

University Outstanding Teaching Award 2019:

• Professor Pauline CHIU, Professor of Department of Chemistry

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Walking through 80 years, HKU Science nurtures generations of alumni, who devote their time and effort for the betterment of society. Distinguished Alumni Award 2019 was launched to honour their commitment in striving for excellence and creating impact by science knowledge and skills.

In this exercise, 18 Distinguished Alumni were selected in celebration of our Oak Anniversary. Together with the 43 Distinguished Alumni selected on the occasion of Faculty’s Platinum Jubilees in 2009, we have 61 Distinguished Alumni who excel in their walks of life, inspiring the future generations.

Distinguished Alumni 2019 were selected based on one or more of the following criteria:

Distinguished Alumni with notable achievements in science education or scientific research

Distinguished Alumni with outstanding services & contributions to HKU

Distinguished Alumni with exceptional accomplishments in their professions

Distinguished Alumni with impressive services & contributions to society

Prof Shuk Mei HO
1974 BSc graduate; 1977 PhD graduate
Vice Chancellor for Research of University of Arkansas for Medical Sciences, Arkansas, USA (2019 - present)
Director of Cincinnati Cancer Centre and Hayden Family Endowed Chair for Cancer Research University of Cincinnati Medical Centre, Cincinnati, USA (2013 - 2019)

Prof Frederick Koon Shing LEUNG
1977 BSc graduate
Chair Professor and Kintoy Professor in Mathematics Education, HKU
Changjiang Scholar of Ministry of Education, China
Hans Freudenthal Medallist 2013

Prof Tze Leung LAI
1972 BSc graduate in Mathematics
Ray Lyman Wilbur Professor of Statistics, Stanford University
Director of Financial and Risk Modelling Institute, Stanford University

Prof Kam Biu LUK
1976 BSc graduate
Professor of University of California, Berkeley
Hung Hing Ying Distinguished Visiting Professor in Science and Technology, HKU
Laureate of China’s 2019 Future Science Prize Fellow of American Academy of Arts and Sciences

Dr Boon Ying LEE
1977 BSc (General) graduate; 1979 PhD graduate
Former Director of Hong Kong Observatory

Mr Kar Chun LO
1977 BSc graduate
Member of Hong Kong Exchange Fund Advisory Committee, Hong Kong Monetary Authority
Non-Executive Director of Securities and Futures Commission

Mr Jasper Yok Sing TSANG
1972 BSc graduate
Former President of Legislative Council
Vice Chairman of Hong Kong Policy Research Institute

Prof Tze Leung LAI
1972 BSc graduate in Mathematics
Ray Lyman Wilbur Professor of Statistics, Stanford University
Director of Financial and Risk Modelling Institute, Stanford University

Prof Kam Biu LUK
1976 BSc graduate
Professor of University of California, Berkeley
Hung Hing Ying Distinguished Visiting Professor in Science and Technology, HKU
Laureate of China’s 2019 Future Science Prize Fellow of American Academy of Arts and Sciences

Dr Anissa Lai Kuen CHAN WONG
1980 BSc graduate
Chairman of Task Force on Review of School Curriculum
Founding Chairman of Hong Kong Principals’ Institute
Principal of St Paul’s Co-educational College (2004 – 2017)

Mr Peter Wing Leung LAI
1980 BSc graduate
Financial Commentator
Fellow of Hong Kong Securities and Investment Institute Fellow of The Hong Kong Institute of Directors

Prof Paul Kwan Sing LAM
1982 BSc graduate; 1984 MPhil graduate
Executive Director of Special Projects of City University of Hong Kong
Director of State Key Laboratory of Marine Pollution

Ms Oi Lin LEE
1970 BSc (Hons) graduate
Principal of St Paul’s Co-educational College (2004 – 2017)
Principal of USA Chapter, California State University, Long Beach, USA
President of USA Chapter, HKU Science Alumni Association

