

HKU Students Excel at the 6th Hong Kong University Student Innovation and Entrepreneurship Competition

In 2020, HKU students have again shone at the Hong Kong University Student Innovation and Entrepreneurship Competition, a regional competition now in its sixth year. HKU research postgraduate (RPg) students received three First Prizes, three Second Prizes and two Third Prizes under the 'Innovation' section, and three Third Prizes under the 'Entrepreneurship' section. The First Prizes went to work on a novel biosensing platform, an AI handwashing device, and a study on non-wetting droplets.

Infectious diseases such as malaria and the current COVID-19 pandemic have highlighted the importance of rapid, accurate diagnostic testing. Therefore, PhD candidates Yeung Lo and Lin Wang, both from the School of Biomedical Sciences, have worked to integrate nucleic acids, electrochemistry and engineering approaches to tackle this need.

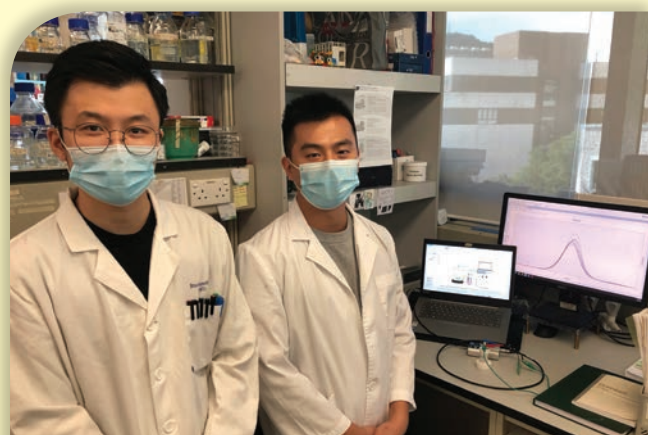
The two students have developed a novel and highly sensitive DNA-based electrochemical biosensing platform that allows for the instantaneous detection of malaria proteins in blood. By utilising DNA's natural ability to bind to its target and change shape, the biosensor is highly sensitive, stable, and re-useable, yet low costing. This novel platform, which won First Prize in the Life Sciences category, is envisaged to be easily adapted towards detecting many other infectious diseases in the future.

The COVID-19 pandemic has also raised public awareness of hand hygiene. Inspired by the UV device used by surgeons to check the cleanness of their hands before operations, PhD candidate Chung To Kong (Department of Computer Science), together with his teammates who are current Master of Electrical and Electronic Engineering students in HKU, developed an AI handwashing device. It adopts machine learning to provide real-time feedback of a user's hand cleanness during and after washing hands, and won First Prize in the Information Technology category.

UV devices currently used in the medical industry are expensive and set up away from the sink. Making use of low cost hardware and software platforms, the AI handwashing project provides a low-cost alternative and could be set up around the sink. Also, there is an option of storing the cleanness index and RFID data with a timestamp in the database for future analysis. The web-based application can also be made as a mobile app.

In the category of Mathematics and Physics / Mechanics and Control Systems, First Prize went to the project 'A study of electro-coalescence of non-wetting droplets and their application' by Yage Zhang and Wei Guo, PhD students in the Department of Mechanical Engineering, and Bachelor student Chentianyi Yang, under the supervision of Professor Anderson Shum.

