From Passion to Profession
How Our Undergraduates Launched Their Careers
Once a HKU-er, always a HKU-er. University is never a place just for gaining knowledge and acquiring techniques. It is where one earns lifelong friendships like no other while obtaining precious experience before stepping into society. One also picks up soft skills to expand social networks prior to handling hardships in life later.

This issue of the Faculty Newsletter evolves largely around our alumni. We will hear stories from HKU Science alumni on how they turn passions into professions. Our undergraduates turned ‘shoot for the moon and land among the stars’ into reality by dedicating their careers toward achieving their career aspirations and making noteworthy contributions along the way. We have also prepared trendy videos highlighting the achievements of our alumni.

Our alumni flourish globally, while our current students and faculty members excel here at HKU. Science students, postdoctoral scholars, and professors have won multiple international gold medals and awards. We also have seven hot-off-the-press research breakthroughs to share with the readers and connect with the alumni. Professor Yao WANG of the Department of Physics will share his excitement about new discoveries in physics via an interview.

We are proud to call HKU Faculty of Science our home and we always welcome our alumni to come home and join us in our efforts to create a better world. At the same time, we want to attract newcomers to the Faculty by sharing our alumni’s inspiring stories. Whether you are an alumnus, a current student, or a prospective student, we invite you to follow your gut feeling, dream big and act boldly, as you know the Faculty will be your safety net and will always care about you. Your impact on the society is felt every day!

Yours sincerely,
Dr Edmund Chun Ming TSE
Chief Editor
Assistant Professor, Department of Chemistry
From Passion to Profession: How Our Undergraduates Launched Their Careers

What does it take to turn a passion into a profession? For our alumni, the answer lies in a combination of a solid educational foundation and a willingness to gain practical experiences through internships and other opportunities. In this series of feature stories, we examine the career paths of six of our former undergraduates who have successfully launched careers in a range of fields. These stories offer valuable insights into how our programmes have provided them with the necessary skills and experiences to excel in their chosen fields. Whether they are at the beginning of their careers or already making noteworthy contributions, these alumni are the best evidence of the transformative power of education and dedication in achieving one’s career aspirations.

Why you chose your major in the first place?
Growing up, I was always fascinated by the intricacies of the natural world and planet. I often read books on typhoon formation, wind dynamics, and glacier melting, which fueled my curiosity for learning more about our environment. Hence, I decided to study Earth System Science as my major, and found immense satisfaction in diving deeper into the complexities of the natural world. I also chose to pursue a second major in psychology out of curiosity and a desire to understand human behavior and social interactions more deeply.

What are the main responsibilities of your position?
Our company offers green advisory services to clients, encompassing sustainability consulting as well as stakeholder engagement. Our team helps companies achieve decarbonisation and develop a strategic roadmap for business sustainability. We work closely with clients to set environmental targets and draft community investment policies. We also collaborate with rating agencies to enhance capital market ratings for our clients.

How did the programme help you embark on your career?
The programme has equipped me with valuable analytical and critical thinking skills. Through the programme, I have learned to analyse scientific problems and develop workable solutions by breaking them down into smaller, actionable steps. This has proven to be useful in my career, especially in the business world where problems can be complex and ambiguous. With the skills I have learned, I am able to identify problems accurately and analyse them in-depth. Moreover, the programme has also honed my communication skills, allowing me to effectively deliver solutions to clients.

Can you tell us about your career outlook?
The field of sustainability consulting is gaining popularity both in Hong Kong and globally, as governments and regulators urge corporations and stakeholders to achieve carbon neutrality. With an increasing demand for green talent, sustainability consulting presents immense potential for individuals looking to develop a career while helping corporations become more sustainable.

What advice will you give the high school students on choosing a major?
While it is often recommended to follow your passion, it is important to also consider the practicality of your chosen major and its potential impact on your future. High school students should ask themselves what they hope to achieve after college and link their goals and passions to the appropriate major. In addition to consulting with professors and reviewing course curricula, it is also beneficial to reach out to current undergraduates through networking events or coffee chats to gain a better understanding of the major before making a final decision.
Applying Physics Knowledge to the Business World

Brian CHAN
Bachelor of Science in Physics and Astronomy/ MPhil in Physics
Job title: Director at FTI Consulting Hong Kong, a company specialised in Artificial Intelligence, Anti-Money Laundering and Counter-Terrorist Financing

How did the Physics major help you embark on your career?

Science graduates are highly sought-after, especially if they possess strong interpersonal and presentation skills. My scientific background provides me with the ability to bring rigour and precision to the business world, resulting in the development of better algorithms.

I became interested in Artificial Intelligence while conducting research in HKU physics, where I worked with large datasets from space telescopcs to detect faint signals from distant galaxies, similar to identifying fraudulent transactions. Additionally, my physics knowledge allows me to have engaging conversations with colleagues interested in the universe.

What are the main responsibilities of your position?

I became the lead of an artificial intelligence team, and our goal is to create AI models to flag any sanctioned parties our clients might conducting business with, and we have also been working with financial institutions to detect fraudulent transactions. My team begins each day with a 15-to-30-minute meeting to discuss objectives, then spend the day on programming, writing proposals, meeting with clients, and presenting work.

Can you tell us about your career outlook?

Consulting companies provide opportunities for undergraduates to jumpstart their careers through summer internships or as graduate consultants. At my company, graduate consultants rotate through different departments to gain experience in areas such as Artificial Intelligence, economic consulting, cybersecurity, and communications. With hard work, dedication and experience, one can advance to become a senior consultant, director, or even a partner at a consulting firm.

What accomplishments are you proud of?

I'm proud to build AI models that automate human tasks. During a past project, I built an automation tool for a bank that saved its department over four hours of tedious regulatory work daily. On the day of the product launch, I stumbled upon the team taking a break at a nearby restaurant, something they hadn't done in years! It felt gratifying to see how my work helped them reclaim much-needed rest and free up time for more meaningful activities.

