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MESSAGE FROM THE CHIEF EDITOR



nce 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.

While it is often recommended to follow your passion, it is important How did the programme help you embark on your to also consider the practicality of your chosen major and its potential career? impact on your future. High school students should ask themselves The programme has equipped me with valuable analytical and critical what they hope to achieve after college and link their goals and thinking skills. Through the programme, I have learned to analyse passions to the appropriate major. In addition to consulting with scientific problems and develop workable solutions by breaking them professors and reviewing course curricula, it is also beneficial to reach down into smaller, actionable steps. This has proven to be useful in out to current undergraduates through networking events or coffee my career, especially in the business world where problems can be chats to gain a better understanding of the major before making a final complex and ambiguous. With the skills I have learned, I am able to decision

SPOTLIGHTS

DEPARTMENT OF EARTH SCIENCES

Mapping Your Passion to Practicality **Aaron CHING**

Bachelor of Science (double major in Earth System Science and Psychology) Job title: Consultant at Ernst & Young Global Limited, one of the big four Accounting firms that provide assurance, tax, consulting and advisory services to its clients

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?

DEPARTMENT OF PHYSICS

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

What are the main responsibilities of your position?

I am the lead of an artificial intelligence team, and our goal is to create AI products to automate relevant tasks, such as

developing 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.

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 telescopes 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.

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 muchneeded 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 valuable research and mathematical skills that have been essential in my Al work. Physics also taught me to tackle complex problems by breaking them down, a skill that one finds useful in all aspects of life.

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



SPOTLIGHTS

DEPARTMENT OF STATISTICS & ACTUARIAL SCIENCE

A Crystal Clear Roadmap to Success Kelvin NG, FSA

Bachelor of Science in Actuarial Science Job title: Senior Pricing Analyst at SCOR Reinsurance Company (ASIA) Limited, a well-established reinsurer

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.

DEPARTMENT OF CHEMISTRY

Nauigating 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 pacing oneself is key to reaching the finish line successfully.

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 study. 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.

What should be considered before pursuing a career as a Toxicologist?

First and foremost, possessing strong technical skills is of paramount importance. As toxicologists possess at least a Master's degree, one shall have a strong science background from disciplines such as Chemistry, Biology or Pharmacology. Furthermore, always staying



SPOTLIGHTS

SCHOOL OF BIOLOGICAL SCIENCES

Combining Science and Public Safety Vivian CHOI

Bachelor of Science in Food and Nutritional Science Master of Science in the field of Food Safety and Toxicology Job title: Junior Toxicologist at Delphic HSE, a UK-based company offering consultancy and risk assessments around the safety of chemicals

curious and embracing life-long learning is essential. With new scientific knowledge emerging, regulations and understanding of different chemicals are ever-changing. Therefore, toxicologists read journal articles and attend technical meetings regularly to ensure they keep themselves on the same page with market development and identify the possible risks associated with different products.

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 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.

DEPARTMENT OF MATHEMATICS

A Mathematician's Journey in the Workforce **Chi Ming NG**

Bachelor of Science in Mathematics Job title: Assistant Transport Planner in William Sale Partnership, a globally-recognised professional services firm in the Transportation and Infrastructure industry

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 job 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 the programme help you on embarking your career?

Mathematics graduates give employers the impression that 'Oh, this person can deal with all the data, numbers, and modelling stuff." They recognise that we have been trained to think about complex concepts. This impression is somewhat true, as I have had no trouble handling logical commands, which has proven to be a valuable asset in my job.

not directly contribute to a non-academic career, but the knowledge I have gained provides me with tools and language for better communication with potential employers. 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 excel 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.

While our programme may not emphasise practical applications, it has equipped me with valuable problem-solving skills. I have learned

to break down complex problems into manageable steps, which has

helped me overcome technical difficulties at work. Taking electives

such as financial calculus, differential equations, and game theory may

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.

C tory-telling through videos has become a popular trend in our lives, the Faculty has been Ocreating more videos to cater the interest of audience with this powerful tool. Check out the videos below and learn more about the work of our dedicated researchers and experiences of our students!