Mr Chee Kuen YIP
1981 BSc graduate
Former Deputy Executive Director of Vocational Training Council Life member, Past Vice Chairman and Current Academic Advisor of Hong Kong Surface Finishing Society

More about Science Distinguished Alumni:

Awardees in 2019: 
https://bit.ly/2D8ziPE
Awardees in 2009: 
**Research Stories**

**Reconstructing Fossil Colour and Studying Fossils with New Technology**

*By Dr Michael Pittman, Research Assistant Professor of Department of Earth Sciences*

Colour and patterns are critical to understanding animal life including their ecology, physiology and behaviour. Our international team, including PhD student Ailindam ROY, has proposed a new framework for reconstructing palaeocoulor. This framework overcomes past challenges by incorporating both the chemical signatures and fossilisation potential of different pigments as well as all fossilised anatomy preserved. Laser Stimulated Fluorescence (LSF) is an important tool in this framework. This in-house technique developed with research associate Thomas G KAYE recently showed that the first discovered fossil feather was not from the iconic early bird Archaeopteryx but an extinct enantiornithine bird – the most diverse bird group of dinosaur times – whose precociality they were born ready to move around.

The first discovered fossil feather was not from the iconic early bird Archaeopteryx: Left feather under normal light; Middle: original 1861 drawing; Right: feather under LSF confirms quill in drawing permitting a complete identification.

*Image Credit: Michael Pittman / Thomas G Kaye*

**Decoding a New Sign in Chromatin Maze**

*By Professor Xiang David LI, Professor of Department of Chemistry*

The chromatin, in which DNA is packaged with proteins called histones, is like a maze. Different histone modifications serve as “road signs” that give order to chromatin-templated events, such as gene expression, DNA replication and damage repair. In a search for new chromatin “road signs”, Professor Xiang David LI’s team, in collaboration with Dr Karen Wing Yee Yuen’s and Dr Jason Wing Hon Wong’s (Biomedical Sciences) groups, identified lysine glutarylation of histone H4’s Lys91 (H4K91glu) as a novel histone mark and unraveled its regulation and function in chromatin structure and dynamics, putting us one step closer towards deciphering the yet mysterious chromatin maze. The findings open opportunities for the development of therapeutic agents for the treatment of human diseases associated with misregulation of histone H4K91glu.

**Win-win Strategies to Tackle Proximal and Horizon Threats to Biodiversity**

*By Dr Louise ASHTON (left), Assistant Professor of School of Biological Sciences (SBS), Dr David BAKER, Associate Professor of SBS; Dr Timothy BONEBRAKE, Associate Professor of SBS; Dr Caroline DINGLE, Senior Lecturer of SBS; Ms Fengyi GUO, MPhil graduate of SBS*

Millions of species are at risk of extinction, putting our planet towards its limits and changing nature’s contributions to people, including food production and our health. Several authors from School of Biological Sciences recently called for win-win strategies for conservation, across multiple scales of time and space, to address the growing, multiple and interacting threats to biodiversity. They published an article in the journal *Trends in Ecology & Evolution*, urging for the needs of large-scale, long-term collaboration to tackle proximal and horizon threats to biodiversity, instead of merely focusing on protecting species from immediate and localised threats. Funding and publishing models need to be re-evaluated to find ways to encourage integrative research that considers current and future threats.

**Evaluation of Bromodomain Inhibitors as Drug Candidates in Living Cells**

*By Professor Xiang David LI, Professor of Department of Chemistry*

Bromodomains, whose misfunctions are associated with human diseases, have emerged as “hot spots” for drug discovery, attracting inputs from both academia and pharmaceutical giants. In humans, there are 61 different bromodomains with high structural similarity. A comprehensive evaluation of a drug candidate’s cellular selectivity is important to avoid off-target toxicity. Recently, Professor Xiang David LI’s team developed the first chemical proteomics platform to comprehensively evaluate bromodomain inhibitors in living cells. Several known inhibitors were examined by the platform. The results matched perfectly with the reported selectivity. The researchers envision that this platform can facilitate the further development of novel bromodomain inhibitors as promising therapeutic agents.