Thinking back now, are the knowledge and skills you learnt from HKU applicable to your career?

Physics students are not limited to careers directly related to their field. The analytical skills gained in physics can be applied to explore other passions. Physics is especially suited for those with strong quantitative skills, and its analytical and mathematical skills are highly transferable.

My experience studying physics at HKU provided invaluable research and mathematical skills that have been essential in my AI work. Physics also taught me to tackle complex problems by breaking them down, a skill that one finds useful in all aspects of life.

DEPARTMENT OF PHYSICS

DEPARTMENT OF STATISTICS & ACTUARIAL SCIENCE

A Crystal Clear Roadmap to Success
Kelvin NG, FSA
Bachelor of Science in Actuarial Science

What are the main responsibilities of your position?

This is my first full-time role since graduating, where I was promoted from an intern position with over three years of experience. My primary responsibility is to support pricing for life and health insurance products in Hong Kong, such as life insurance, critical illness insurance, and medical insurance. This involves analysing various characteristics, including age, gender, and smoker status, to determine appropriate pricing. I regularly use Excel and other data analytics software to analyse and calculate experience data.

How did the programme help you on embarking your career?

The programme provided me with comprehensive training in Mathematics, Statistics, Economics, and Actuarial Science, equipping me with essential professional knowledge. It also thoroughly prepared me for actuarial exams administered by the Society of Actuaries, which are crucial for securing actuary positions. The programme syllabus closely aligned with many of the preliminary Society of Actuaries exams, enabling me to pass with ease and progress towards becoming a fellow of the Society of Actuaries.

It seems like your internship played a significant role in your career growth, given your promotion from an intern position. Can you elaborate on how your first internship experience contributed to your career development?

The programme’s career support services, such as internships, mock interviews, and career planning, equipped me with the necessary skills and experiences. I gained valuable hands-on experience during my first actuarial internship. This experience provided insights into the skills required for my future career and broadened my horizons beyond numbers and exams. I learned that a strong GPA alone was not enough, and that meeting people and gaining work experience were essential assets in my career. In addition, the department advisor provided invaluable all-rounded support, helping me think deeply about my career path.

What accomplishments are you proud of?

My proudest accomplishment is becoming a qualified actuary in the Society of Actuaries. This required me to pass a series of exams, including six preliminary exams during my undergraduate studies and three fellowship exams after graduation. The fellowship exams were particularly challenging, with lengthy study notes of about 1,000 pages and five-hour exams. Preparing for these exams while balancing my full-time job responsibilities was a significant challenge, requiring me to carefully manage my time and forego leisure activities during holidays. However, this experience taught me essential skills in stress management and effective time management.

Can you tell us about your career outlook?

The programme has given me a clear direction for my future, with a well-defined career outlook. Like most programme graduates, I am committed to pursuing a career as an actuary. The stability of the job and attractive income are added bonuses. As an actuary, there are many specialisations available, including pricing, valuation, and reporting, and multiple types of insurance companies, such as life insurance, general insurance, direct companies, and reinsurance companies. I intend to remain in my role as a pricing actuary for my career.
Navigating the Challenges and Triumphs of Graduate School

Jae Elise Landayan PAYONG
Bachelor of Science in Chemistry
Designation: PhD student in the Department of Chemistry of the University of California, Irvine

What are the main responsibilities of your position?
I am now a student in Professor Jenny Yang’s research group, which tackles climate change and the global energy crisis using organometallic chemistry. My research examines the influence of Lewis acids and electrostatic effects on transition metal centers, inspired by natural enzymatic systems. This topic bridges my interest in inorganic chemistry and supramolecular systems, and I’m thrilled to explore where it leads me.

What additional responsibilities come with being a PhD student beyond research work?
Being a PhD student involves more than just research; it also entails various responsibilities in the laboratory. We also spend time maintaining the lab by keeping it clean, ensuring we have sufficient supplies and chemicals, and maintaining delicate equipment like spectrometers and gloveboxes. Each member of the research group has their own lab duty, contributing to the ecosystem that enables us to thrive.

Moreover, being a graduate student involves a social aspect that is often overlooked. In addition to presenting at conferences, teaching, and organising outreach events, it’s critical to achieve a work-life balance to avoid burnout. Graduate school is a long journey, and worrying about grades is often overlooked. In addition to presenting at conferences, teaching, and organizing outreach events, it’s critical to achieve a work-life balance to avoid burnout.

What has been your biggest challenge during graduate school?
My biggest challenge as a PhD student has been taking responsibility for my own learning and research output. While I had mentors as an undergraduate, I must now ensure that my work meets my Principal Investigator’s and my own standards. To overcome this, I have learned to effectively use available resources, such as discussing with fellow graduate students, seeking advice from Professors, and being comfortable with making mistakes and learning from them.

How did the undergraduate program at HKU prepare you for your PhD degree?
As an undergraduate majoring in Chemistry at HKU, I found the courses and exams challenging, which was common among my peers. However, looking back at it now, the academic rigour helped to prepare me for my PhD studies, and I’m grateful for that. The professors at HKU were incredibly supportive and emphasised the importance of understanding Chemistry concepts rather than just memorising them for exams. Now as a graduate student, I draw upon the teaching philosophies of my HKU professors to guide my own teaching and mentoring of undergraduate students.

What advice would you give to middle school students who are interested in pursuing a research career?
My advice is not to let fear hold you back. As an undergraduate, I was often afraid of appearing inexperienced or not knowing enough. However, as I spoke more with my professors and graduate student mentors, I realised that they were eager to help and genuinely wanted to see me succeed. I attribute much of my success to their mentorship. So don’t be afraid to ask questions and seek guidance from those with more experience.