Navigating Life after Graduation

 $S_{\rm our}$ into the world of our exceptional graduates with our video series featuring their inspiring stories. They have not only excelled in their fields but also made a significant impact on society. Hear from Jaclyn TSANG, a Hong Kong Powerlifting record holder and founder of a nutrition and fitness training centre, and Dr Colin LUK and Dr Inga CONTI-JERPE, who founded isoFoodtrace, our food using stable isotope analysis. Be

inspired and discover how our programmes help students achieve their dreams.



https://bit.ly/3LyGush



What is Astronomy? Here's What Astrophysicist Says!

urrio is back with another episode featuring the intersection of popular science and daily life, This time, he invited astrophysicist Dr David YU to explain basic astronomy concepts and how they relate to zodiac signs. Watch this episode to see how Currio's

insatiable curiosity drives him on the journey of self-



Length: 07:02 · https://youtu.be/QUnyvPFkR5E







Science in a Minute: **Insights into Cutting-Edge Research**

his is a new video series showcasing the latest research conducted by our team of scientists. Through short and dynamic one-minute videos, we aim to provide a glimpse into the fascinating world of scientific discovery. From unlocking the secrets of human DNA to unravelling the structure

of dark matter in the universe, we have it all. Join us as we explore the frontiers of science and innovation

UIDEC

HIGHLIGHTS

https://bit.ly/3AEg2qV



Dream Frequency: Our Physicist Stars in Microfilm

n this microfilm created by the Hong Kong Science Museum's online platform QK POST, Dr Jason Pun from the Department of Physics portrayed the character of 'Dr Pun' explaining the basic scientific knowledge about music and sound to a tone-deaf young girl who dreamed of becoming a musician. It is surprising to see

that our physicist is also talented in acting!

Length: 9:39 · https://youtu.be/DW7uOeiUKdl





CHEMISTRY AND BIOLOGICAL SCIENCES

Chemical Biologists Decode a Significant Gene Modifier Linked to Cancer

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

ur 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 cuttingedge 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.

我們的化學生物學團隊最近拆解了一個非 DNA 序列中編碼的 遺傳信息被讀取的過程。他們發現了能讀取組蛋白 H3K79 甲 基化 (H3K79me) 的「閱讀器」——一種名為 menin 的蛋白質,



從而幫助理解錯誤「讀取」H3K79me 會如何導 致發育缺陷及多種癌症,並有望開發用於治療 與H3K79me失調有關的癌症的藥物。

earn more: https://bit.ly/3ICerqG

THE SCIENCE BEHIND

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。

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.



自 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。



One of the challenges in chromatin biology is how particular histone marks are interpreted to achieve their biological function. To answer this auestion, 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.

研究各種組蛋白修飾,須了解它們如何被「讀取」來 實現相關的生物功能。為此,必先找出能識別這些 組蛋白修飾的「閱讀器」。「閱讀器」是一類能識 別 特定組蛋白修飾、從而傳遞組蛋白修飾所攜帶的「信 息」,上調或下調對應基因的表達的蛋白。

BIOLOGICAL SCIENCES

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

Researchers// Dr Yuanliang ZHAI, Assistant Professor of the School of Biological Sciences and others Collaborators // The Hong Kong University of Science and Technology, Institut Curie in France, Hong Kong Polytechnic University and others

mproving the specificity of chemotherapy drugs has 提高化療藥物的針對性,一直是研發抗癌化藥物的重 always been vital in developing anticancer drugs. Our 要考量。我們的研究團隊運用了尖端技術「冷凍電鏡」 research team used an imaging technique called cryo[1] (Cryo[1]EM) 研究結合 DNA 的微小染色體維持蛋 electron microscopy (cryo-EM) to visualise the atomic 白 2-7 雙六聚體 (MCM2-7 DH) 的原子分辨率結構。 details of DNA-bound MCM2-7 double hexamer (DH). MCM2-7 是一組由六個蛋白質組成的 DNA 解鏈酶,而 MCM2-7 is a group of six proteins that unzips DNA 我們的研究結果揭示 MCM2-7 如何打開 DNA 雙鍊進而 duplex. Our findings reveal how the MCM2-7 complex 啟動 DNA 複製── 這個過程對於正常和癌症細胞增殖 destabilises DNA to promote the initiation of DNA replication. This process is essential for both normal 的過程極為重要。因此,如能阻斷細胞複製的啓動,便 and cancer cells to proliferate. It thus offers a potential 有望研發一種以 MCM2-7 複合體為靶點 strategy for the selective killing of cancer cells, which 的無毒抗癌藥物,為創建具高度針對性的 helps to develop nontoxic anticancer drugs using the 抗癌療法提供了新的思路。 complex as targets in the future.