**Press Release:**

https://bit.ly/3BDHy7F

**Development of a Novel Chemical Proteomics Platform for Comprehensive Evaluation of Bromodomain Inhibitors in Living Cells**

*Press Release:

https://bit.ly/2V4mXcA*

**Discovering Cell Division Requires a Balanced Level of Non-coding RNA for Chromosome Stability**

*By Dr Karen Wing Yee YUEN, Associate Professor of School of Biological Sciences*

Our genetic information, composed of deoxyribonucleic acid (DNA), is packaged in chromosomes. Not only the protein-coding genes are important, non-protein-coding RNAs copied from DNA are found to be of vital functions too. To ensure the genetic code is maintained accurately in all cells, each cell must divide its chromosomes equally to its two daughter cells. Errors in chromosome separation will cause chromosome loss or gain, which may result in spontaneous abortion, genetic diseases or cancers. One chromosome region essential for proper chromosome segregation during cell division is the centromere.

Dr Karen Wing Yee YUEN’s Lab from the School of Biological Sciences discovered that centromeric DNA is used as a template to produce a non-protein-coding, centromeric RNA (cenRNA), which is crucial for centromere function and chromosome stability. The findings were recently published in one of the top multidisciplinary journals, *Proceedings of the National Academy of Sciences (PNAS)* in USA, and recommended by F1000Prime, which represents the top articles in biology and medical sciences.

**Press Release:**

https://bit.ly/2vEmXCq

**Space–Time Templet to Identify Proximal and Horizon Threats to Biodiversity**

*Ms Fengyi GUO, MPhil graduate of School of Biological Sciences (SBS); Dr Caroline DINGLE, Senior Lecturer of SBS; Dr Timothy BONEBRAKE, Associate Professor of SBS; Dr David BAKER, Associate Professor of SBS; Dr Jason Wing Hon Wong (Biomedical Sciences)*

Research Assistant Professor of Department of Earth Sciences

Space–Time Templet to Identify Proximal and Horizon Threats to Biodiversity

*Press Release:

https://bit.ly/2STNo5w*
A Heavyweight Stellar Champion for Dying Stars

By Professor Quentin PARKER, Professor of Department of Physics

Planetary nebulae (PN) are the ejected, ionised envelopes of dying stars. Theory indicates that they emerge from stars 1-3 times the mass of our Sun. Until now, the only evidence to back this is from stars 1-3 times bigger than our Sun with nothing at higher masses. Professor Quentin PARKER and his PhD student Frapplon presented a PN emerging from a star born with 6.5 times the mass of the Sun, published in the prestigious Nature Astronomy in September 2019. Their results, based on the rare discovery of PN BPM1613-5406 in Galactic star cluster NGC 6067 and using data from the 10m SALT telescope, confirmed larger-mass stars can form PN. The finding is contributing to a better understanding of stellar and Galactic evolution.

Research Stories

One Origin of Globular Clusters around Giant Galaxies being Unveiled

By Dr Jeremy LIM, Associate Professor of Department of Physics

Globular Clusters (GCs) — containing up to ten million stars in a densely packed sphere — are thought to have formed soon after the Universe began 13.8 billion years ago. In work utilising images from the Hubble Space Telescope and published in Nature Astronomy, an international research team led by Dr Jeremy LIM has discovered that GCs are continuing to form, even at the giant galaxy. This cool gas precipitated from an enormous reservoir of hot gas that infuses the entire galaxy cluster.

The GCs were produced in a complex filamentary network of cool gas that extends to the outer reaches of the giant galaxy. This cool gas precipitated from an enormous reservoir of hot gas that inflates the entire galaxy cluster.