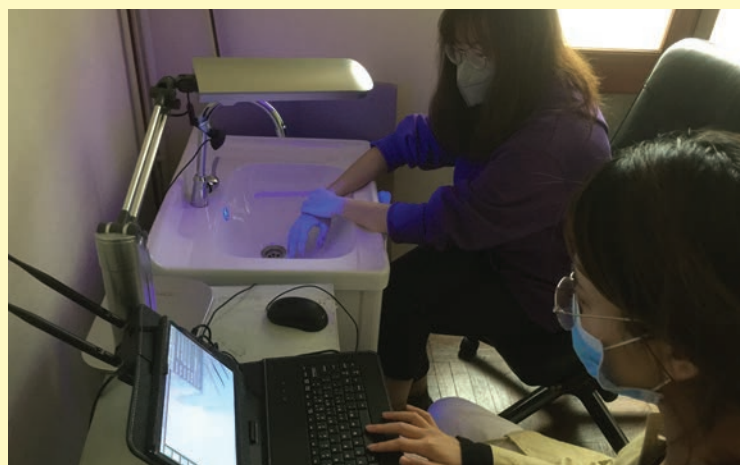
Liquid droplets stabilised by hydrophobic nano-/micro-sized particles form the so-called non-wetting droplets, or liquid marbles. Their non-sticky properties make them suitable micro-reactors in the field of digital microfluidics, but they need to be controlled precisely to benefit applications. The group has found that electrostatic force is a valid way to trigger the coalescence of liquid marbles. By manipulating the size of the coating colloidal particles, different coalescence dynamics were found, and further affected the resultant shape of the non-wetting droplets. This work would benefit the application of liquid marbles as effective micro-reactors in analytical chemistry and clinical diagnostics, and in the preparation of non-spherical colloidal structures in the gaseous environment, which can be exploited as anisotropic building blocks for the fabrication of novel complex materials.



Lin Wang (left) and Yeung Lo

Congratulations go to all of the following winners:

Award	Name of Project	Project Team Members
Category: Innovation		
Subject: Life Sciences		
First Prize	Highly sensitive, adaptable synthetic antibody based biosensor for infectious diseases	Yeung Lo Lin Wang (<i>PhD students, School of Biomedical Sciences</i>)
Third Prize	A droplet microfluidics-based approach for screening and development of new RNA fluorogenic aptamer	Wei Guo Yage Zhang (<i>PhD students, Department of Mechanical Engineering</i>)
Third Prize	3D multicellular cancer microenvironment platform for high-throughput personalized drug screening – Acute myeloid leukemia (AML) as an example	Hoi Lam Cheung (<i>MPhil student, Department of Mechanical Engineering</i>) (<i>in collaboration with Professor Anskar Yu Hung Leung, Professor, Department of Medicine</i>)
Merit Award	Differences between 2D versus 3D cultures of nasopharyngeal carcinoma and establishment of 3D tumor drug screening platform	Canhui Yi (<i>PhD student, School of Biological Sciences</i>)
Subject: Energy, Environmental and Chemical Engineering		
Second Prize	Automatic microplastics detector by deep learning assisted digital holography	Yanmin Zhu (<i>PhD student, Department of Electrical & Electronic Engineering</i>)
Second Prize	Load forecasting for unit commitment with renewable energy integration	Yau Chung Cheng (<i>PhD student, Department of Electrical & Electronic Engineering</i>)
Subject: Information Technology		
First Prize	AI hand washing	Chung To Kong (<i>PhD student, Department of Computer Science</i>) Wei Chen Yanqing Jiang (<i>MSc(Eng)(EEE) students</i>)
Subject: Mathematics and Physics / Mechanics and Control Systems		
First Prize	A study of electro-coalescence of non-wetting droplets and their application	Yage Zhang Wei Guo (<i>PhD students, Department of Mechanical Engineering</i>) Chentianyi Yang (<i>BEng(EngSc) student</i>)
Second Prize	Fast swimming robotic fish for underwater exploration	Qimeng Liu (<i>MSc(Eng)(ME) student</i>) Zhong Shen (<i>PhD student, Department of Mechanical Engineering</i>)



AI handwashing

List of winning projects by HKU RPg students: (continued)