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. 冷凍電子顯微鏡是一項先進的成像技術,它使用極低的溫度來保存生物 樣品。這項技術有助於獲得大蛋白分子或蛋白複合物的高清圖像。



Learn more: https://bit.ly/3k9lz38

THE SCIENCE BEHIND

RESEARCH STORIES

MARINE SCIENCE

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

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.

研究表明,一些價格相宜的修復方法, 例如使用石灰岩作修復蠔礁的基礎,可 以跟較昂貴的方法一樣有效。



Their findings reveal that oyster reef restoration initiates a rapid increase in biodiversity and abundance of reef-associated species within two years; however, the recovery rate then decreases substantially, leaving a global shortfall in recovery of 35% below a pre-disturbed state.

此研究發現,修復蠔礁後的兩年間,可見附近的生物多樣性及與 蠔礁相關的物種急劇增加;然而,恢復速度會在其後放緩。現存 蠔礁所承載之生物多樣性僅為原生蠔礁的 65%。



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

arine Scientists utilised an assessment method called recovery debt, to examine the effectiveness of global oyster reef restoration. By screening over 70 journal articles comparing restored oyster reefs to surviving natural oyster reefs, the researchers aimed to determine what constitutes successful recovery of oyster reefs and identify the most successful methods of restoration. The study provides a comparative analysis of the methods, offering a reference for future conservation efforts.

我們的海洋科學家採用了生態學概念「復原債務」,評 估各地蠔礁修復工作的成效,在世界各地逾七十個蠔礁 的修復案例中歸納出修復蠔礁之要領, 同時篩選出最有效的修復方法。是次研 究闡示了各種修復蠔礁方法的優劣,可

為未來保育工作提供參考。

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

'Oyster reef restoration fails to recoup global historic ecosystem losses despite substantial biodiversity gain' (published in Science Advances, 2022)

EARTH SCIENCES

Numerous Ancient Martian Lakes that Might Dramatically be Underestimated by Scientists

Researcher // Dr Joseph MICHALSKI, Associate Professor of the 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

akes on Earth, sustained by various sources such as rainfall, snowmelt, rivers, and groundwater, are an indication of its thriving life and past climates. Similarly, evidence of approximately 500 ancient lakes on Mars that existed billions of years ago suggests a potential for uncovering evidence of ancient life and climate on the red planet. Our geologists, through a comprehensive analysis of satellite data collected over the years, have put forth a proposal that, besides the known larger lakes on Mars that are over 100 km², many smaller lakes were likely to exist on the red planet. It is estimated that up to 70% of these Martian lakes have yet to be discovered.

地球上的湖泊是由降雨、融雪、河流和地下水供給的水體所形 成,不但為地球孕育生命,亦是反映地球過去的氣候之重要地 質憑證。同樣地,火星於數十億年前確曾擁有大約 500 個古老 湖泊,當中亦很有可能包含古生命和氣候狀況的證據。奇怪的 是,已知的火星湖泊幾乎全部都很大,平均大於100平方公里; 而縱觀地球上,七成以上湖泊的面積偏偏都較火星上的小。我



們的地質學家於是綜合了多年來收集的衞星數 據,並推論出小湖泊很可能都在火星上存在, 而且至少有七成的火星湖泊尚未被發現!

Learn more: https://bit.ly/3xDBU4r

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 two primary research directions: black hole physics and manybody physics.





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.

的發現。



permafrost-hosted lake on Mars. Both images show elevation data from the MOLA (Mars Orbiter Laser Altimeter) and HRSC (High Resolution Stereo Camera) instruments draped onto images from THEMIS (on the left) and CTX. Image credit: ESA/JPL/NASA/ASU/MSSS



我們的物理學家團隊部署了新一代超級電腦「黑體」,它具有 1024 處理 器計算核心及多個儲存系統,能夠在一秒內完成一個人要花 65 萬年才能 人手完成的運算。「黑體」將為科學家提升巨大的計算能

力,並將為量子物理學和天文學帶來更深刻和更有影響力

Learn more: https://bit.ly/3Za8RBI





MATHEMATICS New Evidence to the Langlands Conjectures

Researcher// Dr Chun Yin 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.



