Be Inspired by Our PhD Students: Building a Research Career at HKU Science

What does the life of a PhD student look like? Some might regard it an extension of undergraduate studies. In this feature story, you will find that pursuing a PhD degree is way more challenging, yet much more fruitful than you can imagine. It is all about learning independently, questioning the boundaries of existing knowledge, embracing failure and pushing frontiers through collaborations.

With the support in different aspects, our recipients of HKU Presidential PhD Scholarship (HKU-PS) and the Hong Kong PhD Fellowship Scheme (HKPFS) gradually build their research career at the Faculty, marching closer towards their scientific goals day after day. Let us hear their experiences and get some inspirations here.

DEPARTMENT OF CHEMISTRY

Great Teachers Lead the Way

TEO Qin Han

Recipient of HKPFS and HKU-PS

Year 2 PhD student from Department of Chemistry
Field of study: synthetic organic chemistry, focusing on making molecules with seven-membered rings
Place of origin: Malaysia
Supervisor: Professor Pauline CHIU, an expert in organic chemistry

As a kid, I was often fascinated by the reaction and interaction between chemicals, so I operated a tiny laboratory to do my silly experiments at home, which kindled my passion and interest in the realm of chemistry.

I am a firm believer in chemistry and think that its proper applications via technology in various fields such as medicine, agriculture, and food industry shall be the legacy we leave to our future generations. Being able to be a part of this process gives me a great sense of achievement and pride.

My research focuses on making molecules with 'seven-membered rings', one of the many kinds of bioactive natural structures that chemists have always been fascinated with and hope to synthesise them to serve as a lead compound for drug discovery and advance our understanding of the natural world. It is one of the many paths I am attempting to explore. In the long run, I hope my work will contribute back to society and help shape the world into a better place.

Nevertheless, research funding is always a challenge. Apart from financial aid provided by my scholarship, I am grateful that I also received extra funding to support my research, and the level of support is sufficient for buying items related to my thesis research, procurement of research materials, books, equipment, publication fees, and editing service.

The transition from undergraduate study to postgraduate research is also one of the bottlenecks. The most important fixed goal you can set during your undergraduate study is the date for your graduation. But as a postgraduate, your experimental plan could be changed anytime if the current one does not work. I manage to overcome it with the help of my supervisor and lab mates. I am grateful for the opportunity to work with my current supervisor, Professor Pauline CHIU, who always makes sure that I am on the right track and actively gives me feedback during our weekly meetings, which helps plan subsequent experiments and work. And thanks to my lab mates, who are from diverse backgrounds, eager to share different experiences with me all the time.

I also do my reflections and rethinking from time to time, which is an important process to lead myself and facilitate a more profound way of learning.

'Stay true, and persistence is the key!'

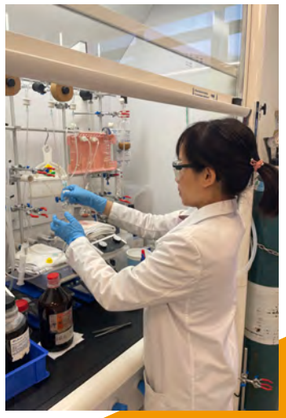
Benefits

The extra annual cash award cover half of my accommodation fees and some of the living expenses.

My lab mates are fun, considerate, caring and willing to help!

The chemistry between my supervisor and I is great!

Extra funding to support my research.



Tips to ace the scholarship interview

- Be authentic and be clear about your own direction.
- Don't be nervous when you meet the panels! Just imagine that you are having a casual talk with them.

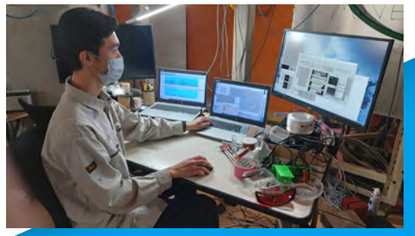
'Fostering self-initiative is important to excel as a researcher.'