Making Rice Grains Bigger and Better

By Professor Mee Len CHYE (middle), Wilson and Amelia Wong Professor in Plant Biotechnology of School of Biological Sciences

Rice provides a daily subsistence for about three billion people worldwide and its output must keep pace with a growing global population. Professor Mee Len CHYE’s Lab has identified a rice acyl-CoA-binding protein (OsACBP2) that when overexpressed in transgenic rice enhanced grain size, weight and biomass by 10%. The research project, funded by the Research Grants Council of Hong Kong and the Wilson and Amelia Wong Endowment Fund, has yielded a paper in The Plant Journal and an international patent has been filed (Patent Application No. WO 2019/104509). OsACBP2 is a lipid-binding protein that binds lipids such as acyl-CoA esters, the major precursors in seed oil production. OsACBP2 overexpression also improved nutritional value with a 10% increase in lipid content of rice bran and whole seeds. As rice bran oil is considered highly valuable because it contains bioactive components that have been reported to lower serum cholesterol and possess anti-oxidation activities, this technology would not only help address food security but also elevate nutritional properties.

Predict Disease-associated Mutations of Metalloproteins

By Professor Hongzhe SUN (second right), Norman and Cecilia Yip Professor in Bioinorganic Chemistry of Department of Chemistry

Metal ions play pivotal roles either structurally or functionally in the (patho)physiology of human biological systems. It was discovered that a mutation in human genome is strongly associated with different diseases. If these mutations happen in the coding region of DNA, it might disrupt metal-binding sites of the proteins and consequently initiate severe diseases in humans. Using a deep learning approach, the team predicted disease-associated mutations of the metal-binding sites in a protein. This is the first deep learning approach for the prediction of disease-associated metal-relevant site mutations in metalloproteins, providing a new platform to develop potential drugs more efficiently and economically.

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Short-term Ecological Risk of Palm Stearin to Marine Ecosystems

By Professor Kenneth Mei Yee LEUNG, Professor of School of Biological Sciences & The Swire Institute of Marine Science

In August 2017, a cargo vessel accidentally released 1,000 tonnes of palm stearin (PS) into the Pearl River Estuary and about 200 tonnes of them reached the southwest coast of Hong Kong. As their impact to marine ecosystems was largely unknown at the time, Professor Kenneth Mei Yee LEUNG and his team conducted a comprehensive investigation. They found all seawater and sediment samples collected from six coastal sites were heavily contaminated by PS within 1 week and their levels significantly decreased to pre-accident levels after 4 months. Waterborne exposure to PS can inhibit the growth of microalgae, copepod and fish, and cause mortality to brine shrimp, copepod and rotifer. Fortunately, the results indicated that the negative impact of PS was relatively transient and short-term.

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Immediate action for removal of the palm stearin from the shores jointly for the government and citizen was important for maintaining the long-term impacts to the marine environment.

August 2017

- August 2017
- November 2017

A lot of palm stearin were found on the shore of Repulse Bay in early August 2017.


Poor Dietary Habits May Increase the Risk Factors for AMD Development

By Dr Jetty Chung Yung LEE, Senior Lecturer of School of Biological Sciences

Age-related macular degeneration (AMD) is one of the most common causes of vision impairment among the elderly in Hong Kong. The major symptom involves the gradual blurring of central sight, triggered by the multifactorial degeneration of retinal cells. As the disease progresses, certain patients with atrophic AMD (dry-form) might develop macular neovascularisation (wet-form), causing rapid loss of vision. In an observational study, wet-form AMD patients in Hong Kong were deficient in fatty fish (omega-3 fatty acid) and dark green vegetables (carotenoids), and had excessive red meat (omega-6 fatty acid) in the diet, which increased the risk of developing AMD. The poor dietary habits were also associated with the generation of fatty acid oxygenated products via free radicalROS, which promoted inflammation and further increased the risk factors for AMD development. It is the first of such research in Asia.