在機器學習中,我們常利用訓練數

據集來訓練預測模型,以便對新的

測試數據進行準確的預測。在傳統

理論中,一般認為模型不應過於準

確地擬合訓練數據,否則會「過擬

合」,反而影響測試數據上的表現。

然而,這個傳統觀點近日受到挑戰:

現代深度學習模型常常在訓練數據

近日,我們的研究團隊對深度學習中的良性

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

'Monodromy of four-dimensional irreducible compatible systems of Q' (published in Bulletin of the London Mathematical Society, 2022)

STATISTICS AND ACTUARIAL SCIENCE

A New Perspective on Overfitting in Deep Learning

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

n 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

as 'benign overfitting'. Recently, our research team has studied benign



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/3M7SW1c



data yet still achieve good test performance. This phenomenon is known 上出現過擬合,但仍然可達到很好的預測準 <u>繩度。這種現象稱為「良性過擬合」。</u>

overfitting in deep learning, providing an explanation for

過擬合進行研究,為其發生作出解釋,並進 一步確定了良性和有害的過擬合之間的變化 過程,說明了造就良性過擬合發生的條件。

UPCOMING EVENT

Touchstart Your Summer Adventure



Application period

A re you looking for a fun and exciting way to spend your summer? Look no further than our Touchstart Science Summer Programme! With two PROGRAMME 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!

TouchStart Science Summer Programme: bit.ly/3oEcsKZ

EVENT HIGHLIGHTS

Leading Minds Unite: Revisiting Our Lecture Series

Our Lecture Series brought together leading academics from around the world to share their 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



HKU President's Forum Distinguished Lecture – 'Entropy, Molecular Motors, and Non-Thermal Equilibrium Statistical Physics' by Professor Steven CHU, William R Kenan Jr Professor of Physics. and Professor of Molecular and Cellular Physiology, and of Energy Science and Engineering at Stanford University.



HKU Science Distinguished Lecture Series: https://bit.ly/40H0rBz



EUEN.



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. For those who were unable to attend in person, recordings of some lectures are available on our website, providing a valuable resource for further exploration and learning.





'Hacking Stars to Better Understand our Universe' by Dr Hakeem OLUSEYI, Astrophysicist and Former Space Science Education Manager for NASA.

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.



Distinguished Lecture 'Translational Chemica Biology' by Professor Xiaoguang LEI, Boya Distinguished Professor of Chemistry and Chemical Biology, and Senior Principal Investigator of the Peking-Tsinghua Center Life Sciences, Peking University.



HKU Science Public Lecture Series: https://bit.ly/3Azu5hC





• Uncovering new phenomena and controlling physical processes in novel ways is incredibly fulfilling.

Excitement as the Driving Force for New Discoveries

Professor Wang YAO Chair Professor of Physics

Research interests: Theoretical Condensed Matter Physics, Quantum Physics and Optical Physics **Research achievements:** Professor Yao and his team have reshaped the understanding of valley quantum degree of freedom in electronic systems, and opened the door to its versatile control in two-dimensional materials. While the potential impact on technology remains to be seen, their work marks an important step forward in this field. capturing the interest of the research community.

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 laid 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 twodimensional 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.



Selected Awards and Achievements

2018-2022	Highly Cited Researchers by Clarivate Analytics
2021	Xplorer Prize
2021	Nishina Asia Award
2020	Fellow of American Physical Society
2020	Croucher Senior Research Fellow
2014/15	Outstanding Researcher Award, HKU
2014	OCPA Achievement in Asia Award (Robert T Poe Prize)
2013/14	Research Output Prize (Faculty of Science), HKU
2013	Croucher Innovation Award
2012/13	Outstanding Young Researcher Award, HKU

ACCOMPLISHMENTS



Peggy Tse 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.



Dr Jinyao TANG, Associate Professor at the Department of Chemistry, was selected as the Croucher Senior Research Fellow 2022 for his outstanding research in creating nanorobots that can be manipulated and programmed remotely. With support from the Croucher Foundation, Dr

Tang's research team will develop new tools to integrate individual nanorobots into intelligent materials, unlocking unique properties for new applications.



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 Tencent to support exceptional scientists in conducting fundamental research. Professor Zhang is one of 58 selected scientists, including three from Hong Kong.



External Awards

Professor Ngaiming MOK, Edmund and 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 recognises speakers who have conducted outstanding research in organometallic, catalysis, or inorganic chemistry.



Learn more: https://bit.ly/3Mp5jaT

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.



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 'Inventors me' category. This prestigious programme recognises 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) 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.