What are the main responsibilities of your position?
My major objective is to ensure product safety and product compliance with the regulations of different countries. I mainly engage in technical data entry and assist toxicological profiling of raw materials for chemicals. I am required to screen product formulations, assess product safety, and draft consumer product safety assessments on cosmetics, toys and household products. I work in an office setting and engage in desk work, where I read reports or documents provided by clients and labs.

How did the undergraduate programme help you on embarking your career?
It equipped me with essential technical skills regarding nutrition and toxicology, as well as the knowledge of human physiology and biochemistry, which are very relevant to the job. Volunteering in a laboratory at SBS since Year 2 was the most rewarding experience during my undergraduate studies. The opportunity to participate in human and animal nutritional research consolidated my technical skills and allowed me to find my own niche. After that, I further developed my interest in toxicology while I pursued my MSc degree in Food Safety and Toxicology from HKU, which put me on the path to becoming a Toxicologist.

Science students are well-trained in critical thinking. Does it also benefit your private life?
Yes, definitely. Today, we live in a world where we are constantly overwhelmed by information from different sources and our trust in its accuracy is diminished. One needs to make judgements and decisions based on facts to avoid being biased and becoming ‘puppets’ of certain stakeholders. Therefore, possessing strong critical thinking is essential in our daily lives.

What advice will you give to the students on choosing a major?
One shall always follow their heart and choose the major they are genuinely interested in. For example, I chose FNS as my major because I want to safeguard my physical health and well-being. You may also consider your strengths and weaknesses. FNS involves lots of factual rather than abstract information, requiring a certain amount of memorisation. Thus, you may consider whether you are good at handling facts or are more interested in dealing with abstract ideas.
What are the main responsibilities of your position?

My day-to-day tasks involve handling traffic data using traffic models. I collect, analyse, and manipulate traffic data, which are essential for producing traffic reports. Once we have all the data, our engineers use it to make informed decisions about road design, traffic signal timings, and other measures to improve traffic flow and safety. While it can be challenging at times, I find my work incredibly rewarding as I am part of a team that is working to make our roads and transport systems safer and more efficient. I wouldn’t say that I am proud, but I am more than happy to see that my traffic data is being used for future road improvement works. And, of course, it makes me happy to see the assessment reports being submitted without any further comments.

How did your internship experience contribute to your career development?

Interning at a traffic survey team was vital for my career. Working in engineering taught me the importance of time management and collaboration with colleagues. As mathematics graduates, we excelled at identifying key concerns in tasks and providing concise solutions, which employers appreciate. In fact, I received a permanent job offer for the same position at the same company immediately after graduating from HKU in 2019.

What advice would you give to students who want to study mathematics?

I recommend that mathematics-inclined students take more computer courses as their free electives. Computer skills, combined with an analytical mindset as a mathematician, are valuable in most industries today. In the workplace, I often need to read and modify computer programming languages to carry out daily tasks.
Chemical Biologists Decode a Significant Gene Modifier Linked to Cancer

Potential for Safer Cancer Treatment: Biologists Discover Novel DNA Unzipping Pathway

Researchers // Professor Xiang David LI of the Department of Chemistry, Dr Yuanliang ZHAI, Assistant Professor of the School of Biological Sciences and others
Collaborators // HKU School of Biomedical Sciences, LKS Faculty of Medicine, Hong Kong University of Science and Technology and others

Our Chemical Biologists recently made a significant breakthrough in understanding the mechanisms of genetic information that are stored not as DNA sequence. They discovered the protein menin are a ‘reader’ of the methylation mark at histone H3K79 (H3K79me), which is responsible for regulating gene expression. By using a cutting-edge imaging technique called cryo-electron microscopy, they visualised the interaction between the protein menin and H3K79me, which could lead to new drugs for treating cancers related to misregulated H3K79me.

Our team made a major breakthrough with the discovery of the first true ‘reader’ of histone H3K79me, solving a mystery that has existed since the modification’s discovery in 2002. Self 2002 年 H3K79me 被發現以來，是次研究為首次確認出真正可讀取 H3K79me 的蛋白，因而是科學界上一個重大的突破。

The histone H3K79me mark is a small chemical modification found on a specific part of chromatin that helps to regulate gene expression. 「組蛋白 H3K79 甲基化」是一種在染色質特定部位上的小型化學修飾，於調節基因表達有關。

One of the challenges in chromatin biology is how particular histone marks are interpreted to achieve their biological function. To answer this question, it is essential to find the ‘readers’, a class of proteins that recognise specific histone marks and ‘translate’ them by passing the ‘message’ to proteins related to gene expression.

The science behind cryo-electron microscopy is a cutting-edge imaging technique that uses extremely low temperature to preserve biological samples in their native states. This technology helps to get clear and high-resolution pictures of large proteins or protein complexes that cannot be crystallised.

Improving the specificity of chemotherapy drugs has always been vital in developing anticancer drugs. Our research team used an imaging technique called cryo-electron microscopy (cryo-EM) to visualise the atomic details of DNA-bound MCM2-7 double hexamer (DH). MCM2-7 is a group of six proteins that unzips DNA duplex. Our findings reveal how the MCM2-7 complex destabilises DNA to promote the initiation of DNA replication. This process is essential for both normal and cancer cells to proliferate. It thus offers a potential strategy for the selective killing of cancer cells, which helps to develop nontoxic anticancer drugs using the complex as targets in the future.

Learn more: https://bit.ly/3k9Iz38

The human pre-replication complex is an open complex (published in Cell, 2023)
**MARINE SCIENCE**

**Bringing Oyster Reefs Back to Life: A Global Assessment Approach**

Researchers / Associate Director of SWIMS and Associate Professor Dr Bayden RUSSEL, Postdoctoral Fellow Dr Ashley HEMRAJ of School of Biological Sciences and others

Collaborators // The Nature Conservancy, Macquarie University, University of Edinburgh, and University of Exeter and others

**THE SCIENCE BEHIND**

The research demonstrates that some of the simplest and cheapest restoration techniques, such as the use of limestone rock as the base for restoring reefs, can be just as effective as more expensive techniques.