I am given the opportunity to collaborate internationally.

The programme broadened my network to other scientific areas and enriched my student life.

HKPFS enabled my overseas research by removing a huge financial burden.

Benefits



Advice for prospective PhD students

- Be clear of your goals so that proper actions can then be taken to achieve them.
- Be aware of all the resources available to you as a student or researcher, as they will be of immense help.
- Although you will be given guidance as a student, you are meant to work independently on a research topic as a postgraduate student.

DEPARTMENT OF PHYSICS

Networking Opens New Doors

YAP Jinn Ming

Recipient of HKPFS and HKU-PS

Year 2 PhD student from Department of Physics
Field of study: nuclear physics, focusing on nuclear isotopes that are important in stellar processes
Place of origin: Malaysia
Supervisor: Dr Jenny LEE, nuclear physicist, and also recipient of 2021 NSFC Excellent Young Scientists Fund (Hong Kong & Macau)

I have always been curious of the fundamental workings of things around me. During my undergraduate study, I had a particular interest in the building blocks of our universe and especially found nuclear processes intriguing. I was also aware that a research career would allow me to explore the frontiers of the scientific domain, which led me to look for opportunities in nuclear physics to further my studies.

In the summer of 2019, I met my current supervisor, Dr Jenny LEE, in an undergraduate conference at HKU and eventually started my PhD career at HKU Science. Dr Lee has provided me with a lot of guidance and resources. Her sound knowledge and expertise in experimental nuclear physics are immensely helpful in guiding me through the research process in this domain. Dr Lee's ties within the international nuclear physics community have allowed me to collaborate with researchers worldwide. Her strong work ethic has also motivated me to follow in her footsteps to produce the best possible research work to my capabilities.

My research allows me to travel overseas since experimental research in nuclear physics requires extensive use of accelerators, which are only built in several places around the world. Since November 2021, I have been pursuing my research in the Institute of Physical and Chemical Research (RIKEN), Japan, one of the best facilities in the world for nuclear physics. The Radioactive Isotope Beam Factory (RIBF) at RIKEN has the most powerful accelerator for radioactive isotope production. Its capability allows us to study exotic nuclei that are both difficult to produce and elusive from measurements due to their short half-lives.

My current research is to perform mass measurement of exotic nuclei in the neutron-rich rare-earth region. I will also be working on the development of current state-of-the-art mass spectrograph devices to improve their efficiency and precision. The outcomes of my research will shed light on the formation and abundance of rare-earth elements during nucleosynthesis – the production of elements in the stars.

In the near future, I foresee myself continuing the path of research in nuclear physics, and perhaps even contribute to the successful development of fusion energy. This would require me to further my expertise in my current research and carve out a niche for myself. On the other hand, contemporary research is becoming more collaborative and I look forward to participating in such collaborations.

'Work hard and you will get your reward.'

My supervisor gave me valuable advice on developing my career.

The scholarship and financial aid helped me focus on my research better.

The travelling allowances enabled me to attend more overseas conferences, and even amidst this pandemic situation, I could still make it online and exchange ideas with intellectual researchers around the globe.

Benefits

General procedure to get your paper published

Most academic or peer-reviewed journals classify article submissions into at least three general categories: Accept, Revise & Resubmit, and Reject. Once you get rejected, you are not allowed to submit the same paper to the journal that rejected it ever again. The only chance to get it published is to revise it and submit to other journals. Revise & resubmit means the journal will give you the green light if you can address the comments from the reviewers.

Tips to ace your fellowship interview

- Prepare a good CV because the interviewers would not be able to know you well within a 15-minute interview.
- Make an all-out effort into your undergraduate study. Most importantly, get yourself strong recommendation letters from some reputable professors in your interested field.