The Department of Chemistry won two medals at the 48th International Exhibition of Inventions of Geneva. Professor Hongzhe SUN's team was awarded a Gold Medal for the research 'Bismuthbased Cocktail Therapy for Coronavirus' project, while Dr Edmund TSE's team won a Bronze Medal for 'On-site Fertilizer Production for Perpetual Farming.' These accomplishments reflect the department's commitment to advancing research and making a positive impact on society.

Internal Awards



Dr Rachel Ka Wai LUI, Senior Lecturer at the Faculty of Science, was awarded the HKU Excellence. Outstanding Teaching Award 2022 in recognition of her commitment to delivering high-quality education.



The MoU was signed on January 17, 2023 by the Assistant Director (Conservation) of the AFCD, Mr Simon CHAN, and the Director of SWIMS, Professor Gray WILLIAMS.



About HKBIH:

https://bih.gov.hk/en/home/index.html

OBITUARY

In Memoriam of Professor Ming-Chit LIU

□ ormer 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 Ming-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/411BfWV

Dr Binzheng ZHANG, from the Department of Earth Sciences and Dr Yufeng WANG of the Department of Chemistry were both honoured the HKU Excellence Outstanding Young Researcher Award 2022. This award acknowledges their exceptional achievements and significant contributions to their fields, which have advanced the frontiers of knowledge and opened up exciting new avenues for research.

SWIMS and AFCD **Join Forces to Protect** Hong Kong's Biodiversity



The Agriculture, Fisheries and Conservation Department (AFCD) and The Swire Institute of Marine Science (SWIMS) entered into a Memorandum of Understanding (MoU) for enhanced collaboration in managing and disseminating marine biodiversity data.

The AFCD launched the Hong Kong Biodiversity Information Hub (HKBIH) 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 HKBIH, will facilitate the sharing of spatial data of local species. The AFCD and SWIMS endeavour to make the HKBIH a more comprehensive data repository to foster a better understanding and conservation of Hong Kong's wealth of biodiversity.







Dr Kei Yuen CHAN

Assistant Professor of Department of Mathematics Research interests: Representation Theory, Number Theory, Langlands Programme

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 Ibis Kit Chong CHENG

Lecturer of the School of Biological Sciences Teaching areas: Biochemistry, Molecular Genetics, Chemistry, Nutrition and Metabolism, Nutrigenomics, Research Methodology

After completing my PhD study on Hepatocellular Carcinoma, I started my

teaching journey with the aim of developing students' interest and initiatives in learning and fostering their appreciation for biological networks. Prior to joining HKU, I worked as a Lecturer at Lingnan University and HKU SPACE, where I taught courses on generic science, sport nutrition, biochemistry, and research methodology. Currently, I am involved in teaching courses related to food and nutrition. During my leisure time, I love making desserts and doing handicrafts.



Dr Liangqiong QU

Assistant Professor of Department of Statistics and Actuarial Science Research interests: Al in Healthcare, Medical Image Processing, Illumination Modelling, Deep Learning

I'm excited to introduce myself as a researcher in the field of artificial intelligence,

computer vision, and medical imaging processing. My research interests are primarily focused on deep learning-driven image acquisition and reconstruction, as well as developing trustworthy medical AI systems from imperfect medical data. I'm passionate about advancing the use of artificial intelligence in medical settings to improve patient outcomes and enhance the quality of care. I'm looking forward to working with all of you in the future. 🎐



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 travelled 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 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 modelling 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. 💡



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 Daphne Mei Yi WU

Lecturer of the School of Biological Sciences Teaching areas: Nutrition and Food 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 life-long 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 Cecropin B, to address antibiotic resistance.

AMPs have broad-spectrum antimicrobial activities and do not cause resistance due to The team's success in wet lab work, science communication, and education earned them their third gold medal in HKU iGEM history.

Dr Juan Diego GAITÁN-ESPITIA, Associate Professor of the School of Biological Sciences, Faculty of Science Dr Edmund TSE, Assistant Professor of Department of Chemistry, Faculty of Science Dr Amy Tan, former Research Assistant Professor of the Faculty of Engineering

Postdoctoral Researcher Wins International Allergy Research Prize

Dr Mukesh 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.



Learn more about his research: https://bit.ly/3HlhwtX

Supervisor



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.