The study shows that, although recovery rates may initially be rapid, restoration of oyster reefs can still be substantially below that of natural reefs following two years of recovery. The research demonstrates that a variety of techniques can be just as effective as more expensive methods, offering a reference for future conservation efforts.

Learn more: https://bit.ly/3xE1NBa

**PHYSICS**

**A New Generation Supercomputer for Solving Challenging Physics Problems**

Researchers // Assistant Professor Dr Jane DAI (second from the left) and Associate Professor Dr Zi Yang MENG (second from the right), of Department of Physics

The name of the supercomputer ‘Blackbody’ was inspired by Dr Dai’s and Dr Meng’s own research directions: black hole physics and many-body physics.

**THE SCIENCE BEHIND**

Our physicists have recently introduced ‘Blackbody’, a new advanced computing system designed to tackle the most challenging physics problems. With 1024 physical CPU cores and multiple storage systems, Blackbody is capable of performing calculations that would take a person 650 thousand years to accomplish in just one second. This new system provides researchers with enormous computational capabilities, allowing for the development of novel numerical codes and the execution of large-scale simulations in the fields of quantum physics and astronomy.

Learn more: https://bit.ly/3Za8RBl

**EARTH SCIENCES**

**Numerous Ancient Martian Lakes that Might Dramatically be Underestimated by Scientists**

Researchers / Dr Joseph MICHALSKI, Associate Professor of the department of Earth Sciences and Deputy Director of the Laboratory for Space Research at HKU

Collaborators // University of Texas in USA, University of British Columbia in Canada, Natural History Museum in UK, and Brown University in USA

**THE SCIENCE BEHIND**

Smaller lakes on Mars might have formed in cold environments where glaciers had retreated, and are challenging to be detected through satellite remote sensing.

Smaller lakes on Mars might have formed in cold environments where glaciers had retreated, and are challenging to be detected through satellite remote sensing. It is estimated that up to 70% of these Martian lakes have yet to be discovered.

Learn more: https://bit.ly/3xDBU4r
New Evidence to the Langlands Conjectures

Researcher // Dr Chia Tze HUI, Associate Professor of the Department of Mathematics

The Langlands programme is a web of astonishing and extraordinary mathematics proposed by Robert Langlands in the 1960s, connecting number theory, harmonic analysis, and geometry. One of these conjectures suggests that a particular type of mathematical object called ‘Galois representations’ has a unique property called automorphy. By employing recent big image results and the potential automorphy theorems, our mathematicians prove that certain four-dimensional Galois representations are potentially automorphic and have big images, which gives new evidence to the Langlands conjectures. The Langlands programme is highly theoretical mathematics, and our work yields new insights to the study of Langlands conjecture.

A New Perspective on Overfitting in Deep Learning

In machine learning, we train a predictive model based on a training data set in order to make accurate predictions on new test data. Classical learning theory suggests that the model should not fit the training data too well, or it may result in ‘overfitting’ and decreased test accuracy. However, this view has been recently challenged. Modern deep learning models often exhibit overfitting on training data yet still achieve good test performance. This phenomenon is known as ‘benign overfitting’. Recently, our research team has studied benign overfitting in deep learning, providing an explanation for its occurrence, and further identified a clear distinction between benign and harmful overfitting. This allows us to determine when benign overfitting is likely to occur.

A New Perspective on Overfitting in Deep Learning

Researcher // Dr Yuan CAO, Assistant Professor of the Department of Statistics and Actuarial Science

In machine learning, we train a predictive model based on a training data set in order to make accurate predictions on new test data. Classical learning theory suggests that the model should not fit the training data too well, or it may result in ‘overfitting’ and decreased test accuracy. However, this view has been recently challenged. Modern deep learning models often exhibit overfitting on training data yet still achieve good test performance. This phenomenon is known as ‘benign overfitting’. Recently, our research team has studied benign overfitting in deep learning, providing an explanation for its occurrence, and further identified a clear distinction between benign and harmful overfitting. This allows us to determine when benign overfitting is likely to occur.

Learn more: https://bit.ly/30kVVbB

Leading Minds Unite: Revisiting Our Lecture Series

Our Lecture Series brought together leading academics from around the world to share insights on a wide range of topics. In 2023, we organised lectures on multidisciplinary topics, including Chemical Biology, Physics, and Astrophysics, which drew a diverse audience of researchers, high school students, government representatives, and members of the public.

The lectures provided a unique opportunity for attendees to deepen their understanding of cutting-edge research in these fields and engage with experts in a dynamic and interactive environment. Attendees had the chance to ask questions and explore new ideas, further enhancing the multidisciplinary nature of the event.

We look forward to continuing to organise more lectures that bring together leading thinkers and innovators from around the world, fostering a dynamic community of scholars and students dedicated to advancing our understanding of the world.

Learn more: https://bit.ly/3M7SW1c

Touchstart Your Summer Adventure

Are you looking for a fun and exciting way to spend your summer? Look no further than our Touchstart Science Summer Programme! With two exciting topics to choose from, you will have the opportunity to explore your interests in either materials science or medicinal chemistry. Our dedicated instructors will be with you every step of the way, guiding you through interactive workshops, lab visits, demos, and talks, providing you with a hands-on experience like no other. This programme is perfect for curious students who love to learn, explore, and discover.

Don’t miss out on this incredible opportunity to unlock your true potential in science! Share the news with your friends and join us on this journey of discovery. Get ready to ignite your creativity and passion for science!

Learn more: https://bit.ly/3o4vWbB

HKU President’s Forum Distinguished Lecture Series: "Translational Chemical Biology" by Professor Xiaoguang LEI, Boya Investigator of the Peking-Tsinghua Center for Life Sciences, Peking University.