Award	Name of Project	Project Team Members
Category: Entrepreneurship		
Start Up		
Third Prize	Hydrosoft Limited	Zhong Shen Runzhi Zhang Jing Li (<i>PhD students, Department of Mechanical Engineering</i>) Hua Zhong (<i>PhD student, Department of Computer Science</i>) Yafei Zhao (<i>MSc(Eng)(ME) student</i>) Dr Zheng Wang (<i>Honorary Assistant Professor, Department of Mechanical Engineering</i>)
Third Prize	Pre-clinical studies of a small molecule KSD179019 on Anti-Hypertension Drug	Dr Kailash Singh (<i>PhD graduate, School of Biological Sciences</i>) Dr Kenneth Lai (<i>PhD graduate, Department of Surgery</i>) Professor Billy Kwok Chong Chow (<i>Professor, School of Biological Sciences</i>)
Third Prize	Direct thermal charging cell	Dr Yu-Ting Huang (<i>PhD graduate, Department of Mechanical Engineering</i>) Xinya Wu Chun Lin Pang (<i>PhD students, Department of Mechanical Engineering</i>) Dr Shien-Ping Feng (<i>Associate Professor, Department of Mechanical Engineering</i>)

PhD Student Wins Young Scientist Award in Geospatial Sciences

Ka Ho Tsoi – a PhD candidate of the Department of Geography – was named Champion of the 2020 Esri Young Scholars Award (Hong Kong) programme. The Environmental Systems Research Institute (Esri) has launched awards around the world to recognise the exemplary work in geospatial sciences of undergraduate and graduate students. Ka Ho was awarded for his story map submission on “Where are the most dangerous road locations in Hong Kong? An investigation of traffic crash hot spots and hot zones”. As Champion, he has won a trip to attend the Esri User Conference in San Diego, California, USA, next year, as well as an internship place at the Urban Renewal Authority.

Ka Ho’s main research focus is sustainable mobility in cities. He designed an illustrative story map that uses traffic crash data from the Transport Department, HKSAR, to identify and visualise hazardous road locations in Hong Kong. Building upon the hot zone methodology, this study identifies dangerous road

locations not only limited to traditional traffic hotspots, but also including highways, trunk roads and rural roads. Place-based road safety countermeasures are suggested. Moreover, this research features a GIS tool of “Hotzone Generation Add-in”, which is a product of interdisciplinary research led by Professor Becky P.Y. Loo, Head of the Department of Geography, Dr Tobias Grubenmann, formerly a Research Associate from the Department of Computer Science, and Ka Ho. This add-in can identify dangerous road locations in a scientific and fast-computing manner, which can be universally used by road safety administrations, consultancies, as well as researchers all over the world to identify hot zones of road crashes and promote road safety together.



3MT® | Three Minute Thesis Competition

June 23, 2020
Wang Gungwu Theatre
Graduate House

HKU Three Minute Thesis (3MT®) Competition 2020

On June 23, 2020, a total of 20 research postgraduate (RPg) students took up the challenge to present a compelling oration on their research project and its significance to a non-specialist audience in just three minutes. The students were taking part in the HKU Three Minute Thesis (3MT®) Competition 2020, which was jointly organised by the Graduate School and the Knowledge Exchange Office.

The 3MT was developed by The University of Queensland, Australia in 2008 to celebrate the discoveries made by RPg students and encourage them to develop the skills to communicate the importance of their research to the broader community.

Ms Ada Tse, Independent Non-Executive Director of YangTse Foundation Limited, served on the adjudicating panel as our guest of honour. The panel was chaired by Professor John Bacon-Shone, Associate Director of the Knowledge Exchange Office, and also included Professor Frederick Leung, Dean of the Graduate School, and Dr Caroline Dingle of the School of Biological Sciences.