DEPARTMENT OF STATISTICS AND ACTUARIAL SCIENCE

Failure is Success in Progress

JIN Huaqing

Recipient of HKPFS and HKU-PS

Year 4 PhD student from Department of Statistics and Actuarial Science
Field of study: biostatistics, focusing on analysing of the medical data and clinical trials
Place of origin: Mainland China
Supervisor: Professor Guosheng YIN, an expert in biostatistics who made significant contributions to the frontiers of clinical trials. He was elected as a Fellow of the Institute of Mathematical Statistics (IMS) in 2021, one of the top honours for demonstrating distinction in research in statistics or probability.

When I came to our Department as a freshman, I had no idea which area of research to focus on. Thanks to my supervisor, Professor Guosheng YIN, who introduced me to the beauty of Bayesian statistics, which provides many powerful tools to analyse the datasets in practice.

There is an urgency to accelerate clinical trials while maintaining safety and efficacy for the development of new drugs and vaccine candidates during the pandemic. Under the guidance of Professor Yin, I am motivated to focus my research on medical data and clinical trials.

Our team has developed some new phase I and phase II clinical trial designs, which would help to speed up the development of the new drugs and vaccines. One of my papers has recently been accepted by a journal that developed a new calibration-free phase I/II design. I hope my methods will be widely applied in practice and be adopted in clinical trials by doctors one day. In this way, it will make my research work much more meaningful.

Every PhD student struggles to publish their first paper and I am no exception. My first project started in December 2018, three months after becoming a PhD student. However, when I was about to submit it to a conference six months later, I found that I had made some vital mistakes in the theoretic proofs of the paper. I must admit that there was a moment I almost broke down and wanted to give up.

Luckily, my supervisors Professor Yin and Dr Fei JIANG had been very patient with me. I managed to fix those mistakes with their help and submitted the paper on time. Nevertheless, the story did not end here. My paper got rejected, followed by some very harsh and critical comments – I got stumbled again!

Fortunately the misstep did not make me doubt myself. After repeated rejections and unsuccessful attempts, I did a substantial revision and had the paper submitted to a prestigious journal. Though I have never hoped of being able to make it, surprisingly I received good news from the journal after two months – I got the 'revise & resubmit' offer! The feedback from the reviewers was truly inspiring and I tried my very best to address their comments during those rounds of edits. Eventually, my paper got accepted in May 2021.

It took me two years to have my first paper published. This long journey made me realise that although the road of research is full of obstacles, you will still get the reward if you work hard to pursue your goal. I will finish my thesis in July 2022 and continue my research career as a postdoctoral fellow at the University of California, San Francisco. My adventure has just begun!

SCHOOL OF BIOLOGICAL SCIENCES

Clear Goals Pave the Way

Pauline DUFOUR

Recipient of HKPFS

Year 5 PhD student from School of Biological Sciences
Field of study: wildlife conservation, focusing on conservation physiology
Place of origin: France
Supervisor: Dr Timothy BONEBRAKE, an ecologist whose research interests lie in endangered species conservation, urban ecology, tropical biodiversity and global change

I have always loved animals; I just did not know how to make it my lifetime career. Interested in biology, I thought that I wanted to become a veterinarian, but after joining university, I realised what I truly liked was actually called 'ecology'.

During the pursuit of my master's degree in Paris, I started to be captivated by conservation physiology, an emerging field which offers a more dynamic approach in respect to climate change when compared to conventional conservation measures. The different research opportunities I had during that time played a big part in shaping my research direction and motivated me to do a PhD.

I have always loved forensic science as portrayed in fictions or dramas, but I had never connected it to a potential career in conservation, until early 2017 when I moved to Laos, regularly observing ostriches, monkeys, eagles, iguanas, or crocodile eggs in wildlife market – some of which are not even native species to Asia!

I embarked on my PhD journey during the same year, keeping wildlife trade research in the back of my head. My research is nested into a broad field of wildlife conservation, with a primary interest in conservation physiology.