HKU Science Public Lecture Series:

HKU Science Distinguished Lecture Series: "Hacking Stars to Better Understand our Universe" by Dr Hakeem Oluseyi, Astrophysicist and Former Space Science Education Manager for NASA.

HKU Science Distinguished Lecture Series: "Hacking Stars to Better Understand our Universe" by Dr Hakeem Oluseyi, Astrophysicist and Former Space Science Education Manager for NASA.

HKU Science Distinguished Lecture Series: "Hacking Stars to Better Understand our Universe" by Dr Hakeem Oluseyi, Astrophysicist and Former Space Science Education Manager for NASA.

HKU Science Distinguished Lecture Series: "Hacking Stars to Better Understand our Universe" by Dr Hakeem Oluseyi, Astrophysicist and Former Space Science Education Manager for NASA.

HKU Science Distinguished Lecture Series: "Hacking Stars to Better Understand our Universe" by Dr Hakeem Oluseyi, Astrophysicist and Former Space Science Education Manager for NASA.

HKU Science Distinguished Lecture Series: "Hacking Stars to Better Understand our Universe" by Dr Hakeem Oluseyi, Astrophysicist and Former Space Science Education Manager for NASA.

HKU Science Distinguished Lecture Series: "Hacking Stars to Better Understand our Universe" by Dr Hakeem Oluseyi, Astrophysicist and Former Space Science Education Manager for NASA.

HKU Science Distinguished Lecture Series: "Hacking Stars to Better Understand our Universe" by Dr Hakeem Oluseyi, Astrophysicist and Former Space Science Education Manager for NASA.

HKU Science Distinguished Lecture Series: "Hacking Stars to Better Understand our Universe" by Dr Hakeem Oluseyi, Astrophysicist and Former Space Science Education Manager for NASA.

HKU Science Distinguished Lecture Series: "Hacking Stars to Better Understand our Universe" by Dr Hakeem Oluseyi, Astrophysicist and Former Space Science Education Manager for NASA.

HKU Science Distinguished Lecture Series: "Hacking Stars to Better Understand our Universe" by Dr Hakeem Oluseyi, Astrophysicist and Former Space Science Education Manager for NASA.

HKU Science Distinguished Lecture Series: "Hacking Stars to Better Understand our Universe" by Dr Hakeem Oluseyi, Astrophysicist and Former Space Science Education Manager for NASA.

HKU Science Distinguished Lecture Series: "Hacking Stars to Better Understand our Universe" by Dr Hakeem Oluseyi, Astrophysicist and Former Space Science Education Manager for NASA.

HKU Science Distinguished Lecture Series: "Hacking Stars to Better Understand our Universe" by Dr Hakeem Oluseyi, Astrophysicist and Former Space Science Education Manager for NASA.

HKU Science Distinguished Lecture Series: "Hacking Stars to Better Understand our Universe" by Dr Hakeem Oluseyi, Astrophysicist and Former Space Science Education Manager for NASA.

HKU Science Distinguished Lecture Series: "Hacking Stars to Better Understand our Universe" by Dr Hakeem Oluseyi, Astrophysicist and Former Space Science Education Manager for NASA.
What inspired you to pursue a career as a physicist?

Physics has been my favourite subject since high school. I was very fortunate to have an inspiring physics teacher who taught me the subject. I participated in the National Physics Olympiad during my high school period, an experience that encouraged students to explore beyond what is taught in class, and eventually led me to choose a physics major in university.

What challenges did you encounter at the beginning of your research career?

Like everyone at the beginning of the tenure track, the challenge lay in the transition. Before, I worked with senior people as part of their team. Now, I have to build my own research team, find my own research projects, and establish visibility as an independent Principal Investigator on the international stage. My experiences on two different research fronts during PhD and postdoc helped me to find an interdisciplinary area across the condensed matter, quantum physics and optical physics. Luckily, the emergence of two-dimensional atomic crystals provided a wonderful arena for my study.

How do you find your passion in this field as well as maintain it?

My passion for doing physics research comes from the excitement of discoveries from time to time. Discovering physical phenomena that are not known before, and being able to control physical processes in a way not possible before, is truly fulfilling.

What are the biggest problems regarding current physics research?

There are many big scientific problems that remain to be tackled. One grand challenge that can impact everyone’s life is to revolutionise the physics foundation of information technology. The rapid development of modern information technology in the past five decades has been based on the continuous scaling down of microelectronic devices that improve cost, performance and power. This trend, empirically summarised as the Moore’s law, is coming to an end because of the intrinsic scale limit of silicon microelectronics, where quantum physics inevitably interferes with the functionalities at the nanoscale. The new era of innovation will be profoundly different, calling for new physics principles to encode and process information, e.g. using quantum degrees of freedom, and new matter platforms to host devices. The challenge is also a great opportunity for fundamental research.

What advice would you give to teenagers who are interested in science? What would you say to encourage them?

Be curious and be able to think outside the box. Keep an open mind and expose yourself to the various frontiers of modern science. This could be a golden time as acquiring information has never been as facilitated as today.

With HKU’s commitment to research excellence, researchers are highly valued in the University. Can you tell us how HKU support your research?

HKU has provided a great platform to develop my career. I have experienced a friendly and supportive working environment and atmosphere here. The resources, internally and externally, are ample to grow my research as a theoretical group. I find the recognition received from the University very encouraging.
Professor Ngaiming MOK, Edmund and Peggy Tee Professor in Mathematics and Chair of Mathematics, was presented with the 2022 Tan Kah Kee Science Award in Mathematics & Physics. This award is a recognition of his exceptional accomplishments in promoting the development of mathematical research in the Chinese nation. Professor Mok is the first Hong Kong scholar to receive the award (counting all fields), and this is the third signature accolade he earned in 2022.