Congratulations to all the winners of the HKU 3MT Competition 2020:

Champion

Name: Muyan Wu (PhD candidate, Faculty of Engineering)
Presentation Title: An efficient way to get rid of smells after indoor decoration
Primary Supervisor: Professor Dennis Yiu Cheong Leung

1st Runner-up

Name: Jane Richards (PhD candidate, Faculty of Law)
Presentation Title: Inclusion of mental disability in the criminal justice system
Primary Supervisor: Professor Simon Ngai Man Young

2nd Runner-up

Name: Meng Jiang (PhD candidate, Faculty of Dentistry)
Presentation Title: Clinical trial on restoring untreated and SDF-treated dentine caries lesions
Primary Supervisor: Professor Edward Chin Man Lo

Online People's Choice Award (the finalist who has the most 'Likes' on YouTube)

Name: Kanmani Chandra Rajan (PhD candidate, Faculty of Science)
Presentation Title: How to save oysters from ocean acidification?
Primary Supervisor: Dr Thiyagarajan Vengatesen

Videos of the presentations of the awardees and finalists are available at <https://www.ke.hku.hk/hku3mt/index.php/competition/2020/2020-videos-of-finalists-and-awardees>.



Congratulations to the Graduate School Award Winners

The Graduate School is proud to announce and congratulate the winners of the following awards:

University Postgraduate Fellowships Scheme (2019-20)

The University Postgraduate Fellowships Scheme is generously supported by The University of Hong Kong Foundation for Educational Development and Research (HKU Foundation), the Hui Pun Hing Endowment Fund, the Jessie & George Ho Charitable Foundation, Dr Lee Shau Kee, and the Philip K H Wong Foundation. A total of 73 incoming elite PhD students have received the Fellowship this year.

Awards for Outstanding Research Postgraduate Students (2017-18)

The Award for Outstanding Research Postgraduate Student gives due recognition to research postgraduate students who have submitted a thesis of exceptional quality and demonstrated outstanding performance in other academic aspects.

Dr KULPER Sloan Austin (*PhD, Department of Orthopaedics and Traumatology*)

LI Huang (*MPhil, Department of Computer Science*)

Dr LIN Lin (*PhD, Department of Civil Engineering*)

Dr LIU Xin (*PhD, Faculty of Business and Economics*)

Dr RAMANUJAN Keerthi (*PhD, Faculty of Education*)

Dr SHI Huiwen (*PhD, School of English*)

XU Lingyi (*MPhil, School of English*)

Dr ZHANG Anni (*PhD, Department of Civil Engineering*)

Dr ZHAO Shuping (*PhD, Faculty of Dentistry*)

Dr ZHENG Daran (*PhD, Department of Earth Sciences*)

Li Ka Shing Prizes (2017-18)

The Li Ka Shing Prizes are highly competitive and the recipients are the best of our elite students, having submitted the best theses in the Humanities and the Science Faculty groups respectively.

Best MPhil thesis in the Faculties of Architecture, Arts, Business & Economics, Education, Law and Social Sciences

CHEUNG Pui Kwan (*Department of Geography*)

Best MPhil thesis in the Faculties of Dentistry, Engineering, Medicine and Science

KO Wai Tung (*Department of Psychiatry*)

Best PhD theses in the Faculties of Architecture, Arts, Business & Economics, Education, Law and Social Sciences

Dr LOJA Severina Melissa Hubahib (*Department of Law*)

Dr CHEN Hanyu (*Department of Politics and Public Administration*)

Best PhD theses in the Faculties of Dentistry, Engineering, Medicine and Science

Dr YOU Changsheng (*Department of Electrical and Electronic Engineering*)

Dr AN Liwei (*School of Biomedical Sciences*)

Congratulations again to our students who have earned awards this year. We are proud of your accomplishments!

Control of Anthropogenic Atmospheric Emissions Can Improve Water Quality in China's Coastal Seas