Study Path for YSS Students in the Cambridge Scheme (2+2+1)

HKU-Cambridge Undergraduate Recruitment Scheme (Natural Sciences)

Cambridge Track for Selected YSS Participants in Natural Sciences Disciplines

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Available for students in the 6901 BSc Programme

- Biochemistry
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- Chemistry
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- Physics
- Physiology, Development & Neuroscience
- Plant Sciences
- Zoology

Cambridge Undergraduate Degree

Specialisation for a Natural Sciences degree at Cambridge in year 4:

- Astrophysics
- Biochemistry
- Chemistry
- Earth Sciences
- Genetics
- Materials Science
- Pathology
- Or a broad Science programme:
  - Biological & Biomedical Sciences
  - Physical Sciences

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- Astrophysics
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- Chemistry
- Earth Sciences
- Genetics
- Materials Science
- Pathology
- Or a broad Science programme:
  - Biological & Biomedical Sciences
  - Physical Sciences

The Scheme requires selected YSS students to spend their first 2 years at HKU Faculty of Science, and the remaining 2 or 3 years at the University of Cambridge in science disciplines (288 credits in total for the fulfillment of HKU graduation requirements).

For more details, please visit:

Features of this Cambridge-track:

- Allows selected participants in YSS of the 6901 BSc programme to pursue studies in two renowned universities
- Allows students to study abroad and experience life and culture overseas
- Nurtures future science professionals to develop innovative solutions for global challenges
- Provides ample learning opportunities to YSS students:
  - Summer Research Fellowship
  - Overseas Research Fellowship
  - International scientific conference
  - Guidance by research mentor

HKU Undergraduate Degree

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Students’ Corner

The International Genetically Engineered Machine (iGEM) Competition is a golden opportunity for students to push the boundaries of synthetic biology by tackling everyday issues facing the world. In 2019, we are proud that the iGEM team led by HKU Chemistry alumnus won the iGEM Silver Medal for their innovative project targeting cancer stem cells.

With a focus on salmonella, the team aimed to develop a genetically engineered system that could selectively target and kill cancer stem cells, a key factor in many forms of cancer. This project not only pushed the boundaries of scientific knowledge but also had the potential to revolutionize cancer treatment, offering hope to patients worldwide.

The team members, including BSc students Samson Wing Ming Cheung, Karen Ching, and Huayue Lin, worked tirelessly to bring their vision to life. They faced numerous challenges but persevered, driven by their passion for science and their desire to make a meaningful contribution to society.

In the end, the team’s hard work paid off. They were awarded a Silver Medal for their project, a testament to their dedication and creativity. This achievement not only brought pride and recognition to the HKU Chemistry Department but also inspired future generations of scientists to pursue their ambitions with courage and determination.

The iGEM experience has been described as a life-changing journey for the team members. It reignited their passion for science and provided them with invaluable skills that will serve them well in their future careers. The iGEM platform has been instrumental in fostering a spirit of innovation and collaboration, essential qualities for success in the rapidly evolving field of synthetic biology.

As the team looked back on their iGEM journey, they were filled with pride and gratitude. They expressed their desire to continue advancing scientific knowledge and contributing to the betterment of society. The iGEM experience has undoubtedly left a lasting impact on their lives, shaping them into future leaders in the field of synthetic biology.

East Africa Wildlife Eco-Tour

Conserve and Co-exist with the Nature with Appreciation

15 BSc students had taken the role as eco-leaders and paired up with 17 HKU alumni and HKU Foundation Members in a knowledge exchange East Africa Wildlife Eco-Tour, co-presented by Faculty of Science and HKU Foundation in July 2019.

Led by Dr Billy HAIU, Principal Lecturer of School of Biological Sciences, participants had an once-in-a-lifetime opportunity to witness the Great Migration in Kenya, as well as breathtaking views of Mount Kilimanjaro in Amboseli and more. Apart from pure admiration of the fascinating nature, the Eco-Tour also aimed at bringing out the important message of nature conservation.

Student eco-leaders not just witnessed the amazing nature, but were inspired to re-think the relationship between human and nature, and even the impact of eco-tourism on wildlife animals. Many were motivated to pursue this academic field and vow to conserve nature after the tour.

An exhibition was held from September 24 to October 4, 2019 to present the stunning scenery and wonders of nature seen in this Eco-Tour (over 330 species of birds, 50 species of mammals and 15 species of reptiles and amphibians), captured by the lenses of student eco-leaders, who were trained in wildlife photography.