Professor Vivian Wing Wah YAM, the Philip Wong Wilson Wong Professor in Chemistry and Energy and the Chair Professor of Chemistry, has become the first Asian and Chinese recipient of the Bailar Medal. This highly respected award is presented annually by the University of Illinois Urbana-Champaign to scientists who have distinguished themselves in an area of inorganic chemical research. Professor Yam was also invited to give two Bailar Medal Lectures at UIUC, which is a tradition that provides the award recipient with an opportunity to share their research and insights with the Chemistry community. In addition to this, Professor Yam was invited to deliver the Dow Lecture at the California Institute of Technology. This special lecture recognizes speakers who have conducted outstanding research in organometallic, catalysis, or inorganic chemistry.

Learn more: https://bse.jhu.edu/YAM

Professor Xuechen LI from the Department of Chemistry was awarded the Contribution Award in Carbohydrate Chemistry by the Chinese Chemical Society for his pioneering work in precision chemical synthesis, innovative studies in chemical biology, and the development of therapeutic glycoconjugates. This prestigious award is a testament to his dedication and passion for advancing the science of carbohydrate chemistry.

Professor Yinsheng ZHANG, Chair Professor of Department of Earth Sciences, Professor Wang YAO, Chair Professor of Department of Physics, and Professor Shuang ZHANG, Interim Head and Chair Professor of Department of Physics, were named by Clarivate Analytics in its list of ‘2022 Highly Cited Researchers’ as the most influential in the world. Most of them were named multiple times. Their works have been highly cited by fellow academics, making a significant impact on ongoing research in their respective fields of study.

Additionally, Professor Shuang Zhang was selected for the New Cornerstone Investigator Program 2022, a prestigious fund initiated by the BSI to support exceptional scientists in conducting fundamental research. Professor Zhang is one of 58 selected scientists, including three from Hong Kong.

Dr Yi YANG, Assistant Professor at the Department of Physics, was named one of the 2022 Innovators Under 35 (China) by the MIT Technology Review under the ‘Innovators Under 35’ category. This prestigious programme recognizes young innovators who are making. Additionally, Dr Yang was selected as Physical Science Fellow in 2023 Asian Young Scientist Fellowship.

Professor Billy CHOW, Chair of Endocrinology at the School of Biological Sciences, led a project that was awarded the Healthy Longevity Catalyst Awards (Hong Kong) in 2022 in the Healthy Longevity Global Competition. The research team developed the first small molecule-based Secretin receptor modulator (KSD179019), which is a novel class of oral anti-hypertensive drug. This provides an important advancement in finding novel small molecule drugs for resistant hypertension by targeting the Secretin receptor.

About HKBIIH: https://bse.jhu.edu/hkbiih/home/index.html

The MoU was signed on January 17, 2023 by the Assistant Director (Conservation) of the AFCD, Mr Simon CHAN, and the Chair Professor of Chemistry, has established a project to protect Hong Kong’s biodiversity. The AFCD launched the Hong Kong Biodiversity Information Hub (HKBIIH) in March 2022 to provide a one-stop shop for information on local biodiversity. The forthcoming Biodiversity Geographic Information System (BGIS), which is expected to be launched in 2024 as part and parcel of the HKBIIH, will facilitate the sharing of spatial data of local species. The AFCD and SWIMS will use this database to foster a better understanding and conservation of Hong Kong’s wealth of biodiversity.

OBITUARY

In Memoriam of Professor Ming-Chit LIU

Former Chair Professor Ming-Chit Liu passed away on March 24, 2023, at the age of 85. He dedicated over 30 years to the Department of Mathematics and made significant contributions to analytic number theory. Professor Liu taught calculus and courses in number theory and postgraduate complex analysis, providing rigorous training to students. He served on various committees for HKU, local universities, and the Hong Kong Government. Professor Liu retired in 2000, and in 2005, the Department of Mathematics established the Liu Ping-Chit Prize in Mathematics with his generous donation. Currently, a team of five people working on number theory or closely related areas is maintained by the department.

Professor Liu will be dearly missed by the University and the Faculty of Science family.

Learn more: https://bit.ly/411BWV
Dr Aspen Xiao-yang CHEN
Assistant Professor of Department of Chemistry
Research interests: Supramolecular Chemistry, Synthetic Organic Chemistry, Catalysis

Fifteen years ago, as a high school student, I traveled to Hong Kong by myself just to visit HKU. Today, I am thrilled and grateful to have the opportunity to start my independent career at my dream school. My research lies at the intersection of supramolecular and synthetic organic chemistry. By leveraging existing structures and chemical processes in nature, our group seeks to design novel molecular and supramolecular tools for tackling important challenges in molecular recognition and catalysis. In my spare time, I enjoy swimming, reading and spending time with my family and friends.

Dr Wenyuan LI
Assistant Professor of Department of Statistics and Actuarial Science
Research interests: Actuarial Science; Insurance Economics; Mathematical Finance

My research revolves around applying the stochastic control approach to examine the optimal trading and insurance strategies for individuals. To draw an analogy, just as a physicist studies the motion of natural forces such as wind, rain, and sea flow, my focus as an actuary is on analysing the market’s movements and how changes in economic variables, such as interest rates, inflation rates, and exchange rates, interact and affect individuals’ insurance demands. Going forward, I plan to employ deep learning algorithms to investigate the most effective trading and insurance strategies. It would be wonderful to connect with like-minded individuals, share common interests, and explore new ideas.

Dr Jan Marius HOFERT
Associate Professor of Department of Statistics and Actuarial Science
Research interests: Copula Modelling; Computational Statistics, Data Science and Quantitative Risk Management

After holding positions at ETH Zurich, the Technical University of Munich, University of Washington, and University of Waterloo, I have recently joined HKU with the goal of further expanding my research horizons. I am particularly excited about developing neural networks for copula modeling purposes, which we have recently pioneered. My aim is to provide holistic solutions to problems, including theory, algorithms, and their implementation in freely available software. I also contribute to the education of actuaries and risk managers by offering courses, books, teaching materials, and software.