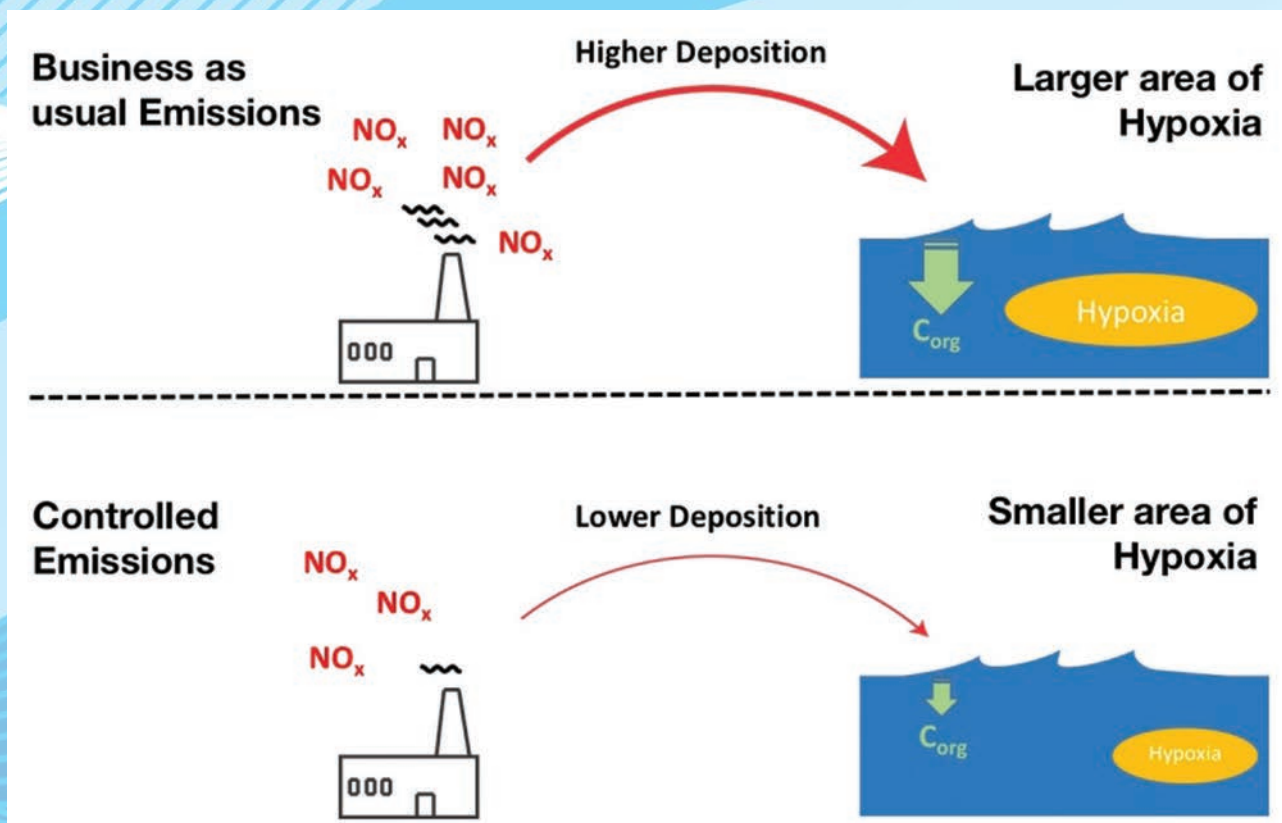
New research led by MPhil student Yvonne Yu Yan Yau supervised by Dr Benoit Thibodeau from the Department of Earth Sciences and the Swire Institute of Marine Science, has highlighted the importance of reducing fossil fuel combustion not only to curb the trend of global warming, but also to improve the quality of China's coastal waters. The findings were recently published in the prestigious journal *Environmental Science & Technology*.

Production of nitrogen oxide (NO_x) emissions via fossil fuel burning and the manufacturing of fertilizer pollutes the atmosphere and leads to the formation of ground-level ozone, smog and acid rain, and contributes to global warming through the greenhouse effect. However, other forms of atmospheric and marine pollution linked to energy production, transportation and industrial activity are often overlooked. When atmospheric nitrogen oxides deposit in the water, the nitrogen, being a natural fertilizer, enhances the production of algae – a chain reaction known as 'eutrophication'. Oxygen is consumed from the water during the decomposition of the organic material, resulting in reduced dissolved oxygen content. Constant reductions of dissolved oxygen can lead to hypoxia, endangering normal activities of organisms in the water.