Awards and Learning Experiences

Three outstanding members from the Department of Chemistry have been awarded postdoctoral research fellowships and scholarships by the Croucher Foundation to pursue doctoral studies and postdoctoral research at world’s top universities.

Dr Alan Kwun Wa Chan (left) being awarded the Croucher Fellowship for Postdoctoral Research at the University of Tokyo.


Ms Yahui Zhang, PhD student of Department of Earth Sciences, won the Best Paper Award for the paper “Numerical investigation of micromechanisms of thermal strengthening in rock”, in The US Rock Mechanics Geomechanics Symposium annually organised by American Rock Mechanics Association (ARMA).

She also won the 2nd runner-up in The Young Persons’ World Lecture Competition (YPWLC) (Hong Kong heat) in 2019.

Ms Vicky Zhang (right) won the 2nd runner-up in Young Persons’ World Lecture Competition (Hong Kong heat) 2019-2020.

Mr Alfred Amruth, MPhil candidate of Department of Physics, was awarded a Kurt Godel Gold Medal for being the Best Poster Presenter at the conference Kurt Godel’s Legacy: Does Future Lie in the Past?

Mr Alfred Amruth.
**Dr Jian HE**

**Assistant Professor, Department of Chemistry**

Research interests: catalysis, metal organic frameworks, perovskite, radical chemistry, polymer chemistry, materials chemistry

“I finished my PhD study at Scripps Research and my postdoctoral training at Caltech. In 2017, I joined HKU as an interdisciplinary research programme at the interface between chemistry, biology, and materials science, which allows me to design novel MOFs and polymer-based heterogeneous catalysts for organic synthesis.”

**Dr Zhongxing HUANG**

**Assistant Professor, Department of Chemistry**

Research interests: organic synthesis

“My research efforts are on the topic of synthesis. In the field of organic synthesis, after the evolution of new transformations, new and more efficient and sustainable synthetic approaches are emerging. As such, naturally occurring catalysts are aiming for address long-standing challenges of organic synthesis, including control of enantioselectivity, chemical bond formation, and development of new metal-ligand reactions.”

**Dr Nicole Sophia KHAN**

**Assistant Professor, Department of Earth Sciences**

Research interests: sea-level and coastal change

“The overarching theme of my research is the use of sedimentary, microfossil and geochronological indicators to produce and synthesise records of present and past storms, floods and sea level, and their extent of geological and environmental 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 climate changes.”

**Dr Philip Yongxin LI**

**Assistant Professor, Department of Chemistry**

Research interest: chemical biology

“My research focuses on developing a genomics-guided discovery approach that involves the combination use of big data genome mining and synthetic biology, exploring human dimension, and simulating the potential chemical pathways to enhance the reservoir of potentially therapeutic small molecules.”

**Dr Ying LI**

**Assistant Professor, Department of Chemistry**

Research interests: RNA ligation & modification, RNA-protein interaction

“After receiving training in polymer and supramolecular chemistry at Tsinghua and UIUC, I moved to UCL to learn more about biology, particularly RNA with newly discovered biological roles such as regulation of a gene person between DNA and protein. I look forward to deciphering the roles of RNA structure in mRNA and ribosomes, RNA modifications, and protein-RNA interactions that regulate RNA function.”

**Dr Junzhi LIU**

**Assistant Professor, Department of Chemistry**

Research interests: organic synthesis, polymer chemistry, organic functional materials, organic electronic devices

“My research interest focuses on the synthesis of small molecule organic materials, and detailed investigation of their electronic, photochemical, and mechanical properties for the development of electronic devices. We use a high-throughput integrated multidisciplinary research programme including physical, chemistry and functional materials, focussed on molecular bottom-up organic synthesis at atomic level.”