Professor Dong LI
Chair Professor of Department of Mathematics
Research interests: Analysis and partial differential equations, Applied Maths

I am very happy to return to my alma mater after a decade of studying and working overseas. The Department of Mathematics remains as energetic and creative as ever. My research lies in Representation Theory, which is a beautiful subject studying the symmetry in the universe. The idea is very simple: if one knows half, then one knows the other half, but it is powerful when facing complicated systems. The major theme I am working on is the Langlands programme, a vast subject investigating how hidden symmetry appears in numbers. I look forward to the fantastic environment at HKU bringing new insights to my research.

Dr Daphne Mei Yi WU
Lecturer of the School of Biological Sciences
Teaching areas: Nutrition and Food Science
Research interests: Food and Nutrition Science

I have been teaching in higher education for 10 years in the areas of food science and nutrition. I worked in private and public hospitals as a dietitian in Hong Kong and in the UK for years before pursuing my PhD in the UK. I am particularly interested in the areas of sports nutrition, macronutrients metabolism and weight management. My teaching philosophy is ‘Be a Mo-king learner’. During my leisure time, I like to enjoy the universal language of music.

Science Students Won Gold Medal in Prestigious International iGEM Competition

A team led by our science students won gold at the International Genetically Engineered Machine (iGEM) Competition Grand Jamboree 2022 for using microalgae to produce antimicrobial peptides (AMPs), specifically C sapiens B, to address antibiotic resistance. AMPs have broad-spectrum antimicrobial activities and do not cause resistance due to their low specificity, and microalgae are an ideal chassis to optimise their production. The team’s success in wet lab work, science communication, and education earned them their third gold medal in HKU iGEM history.

Postdoctoral Researcher Wins International Allergy Research Prize

Dr Mukes KUMAR, a postdoctoral researcher at the School of Biological Sciences, won the first prize in the Global Challenges University Alliance 2030 Award 2022 for his high-quality research on allergies and the development of novel anti-allergic drugs. His work has the potential to promote well-being for all ages. Additionally, he also won second runner-up in the Basic and Translational Research category at the Rohto Award 2022 for his presentation on the development of these drugs.

Teacher-Student Team Wins International Upcycling Project

Dr Janet CHAN, Coordinator of the MSc Environmental Management Programme at the School of Biological Sciences, and her former student, Stacey LI, who is also a graduate of the programme, won the Award for Excellent Presentation at the 2nd International Symposium on Electronic Waste and End-of-Life Vehicles (ISEE2022) in Seoul. Their presentation, titled ‘OFF-LINES’, focused on the recycling and upcycling of USB cables to raise awareness of e-waste and provide solutions to the problem.
Embarking on a Mission

As a youth climate activist, Mark is dedicated to addressing the climate crisis and promoting climate justice. Recognizing the lack of Asian representation in international forums, Mark took the initiative to encourage HKU students to attend COP27.

After putting in great effort to draft proposals, create promotional materials, and secure meetings with HKU management, Mark finally led the first University student delegation from Hong Kong to attend COP27 in November 2022. Representing East and Southeast Asian students who are often overlooked in international forums, the delegation aimed to make their voices heard and contribute to the global fight against climate change by pushing for more inclusive and ambitious actions.

With prior experience from COP 26, Mark guided his fellow delegates to maximize their learning opportunities. He also played a role in crafting policy proposals, participating in bilateral meetings, and taking notes of member states’ stances on certain topics during official negotiations.

With a welcoming atmosphere and attitude, some negotiators and Sub-Committee were open to their perspectives and voices. They agreed to take their views into consideration during the official meeting. Mark said, “I was proud to see youth’s ideas taken into consideration and would make a difference in the wider context of the Global Goal on Adaptation.”

Navigating the Challenges of Climate Negotiations

Young activists may become discouraged in their advocacy work, as it can involve making concessions and participating in discussions that often result in unfavourable outcomes. Despite these difficulties, the student group remained steadfast in their commitment to championing climate action. Mark focused on having informal chats and connecting with global professionals and youth fighting for the same values and goals, rather than solely working on the intergovernmental aspects at COP27. These encounters and exchanges reminded Mark of the importance of applying a people-centric and right-based approach in generating climate policies and solutions, he said. “Human beings are always a crucial part in the climate crisis, and the relations between local cultures and climate actions should not be overlooked in decision making and planning processes. It is essential to have a bottom-up approach in different layers of the society to try to achieve intergenerational and intersectional equity.”

Reaping the Rewards: Takeaways from the Trip

The trip allowed the student group to immerse themselves in the global effort to combat climate change, and gain diverse perspectives and insights regarding the impacts of climate change on different communities. They returned home with newfound inspiration and a sense of responsibility to take action on climate change.

As the world moves forward in the face of this crisis, the hope is that more young people like Mark, especially amongst our readers, will step up and take on the mantle of climate champions.


From HKU to Cambridge: A Unique Opportunity to Study Science across Two Continents

The HKU-Cambridge Undergraduate Recruitment Scheme for Natural Sciences is an excellent opportunity for Young Scientist Scheme (YSS) participants in Natural Sciences Disciplines to pursue their passion for science across two continents and access world-class resources. After two years at HKU and two to three years at Cambridge, selected students can earn three to four degrees from HKU & Cambridge in four to five years.

Rupert Kwan, a member of the scheme’s first cohort, found the experience to be life-changing. He was captivated by Cambridge’s atmosphere, but it was the academic experience that left the most profound impression on him. Rupert was challenged in ways he never thought possible, as he juggled a hectic schedule of coursework. Each term only lasted eight weeks, but the amount of material he covered was comparable to a full semester at HKU. Despite the challenges, Rupert found comfort in the supportive supervising system, where small groups of students worked closely with a supervisor to discuss complex problem sheets. He was able to ask questions and engage in lively discussions, leading to a deeper understanding of sophisticated physical concepts.