The study used Intergovernmental Panel on Climate Change (IPCC)-projected trends in atmospheric emissions of NO_x coupled with a biogeochemical model to estimate the impact of the deposition of nitrogen oxides in four major Chinese coastal seas: the South China Sea, the East China Sea, the Yellow Sea and the Bohai Sea. The researchers found that although atmospheric deposition is not as important as riverine nitrogen input, it can still fuel up to 15% of the total amount of organic matter found at the bottom of the ocean, increasing significantly (up to 5%) the area of hypoxia. A reduction of emissions, on the other hand, can lead to a significant decrease of hypoxic zones. Among the four coastal seas, the South China Sea is the most sensitive area to nitrogen input.

Yvonne hopes that the study will bring more attention to the potential benefits of reducing fossil fuel burning, not only for human and ecosystem health, but also for local economic activities such as fisheries, which are severely affected by hypoxia. Dr Thibodeau has further stressed the importance of investigating the impact of atmospheric deposition more locally.

This article is adapted from <https://www.hku.hk/press/press-releases/detail/20800.html>.



Bitten by the Bug –

An Alumni Story of Dr Tommy Tsan Yuk Lam



The place is Hong Kong, the year is 1999. A year 6 student finds the National Institutes of Health website and types in a search. With his eyes lit sharply by the screen, he scans for the information needed for his presentation. An animation of a virus appears. Grotesque and cartoon-like, the 'cyber creature' floats into view.

A needle follows and then injects DNA material into the cell. The boy is fascinated – he is entranced, excited, he feels exhilarated. And so it happened: Tommy Lam was bitten by the bug. The virus bug.

Tommy wanted to study medicine, but his passion for biology became entwined with his love of computer science. At the time, this crossover of disciplines was very unusual. Whilst his peers were gaming, he was programming. His favourite movie from this period is still *The Matrix*.

But real life wasn't so easy and the young Tommy Lam fully experienced the highs and lows of being a student. He yearned to follow the explorer's path of seeking new knowledge and not just absorbing the old. His academic results reflected his discontent and he found that he was scraping through exams.

"I was studying in an area I didn't enjoy," he confesses. "I was impressively bad." But he reflects that "life is like waves – you always have to have the down times." Indeed, Dr Lam's advice to students now is to "find your passion" and you have to persevere, even if life is at a low point.

Fortunately, HKU offered a Bioinformatics bachelor programme that combined his interests. It was here in his final year of study that Tommy Lam was placed with Professor Frederick Chi-Ching Leung in the School of Biological Sciences. So, the virus bug was to strike again and on this occasion it was truly life changing.

His final-year project on the study of chicken hormones was a little uninspiring, until PhD student Chung-Chau Hon (now Dr) appeared in the lab. On learning of the predicament, he suggested the study of viruses, and Tommy's ultimate choice was the influenza virus. He recalls the incident with enthusiasm because, as he happily claims, "this triggered my research career in viruses."

Encouraged and mentored by Professor Leung and Dr Hon with life lessons learned, Dr Lam went on to receive his PhD in Molecular Virology at HKU.

For his postdoctoral studies, he travelled to the US to Pennsylvania State University, where he was bodily sustained by "The Panda Express" fast foods, and his studies were supervised by the leading evolutionary biologist Professor Edward Holmes. Thankfully, whilst studying there Dr Lam chanced to meet his future wife, Yee Ling, who besides having a PhD herself, is also an excellent chef. "I love my wife's cooking," Dr Lam exclaims delightedly. No more junk food then!

With his passion fuelled for research in virus ecology and evolution, Dr Lam began receiving awards and commendations, notably the Novartis Vaccines Award for Epidemiology of Infectious Diseases from the International Society for Infectious diseases (2008) followed by a Newton International Fellowship from the Royal Society UK (2010). At Oxford University he furthered honed his research skills with Professor Oliver Pybus, an expert in virus evolution.