I investigate the physiological responses of diurnal and nocturnal ectotherms to climate change, with a particular interest in lizards. Besides, I have also developed a project about the trade of tokay geckos, both for traditional medicine and pet trades.

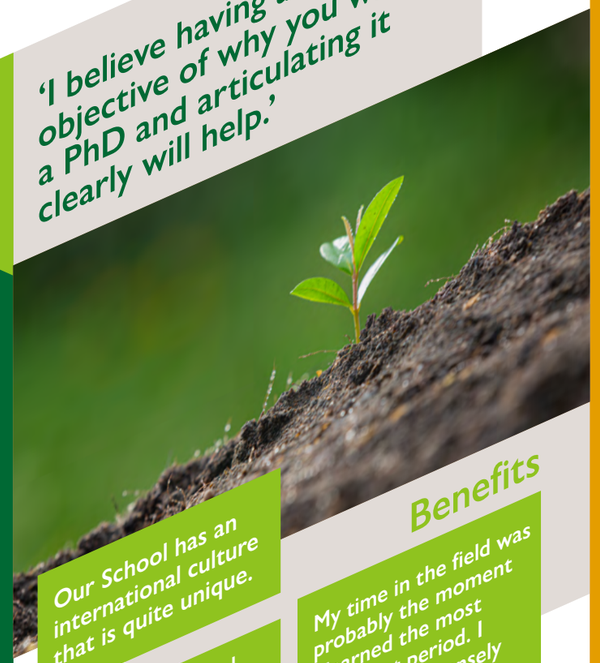
Being exposed to the Conservation Forensics Lab at the School of Biological Sciences, I developed interests and skills from many passionate ecologists, for which I am very grateful.

My supervisor, Dr Timothy BONEBRAKE, has played a crucial role in shaping the scientist I have become, by granting me his trust from the start and allowing me to develop my ideas at my own pace. I am very grateful for the opportunities and advice I received from him over the years, even during the most stressful parts of this journey.

I was also influenced by other scientists such as Dr Caroline DINGLE, the Director of the Conservation Forensics Lab. She always welcomed my questions, whether scientific or about student struggles. As the founder of the Women in Science at HKU, she also championed many of my peers and myself.

I would like to dig deeper into the topics I have based my research on, to address ecological and societal issues. The more I learn about the science of climate change, the more I see the need for societal change and human adaptations. I cannot imagine having a job that does not touch on these issues. I am looking forward to building my career on this expertise and experience, and to take part in creating a more informed, self-sufficient, and resilient society.

'I believe having a clear objective of why you want a PhD and articulating it clearly will help.'

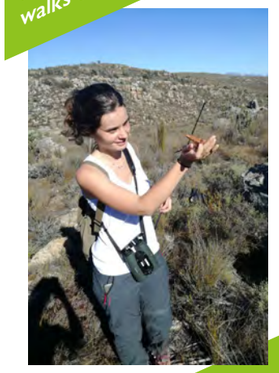


Our School has an international culture that is quite unique.

Joining international conferences allowed me to meet people beyond papers, including renowned researchers in my field. The whole experience was rewarding, even though it felt a bit overwhelming at times.

Benefits

My time in the field was probably the moment I learned the most in a short period. I benefited immensely from the experience and support of people I met, not only from researchers, but also from people from all walks of life.



Advice for prospective PhD students

Time management is definitely an issue for PhD studies. Students would need to review their progress and accomplishments from time to time, adjust their expectations and make back-up plans for their studies.

DEPARTMENT OF EARTH SCIENCES

Preparing for an Interdisciplinary Future

Anyang DING

Recipient of HKPFS and HKU-PS

Year 4 PhD student from Department of Earth Sciences
Field of study: biogeochemical cycling, focusing on iron cycling in Precambrian oceans and its interaction with the environment
Place of origin: Mainland China
Supervisors: Professor Guochun ZHAO (primary supervisor), a renowned geologist whose main research fields are metamorphic petrology, Precambrian geology and supercontinents, and was named by Clarivate Analytics as 2021 Highly Cited Researcher; Dr Sean CROWE and Dr Yiliang LI.