Tips for Entering the Cambridge-Track

For selected YSS students applying for the Cambridge-Track, the Faculty offers valuable preparation by offering mock interview opportunities with academics in their respective fields. According to Rupert, the test and interview at Cambridge are not excessively challenging. He worked on online physics problem sets for a few weeks before the interview to refresh his knowledge and get comfortable thinking like a physicist. Rupert also emphasized that while Cambridge interviewers don’t anticipate candidates to have extensive out-of-curriculum knowledge, they do expect them to have a sound comprehension of what they have studied and apply it in different cases.

What is YSS?

Young Scientist Scheme (YSS) provides outstanding students with ample early research experiences in 6901 BSc and 6688 Science Master Class Programmes. More details: https://bit.ly/3FZPfJ1

From Classroom to Conference Room: Student Delegation Driving Climate Action at COP27

The world is grappling with a critical challenge in the form of climate change, and future generations will bear its brunt. However, instead of feeling defeated, a group of students from HKU has taken up the mantle of climate action, and is pushing for more inclusive and ambitious actions.

Mark Cheung Kong Wai

Mark Cheung Kong Wai

A final-year student majoring in Environmental Science, Mark is a co-founder of the Laboratory for Environmental Science Research (LESR), a student-led research group in Environmental and Climate Justice.

Conference of the Parties (COP)

The Conference of the Parties (COP) governs the United Nations Framework Convention on Climate Change (UNFCCC). Represented by 196 nations gather annually to review climate change progress and discuss solutions. Since its founding in Berlin in 1995, the COP has been the world’s leading forum for cooperative action on climate change.

Rupert Long Hei Kwan

Year 2 student at University of Cambridge in the Cambridge Natural Sciences Tripos majoring in Physics. Year 3 student at HKU in Cambridge-Track.

En Yu Yap

Year 2 student in Science Master Class (BSc & MRes) majoring in Chemistry (Intensive).

Yen-hsu Lin

Year 3 student in BSc Programme, majoring in Chemistry (Intensive).

"My experiences at HKU gave me a solid foundation in physics, making it easier for me to grasp new concepts and adapt to the learning style at Cambridge quickly."
Food connects people to their culture, roots, and memories. However, globalisation and food fraud have made tracing food from farm to table increasingly vital. To address these challenges, two visionary PhD graduates from the School of Biological Sciences co-founded IsoFoodtrace. They use stable isotope analysis to provide a reliable and efficient platform for tracking food products’ origin and journey. IsoFoodtrace verifies food product attributes and labels, enabling consumers to know exactly what they buy. Let us explore the pioneering journeys of these young entrepreneurs driving unprecedented assurance in our food systems.

### The Success of the Collaborative Friendship

Meeting during their PhD studies in 2014, Inga CONTI-JERPE investigated coral biology using stable isotope analysis while Colin LUK studied forest recovery using Arthropods indicators. At that point, Colin had over ten years of F&B experience with concerns about food origin. He recalled, ‘I discussed using stable isotope analysis to detect food fraud with Inga, and we both think it’s doable. At the same time, HKU Dendron had just initiated a start-up SEED programme while science Park offered a HK$100K start-up grant—it seemed a good opportunity for us to build a start-up.’ With the support of Dr David BAKER, the Director of HKU Conservative Forensic Laboratory, and the consultation from Dr Jetty LEE, the Programme Director of the HKU MSc Food Industry: Management & Marketing, they piloted testing supermarket wild salmon and wrote a business proposal for funding, enabling them to launch IsoFoodtrace, a real business tackling food fraud.

### Empowering Consumers to Make Informed Choices

In just two years, IsoFoodtrace has grown to a team of 11. In the long term, it aims to build a global food stable isotope database enabling verification of production and origin claims. Colin said, ‘We are not only to battle fraudulent claims of food quality but also to contribute to better food safety and sustainability by allowing businesses and consumers to make more informed purchases.’ Through their innovative approach to food tracing, they have revealed the complex processes involved in food production and distribution. Though now relocated to the US, Inga continues working with Colin to grow the IsoFoodtrace business. She said, ‘Food safety is of paramount importance in today’s globalised food systems. By tracing the roots of food, I hope we can eventually empower consumers to make informed choices and hold businesses accountable for authentic claims.’

As consumers, we all can play a role in supporting their efforts by seeking out products that have been certified and demanding greater transparency in the food industry. By doing so, we can help to build a safer and more sustainable food system for all.

### The Science behind IsoFoodtrace

Stable isotope ratios vary with food attributes like farming practices, feed, and origin. For example, wild salmon has more 15N (Nitrogen) than farmed, and cattle feed diets (grass vs grain) affect 13C (Carbon) ratios. Using Stable Isotope Ratio Mass Spectrometry, foods are chemically analysed and isotopes measured. Once the stable isotope signatures have been detected, they are then compared against a reference database; hence, the origin and composition of a food sample can be determined. This cutting-edge technology can ensure food safety and authenticity, giving customers peace of mind.

---

**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! Listing of donors in alphabetical order of organisation names and surnames.

**Corporate donors**

- The Croucher Foundation Limited
- Ocean Park Conservation Foundation, HK

**Individual donor**

- Ms Suik Yin YAU Grace

**Editorial Board**

- Chief Editor: Dr Edmund TSE
- Members: Dr Ho Yu AU-YEUNG, Dr Chi Bun CHAN, Ms Cindy CHAN, Professor Ka Chun CHEUNG, Dr Ka Ho LAW, Dr Kai Ming LEE, Dr Man Hei LEE, Ms Casey TO

**FACULTY OF SCIENCE**

- The University of Hong Kong, Pokfulam Road, Hong Kong
- Tel: 3917 2683 Email: science@hku.hk

---

**www.scifac.hku.hk**

**@science.hku**

**@hku_science**

**@hkscience**

**HKUFacultyofScience**