Currently, Dr Lam has forged close ties with Shantou University through Professor Yi Guan, of whom he speaks respectfully: "He is a great scientist ... [I admire] his adventurousness and toughness."

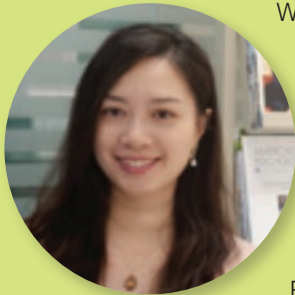
Dr Lam confirms that HKU supports and encourages international research. Creating these 'people networks' is essential to his work. "Research is a community, a big family," he adds.

So with these global links, what keeps him here at HKU? "I have a strong sense of belonging ... and I very much enjoy working with great people here."

Recently, Dr Lam was ranked by Essential Science Indicators in the top 1% of scholars in his field and in the same year (2019) he was awarded through the Excellent Young Scientists Fund under the National Natural Science Foundation of China.

Dr Lam's present role is Assistant Professor in the Division of Public Health Laboratory Sciences of the School of Public Health. In our present global crisis – the COVID-19 pandemic – Dr Lam is concerned with how the disease has spread in the community, where it has come from and how during the pandemic it has evolved. He continues to advise the World Health Organization and the Food and Agriculture Organization of the United Nations on vaccination and laboratory diagnosis, (not only of the COVID-19 virus but other viruses too). In his research he is mainly involved with "tracing animal origins and how it evolved to be human transmissible." Using artificial intelligence, he is able to efficiently search huge databases for genetic sequences of the COVID-19 virus. It would seem that the dual skills of biology and computer science came together at the right time. How fortunate we are, therefore, that all those years ago a young man gazed at a computer screen and was 'bitten by the bug'.

PhD Candidate Receives U21 Graduate Collaborative Research Award for Cross-cultural Research on Children's Dependency Behaviours



Weiyi Xie, a PhD student from the Faculty of Education under the supervision of Dr Xiao Zhang, has won the Universitas 21 (U21) Graduate Collaborative Research Award 2019.

The awarded project, 'The Role of Parental Attitudes on Young Children's Dependency Behaviours and Psychosocial Adjustment: A Cross-cultural Study', aims to explore the role of cultural contexts on the relation between dependency behaviours and psychosocial adjustment, and examine potential cross-cultural differences in parental attitudes towards children's dependency on them.

It is unknown whether dependency behaviours have different adaptive meanings across cultures. To address

this knowledge gap, this research plans to explore whether children's dependency behaviours and their psychosocial adjustment meanings vary across cultural groups, and, if so, how parental attitudes towards dependency behaviours contribute to such a cross-cultural difference. China and the United Kingdom are selected to represent collectivistic and individualistic cultural contexts respectively. Findings will contribute to our understanding of children's dependency behaviours and the developmental consequences of such behaviours from a cross-cultural perspective. They will also highlight the importance of parenting and help to understand the adaptive meanings of dependency.

The project team consists of three doctoral candidates from U21 member universities, namely HKU, the University of Edinburgh and Fudan University.

Price and Prejudice – Analysts' Stock Recommendations are Coloured by Their Cultural Biases

Congratulations to Vesa Petri Pursiainen, a final-year PhD student in the Faculty of Business and Economics, for being featured by *The Economist* for his research regarding the effect of cultural biases on equity analysis.

Vesa's research finds that cultural biases have a significant effect on equity analysts' stock recommendations and they have a larger effect during bad economic times. The rise of nationalism also increases the cultural biases. In other words, equity analysts are less likely to recommend stocks from countries their nation is biased against. The bias effect varies over time and, on top of that, significant political events can induce new cultural biases – for example, a negative North-South bias emerging during the European debt crisis, a UK-Europe divergence amid Brexit, and a Franco-British bias during the Iraq war – which are strong enough to affect stock recommendations.



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