Professor Dong LI

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

https://bit.ly/3NCn





Professor Billy CHOW of the School of Biological Science

Teacher-Student Team Wins International Upcycling Project



Learn more about the award: https://bit.ly/3AzOCm3



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 leading the charge towards a more sustainable and just future.

Mark CHEUNG, a final-year student from the School of Biological Sciences, and the leader of the student delegation, made a remarkable impact through his unwavering efforts to promote climate justice at the Conference of the Parties (COP27) held last year.

Embarking on a Mission

As a youth climate activist, Mark is dedicated to addressing the climate crisis and promoting climate justice. Recognising the lack of Asian youth representation in international forums, Mark took the initiative to encourage Hong Kong universities, including HKU, to send student delegations to COP.

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 maximise 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 next official meeting. Mark said, 'I was proud to see youth's ideas were taken into consideration and would make a difference in the wider context of the Global Goal on Adaptation.'

Mark Cheung Kong Wai

- A final-year student majoring in Environmental
- Co-Founder of the Network of Environmental Student Societies (NESS)
- Member of the UN Asia Pacific Youth Advisory Group on Environmental and Climate Justice



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 rightbased 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.



Discover Mark's climate change mission: http://bit.ly/3Lp9K3x

Conference of the Parties (COP)

The Conference of the Parties (COP) governs the UNFCCC. Representatives from 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 climate change forum. Countries debate their intentions to reduce greenhouse gas emissions, adapt to climate change, and finance the low-carbon economy at these gatherings.

STUDENT WRITER En Yu YAP Year 2 student in Science Master Class (BSc & MRes) majoring in Chemistry (Intensive)

From HKU to Cambridge: A Unique Opportunity to Study

Science across Two Continents The HKU-Cambridge Undergraduate Recruitment Scheme for

Rupert found ample opportunities to hone his research skills Natural Sciences is an exclusive opportunity for Young Scientist through practical sessions, report writing, and poster presentations Scheme (YSS) participants in Natural Sciences Disciplines to pursue in Cambridge's undergraduate laboratory courses. These hands-on classes allowed him to explore experiments aligned with his interests their passion for science across two continents and access worldclass resources. After two years at HKU and two to three years at and build a solid foundation in both theoretical and experimental Cambridge, selected students can earn three to four degrees from physics, benefiting his future research career. However, Rupert's HKU & Cambridge in four to five years. success on the Cambridge-Track would not have been possible

Rupert KWAN, a member of the scheme's first cohort, found the experience to be lifechanging. 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.



Rupert Long Hei KWAN Year 2 student at University of Cambridge under the Cambridge Natural Sciences Tripos majoring in Physics/ Year 3 student at HKU (Cambridge-Track)

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 emphasised that while Cambridge interviewers don't anticipate candidates to have extensive outof-curriculum knowledge, they do expect them to have a sound comprehension of what they have studied and apply it in different cases.

STUDENT WRITER Yen-hsu LIN Year 3 student in BSc Programme, majoring in Chemistry (Intensive)



ma the second and the star





'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.'

without the rigorous training he received at HKU. He said, 'The experiences and knowledge I acquired at HKU allowed me to build a solid foundation in physics, making it much easier for me to understand new concepts in the fastpaced lectures. This is probably why I adapted to the learning style at Cambridge quickly in my first term and continue excelling academically.'

As Rupert enters his final year as an undergraduate, he knows his academic journey is far from over. He is more determined than ever to become a physicist and explore novel physics phenomena to further the understanding of the universe's building blocks. 'The Cambridge-Track has driven me closer to realising my dream of becoming a researcher,' he said with a bright smile, eyes sparkling with excitement.



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/3FZPf[1

Learn more about Rupert's journey https://bit.ly/44hVhz9



Tracing the Roots of Food with Stable Isotope Analysis

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 nutrition 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 iDendron had just initiated a start-up SEED programme while Science Park offered a HKD100K 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 aim 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 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 holds businesses accountable for authentic claims.'



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

Click this link for video interview: https://bit.ly/3mAAndl

STUDENT WRITER En Yu YAP Year 2 student in Science Master Class (BSc & MRes) majoring in Chemistry (Intensive)

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.



Dr Inga E CONTI-JERPE (Left) Scientific Development Lead@isoFoodtrace Biological Researcher at University of California, Berkely

Dr Colin Chung-lim LUK (Right) PhD in Biological Sciences Project Development Lead@isoFoodtrace



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.

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