When I was a freshman, I became fascinated by the beauty of rocks and minerals, which led me to choose geology as my undergraduate major. As I explored deeper and deeper into the world of these essential building blocks of our planet, I found that geology is not merely a subject about understanding rocks but of studying the evolution of our 4.5 billion-year-old Earth. I therefore became more open-minded in different research fields and questions, and got interested in the interplay between early life and the environment. To satisfy my thirst for learning and exploring the unknown, I decided to go on to graduate study and dive into the world of geosciences.

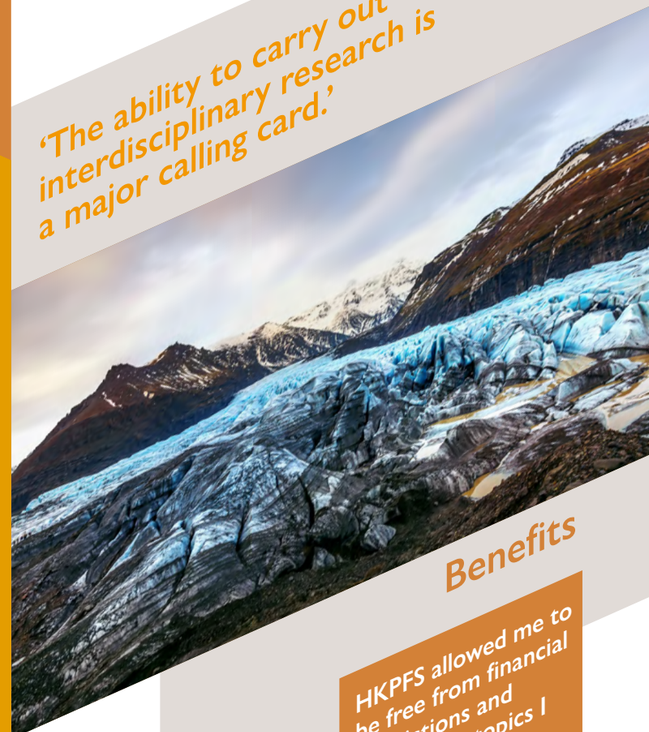
It is very challenging to verify or validate the scientific findings in the area of Earth Sciences, as the geological record has been altered or does not even exist anymore. The best we can do is to provide as much evidence and support as possible to back up our interpretation of the observation.

Recently, I have published a paper in *Communications Earth & Environment* with my supervisor Dr Yiliang LI and our collaborator on solar cycles on the early Earth. To argue the presence of solar cycles and their influence on climate was probably 2,470 million years ago, we reviewed previous studies on the dynamos of main-sequence stars, solar-activity-climate interaction, and microbial ecophysiology in ferruginous water bodies. Dr Li guided me through the whole process, from data analysis to manuscript proofing. He is always there to listen, help, and offer guidance. We have had numerous inspiring conversations – it is he who gave me the confidence to explore any topics that interested me.

As a graduand in the Class of 2023, I am fully aware of the highly competitive job market in the academia. To cope with this, the ability to carry out interdisciplinary research projects is a major calling card. Therefore, I am currently doing research on both environmental elemental cycling (by running simulation) and microbial activity (by lab work), and I also equipped myself by learning versatile research techniques, including computer simulation and microbial culturing, hoping that enhancing interdisciplinary research skills may benefit my future research path.

At this point, I have been trying my best to address small questions, as I believe this will eventually help the scientific community solve the big questions collectively.

'The ability to carry out interdisciplinary research is a major calling card.'



Benefits

HKPFS allowed me to be free from financial restrictions and choose any topics I desire to focus on.

Photo courtesy of Shuhan & Wenjun

Advice for prospective PhD students

- Being anxious about the future will only make your life miserable. So focus on the present moment instead of dwelling on regrets or worries.
- Doing nothing will build up anxiety very fast, so always do something related to your research.