**Dr Wei LIU**

**Research Assistant Professor, Department of Chemistry**

Research interests: biophotons, biosynthetic chemistry, chemical biology

“After receiving my PhD in biophysical chemistry at Yale, I spent a few years in both academic and industrial research in the USA and Asia. My research focuses on utilizing optical methods to investigate biological problems. It is a great excitement to continue my research at HKU, where I can enter the robust academic environment and to create impact in society.”

**Dr Xin LUO**

**Research Assistant Professor, Department of Earth Sciences**

Research interests: hydrogeology, hydrology, geomorphology, reactive transport model and biogeochemistry

“I have spent nearly ten years of study and research at HKU. My core interest is about the physical and chemical understanding of hydrogeology, especially in extremely environment of permafrost, glaciers and glacial sediments. I employ the approaches of multiple natural isotopes and numerical models, in-situ observation, geomorphological mapping, etc. to decipher the behavior of groundwater and processes of geochemistry.”

**Dr Tran Tung LUO**

**Assistant Professor, Department of Physics**

Research interest: ultrafast optics, strong-field physics, light-matter interaction, attosecond science

“In our group, we would like to develop and utilize the ultrafast laser pulses, ones that allow us to ‘see’ the electronic motion in real time scale. In particular, we explore the ultrashort laser pulses would enable studies of electron properties and chemical reactions for relevant and novel ultrafast phenomena with the finest temporal resolution available.”

**Dr Yan ZHANG**

**Assistant Professor, Department of Statistics & Actuarial Science**

Research interests: high dimensional data analysis, machine learning, bioinformatics, Bayesian methods, public health and biomedicine research

“After 4 years of study and work at UCLA, I am very happy to join HKU. As a quantitative scientist, my research focuses on developing statistical methods to solve scientific problems emerging in genomics, molecular biology, public health and medical fields. I wish to make contributions on identifying genes and collaborations among probands and between communities, and further to improve the public health for public health and precision medicine.”

**Professor Michael Kwok Po NG**

**Chair Professor, Department of Mathematics**

Research Division Director of Mathematical and Statistical Science

Research interests: applied and computational mathematics, artificial intelligence and machine learning, data and imaging sciences and statistical computing

“I am interested to develop mathematical and statistical theory and algorithms for solving real-world problems in science and engineering. The computational methods I develop in my work lead to the most favourable results, not only because they are efficient and scalable, but because they allow us to ask the right question. The sciences themselves develop under the influence of applications, which reveals new mathematical and statistical inference and new aspects of scientific objects.”

**Dr Kou OKURO**

**Associate Professor, Department of Chemistry**

Research interests: supramolecular chemistry, chemical biology, bioinorganic chemistry

“My research focuses on designing new molecules and nanomaterials based on supramolecular chemistry for manipulating biological processes. I believe that supramolecular chemistry is the key to unlock the progress of molecular biology in the twenty-first century as well as pharmaceutical science.”

**Dr Ying LI**

**Assistant Professor, School of Biological Sciences**

Research interests: behavioural ecology and life histories of large mammals; human and animal dimensions of conservation, qualitative methods, African elephants, African wild dogs and wild boar

“I am interested in the behavioural and evolutionary ecology of large mammals and how this informs a range of approaches to applying behaviour to conservation problems. My research focusses on collaborations among environmental and other communities, and further to develop effective solutions for public health and precision medicine.”

**Dr Jeff Tsun Yu WONG**

**Research Assistant Professor, Department of Mathematics**

Research interests: number theory, elliptic curves

“Being a bachelor and master degree graduate of HKU, I am pleased to serve my alma-mater after receiving my PhD degree from University of Washington. My research recently has impact the next generation by passing on my knowledge and experiences.”

**Dr George AKOM**

**Public Lecture & Exhibition**

“Can we learn when we listen to nature?”

“Science, Technology and Us” – Two live lectures – “Science, Technology and Us” and “Animal Voices: What can they teach us to explore nature?” were conducted by Dr George AKOM and Dr Evan PICKETT respectively on ZOOM, attracting around 270 secondary school students to learn from home with HKU Science.
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)

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