'Explore as many research fields as you can during undergraduate study to help you identify your true research interests.'

The scholar programme has transformed my life. I most appreciate the financial support and the extra research opportunities it offers.

Additional training in effective science communication will help me to succeed in grant applications in the future, which is crucial for my research career.

Benefits

Participating in international conferences allowed me to exchange ideas with researchers from other countries.

Advice for prospective PhD students

- Being patient is an essential quality of a successful researcher.
- It would be best if you volunteer to work in different laboratories during your undergraduate study, as it will give you an understanding of what it is like to work in a research setting.
- Volunteering is the best way to find your ideal supervisor as well.
- Do not limit yourself to your current major. Explore as many research fields as possible because it will help you identify your true research interests.

SCHOOL OF BIOLOGICAL SCIENCES

Early Research Experiences Fuel Interest in Science

Elsie Chit Yu IU

Recipient of HKU-PS

Year 1 PhD student from School of Biological Sciences
Field of study: metabolism, focusing on the metabolic adaptation of the skeletal muscle
Place of origin: Hong Kong
Supervisor: Dr Chi Bun CHAN, an expert in energy metabolism, whose research interests lie in physiological regulation and pathological alternation.

Like many of my undergraduate fellows, I hardly knew what scientific research was like as a freshman, but I was deeply impressed by the enthusiasm of researchers and their commitment to lifelong learning, which led me to take the initiative and volunteer as a student helper in the laboratory led by Dr Mingfu WANG, whose research focuses on anti-cancer effects of phytochemicals.

My first research experience was very educative. I learned to integrate various experimental techniques in chemical compound analysis, better understand the cell culture process, and was given a chance to perform animal experiments. Besides teaching me an array of techniques, Dr Wang also shared his research experience along the way, and showed me how to run a research laboratory, giving me an idea of what to expect in my scientific career.

After having a taste of scientific research, I was admitted to the Summer Research Fellowship (SRF) Scheme. I was given a chance to conduct an individual research project in Professor Nagendra Prasad SHAH's laboratory. Under his supervision, I discovered that using germinated wheat flour instead of regular one produced bread with significantly higher GABA content, unleashing the potential to make anti-hypertensive staple food.

Firing up by these experiences, I even extended my undergraduate study by enrolling in the final year research project (FYP), which trained me to be a logical thinker, thus preparing me for my independent postgraduate research.

Thanks to my current supervisor Dr Chi Bun CHAN, who was my teacher in an undergraduate course about endocrinology, he inspired me to explore the field of metabolism and motivated me to embark on the research journey.

It has been seven months since I joined the PhD programme, and I fully enjoy the moment. Dr Chan's research group creates a very comfortable and friendly atmosphere for newcomers, and I am instantly connected and developed a sense of belonging in the lab. Dr Chan is the kind of mentor who always initiates thought-provoking conversations that stimulate me to seek answers on my own rather than spoon-feed me information. Being around him is like having a supportive friend who always offers comfort and guidance to help me overcome adversity. Besides, I am still dazzled all the time by his logical intelligence!

My ultimate research goal is to unveil the interorgan crosstalk in fatty acid metabolism, which plays an important role in the progression of metabolic myopathy, hepatopathy, and adiposopathy. With the help of collaborators in the chemical and clinical fields, my team could develop novel treatments for these currently incurable diseases and validate the results of the animal model in human clinical studies.

DEPARTMENT OF MATHEMATICS

Get to the Bottom of Problems by Asking a Lot of Questions

Aneesh JATAR

Recipient of HKU-PS

Year 1 PhD student from Department of Mathematics
Field of study: complex analysis
Place of origin: Hong Kong
Supervisor: Professor Tuen Wai NG, whose research areas closely align with complex analysis, in particular, geometric function theory and invariant metrics, complex differential and functional equations, the geometry of polynomials, factorisations and iterations of meromorphic functions.

As a child, mathematics was like an anxiety-inducing chore to me. At some point in my early teens, I realised much of my phobia I had for the subject was actually attributed by my incomprehension of it – I did not understand why and what I was doing when facing homework problems. In this sense, the dread was inevitable.

Somehow, rote learning and the lack of understanding how these mathematics formulae work prevented me from tweaking them to solve equations in the necessary way.

So I took it upon myself to probe on my shaky foundation in all ways I could, essentially asking 'why' repeatedly like a five-year-old child until I got to the bottom of it. Likely, after a very long time, and with the aid of the Internet and some old textbooks, things began to click for me in a way they never had before.

Thanks to an excellent Mathematics teacher I had in high school, my peers and I were exposed to nonstandard ways of approaching problems under his tutelage which inspired me to look beyond 'school Mathematics' and think about the possibility of pursuing 'doing Mathematics' as my career.

Being encouraged by him, I enrolled on a university course opened to high school students. The style of thinking the course promoted was exciting. Although it had a huge learning curve and left me with more questions than answers, I was pretty much obsessed with trying to answer them from then on. This led me to continue learning Mathematics at university and eventually led me to the path of postgraduate study.

I have just embarked on my first year of PhD study, and the experience of working with my research group has been very rewarding and encouraging so far. My supervisor Professor Tuen Wai NG has provided me with ample support both personally and professionally, and the questions being prompted by him and my group during presentations and discussion are invaluable to me, as they serve to point out errors in my thinking, as well as deepen my understanding of my studies. Most importantly, outside of academic matters, my family has been incredibly supportive of me.

I think it is too early to say about my future career pathway. Still, I am excited at the prospect of continuing to conduct research in mathematics and teaching the subject in some form, whether that be through staying in academia or otherwise.

'Do not be afraid to ask questions, even if they are elementary.'

Stipend and Support for the Most Talented Research Elites

HKU Presidental PhD Scholarship (HKU-PS)

As a part of the HKU Presidential PhD Scholar Programme, a prestigious scholarship package, namely, the HKU Presidential PhD Scholarship, is offered to attract top candidates from around the world to pursue full-time PhD studies at HKU.

The HKU Presidential PhD Scholars will receive strong academic and training support from the University, e.g. individualised advisory service, training in teaching, chances to rotate among different research labs/disciplines, and more opportunities to interact with leading scholars. A group of distinguished Faculty members will also give advice, provide additional mentorship and training opportunities, and oversee the academic career paths.

Hong Kong PhD Fellowship Scheme (HKPFS)

Established in 2009 by the Research Grants Council (RGC), the Hong Kong PhD Fellowship Scheme (HKPFS) aims at attracting the best and brightest students in the world to pursue their PhD programmes in Hong Kong's universities.

Those who are seeking admission as new full time PhD students in Hong Kong universities funded by the University Grants Committee (UGC), irrespective of their country of origin, prior work experience and ethnic background, should be eligible to apply. Applicants should demonstrate outstanding qualities of academic performance, research ability/potential, communication and interpersonal skills, and leadership abilities.

In HKU, the package of recipients of HKPFS will be automatically upgraded to an HKU-PS one.

A generous package for recepients of HKU-PS and HKPFS:

- **Cash award to support research & living expenses**
  HK$40,000 in Year 1; HK$20,000/year for the remaining normative study period
- **Conference & research-related travel allowance**
  of HK$13,300/year
- **Postgraduate scholarship (PGS)**
  of HK$26,600/month
- **Waiver of tuition fees**
  for the whole normative study period (i.e. HK$42,100/year)
- **Guaranteed accommodation in year 1**
  Hall place guaranteed in Year 1, with possibility of renewal in Year 2
- **Additional support from HKU Science**
  The Faculty's Doctoral Entrance Award of HK$15,000 in Year 1

For more details,
please visit: https://bit.ly/3JjAwY5