香港科技大學
THE HONG KONG
UNIVERSITY OF SCIENCE
AND TECHNOLOGY

IPO

LEADING

WITHOUT

BOUNDARIES

**INTERDISCIPLINARY
PROGRAMS OFFICE**

CONTENT

DIRECTOR'S MESSAGE

Welcome to the Interdisciplinary Programs Office (IPO) at HKUST!

PROF. HUAMIN QU

Director of IPO

IPO was formed in 2008 to encourage cross-disciplinary collaboration in education and research. Since then it has grown fast and become an education center to train a new generation of professionals who can work well across disciplinary lines, an incubator to support the development of new interdisciplinary programs, and a research powerhouse in environment, sustainability, public policy and emerging interdisciplinary areas.

IPO has made many new initiatives in interdisciplinary education. We are the first in the Great China area to offer Individualized Interdisciplinary Major (IIM), and also MPhil and PhD in Individualized Interdisciplinary Program (IIP). IIM and IIP allow students to create their own bachelor and research postgraduate degree programs that best suit their own intellectual interests and passion. We are also the first in Hong Kong to launch the Dual Degree Program in Technology & Management which provides high-flying students an opportunity to gain two degrees in five years: Bachelor of Engineering (BEng) or Bachelor of Science (BSc), and Bachelor of Business Administration (BBA). We are also the first in Hong Kong to introduce a novel academic framework "Major + X" as a new degree option for undergraduates to excel in an extended major of an emerging hot topic such as Artificial Intelligence or Digital Media and Creative Arts, in addition to a traditional major program.

Offering by IPO world-class faculty members, other programs include BSc in Environmental Management & Technology (EVMT), BSc in Sustainable and Green Finance (SGFN), MSc/PGD in Environmental Science and Management (EVSM), Master of Public Policy (MPP), Master of Public Management (MPM), MPhil/PhD in Environmental Science, Policy and Management (ESPM), MPhil/PhD in Atmospheric Environmental Science (AES) and MPhil/PhD in Public Policy (PP), which have strong interdisciplinary components and are highly relevant to our modern world. These exciting programs have attracted talented students from all over the world. As of September 2021, our 607 undergraduates come from 24 different countries while our 428 graduate students comprise 29 nationalities.

IPO provides a nurturing environment for faculty members from different backgrounds working together for cutting-edge interdisciplinary research. The majority of our regular faculties have joint appointments with other departments/divisions like Mathematics, Computer Science and Engineering, Chemistry, Economics, Civil Engineering, and Social Science. The faculties are clustered into three academically significant and socially impactful divisions. The Division of Environment and Sustainability aims to address issues like climate change, pollution, and demand pressures on key natural challenges through research, education and knowledge transfer. The Division of Public Policy addresses policy challenges related to science and technology innovations, population ageing, and sustainability by conducting evidence-based research supported by HKUST's strengths in science and technology. The newly established Division of Emerging Interdisciplinary Areas focuses on fostering the agile development of new education programs and facilitating incubation of new and emerging interdisciplinary research areas.

IPO is young, dynamic, and distinctive. We are living in a world where technology is evolving in a rapid pace and grand challenges facing humans today need solutions beyond individual disciplines. IPO will explore new pedagogy to develop students' core competencies of fusing knowledge and know-how from different fields to bring multiple perspectives to the task of changing the world for the better. New research clusters will be formed to tackle the challenging and multi-faceted issues of today in an interdisciplinary way. IPO is also playing an important role in supporting the strategic plan of HKUST, especially the new campus at Guangzhou, Mainland China. As the Director of IPO, I encourage you to join us in breaking traditional academic boundaries and broadening our reach through partnerships within the community, industry, academia in Hong Kong and beyond.

IPO STRUCTURE

Division of ENVIRONMENT & SUSTAINABILITY

Undergraduate Programs
- **EVMT** — BSc in **Environmental Management & Technology**
- **SGFN** — BSc in **Sustainable and Green Finance**

Postgraduate Programs
- **AES** — MPhil/PhD in **Atmospheric Environmental Science**
- **ESPM** — MPhil/PhD in **Environmental Science, Policy & Management**
- **EVSM** — MSc/PGD in **Environmental Science & Management**

Division of PUBLIC POLICY

Postgraduate Programs
- **PP** — MPhil/PhD in **Public Policy**
- **MPM** — Master of **Public Management**
- **MPP** — Master of **Public Policy**

Division of EMERGING INTERDISCIPLINARY AREAS

Undergraduate Program
- **IIM** — BSc in **Individualized Interdisciplinary Major**

Postgraduate Program
- **IIP** — MPhil/PhD in **Individualized Interdisciplinary Program**

Dual Degree Program in TECHNOLOGY & MANAGEMENT

Undergraduate Program
- **T&M-DDP** — BEng/BSc and BBA **Dual Degree Program in Technology & Management**

UNDERGRADUATE CORE EDUCATION

Undergraduate Program
- **CC** — **University Common Core Program**

FACULTY MEMBERS (BY HEADCOUNT)
(as of July 2021)

	Regular Faculty (including teaching and research faculty)	Visiting/ Adjunct Faculty	Total
Interdisciplinary Programs Office	2	0	**2**
Division of Environment and Sustainability	24	15	**39**
Division of Public Policy	13	1	**14**
Total	**39**	**16**	**54**

STUDENT ENROLLMENT (as of Sep 2021)

		ENROLLMENT	TOTAL
UNDERGRADUATE PROGRAMS	Dual Degree Program in Technology & Management (T&M-DDP)	195	**607**
	BSc in Environmental Management & Technology (EVMT)	127	
	BSc in Individualized Interdisciplinary Major (IIM)	5	
	BSc in Sustainable and Green Finance (SGFN)	First cohort in 2022/23	
	Extended Major in Artificial Intelligence	280	
	Extended Major in Digital Media and Creative Arts	First cohort in 2022/23	
RESEARCH POSTGRADUATE PROGRAMS	MPhil/PhD in Atmospheric Environmental Science (AES)	MPhil: 10 PhD: 31	**130**
	MPhil/PhD in Environmental Science, Policy & Management (ESPM)	MPhil: 10 PhD: 32	
	MPhil/PhD in Individualized Interdisciplinary Program (Research Area) (IIP)	MPhil: 15 PhD: 7	
	MPhil/PhD in Public Policy (PP)	MPhil: 4 PhD: 21	
TAUGHT POSTGRADUATE PROGRAMS	MSc/PGD in Environmental Science & Management (EVSM)	MSc: 115 PGD: 1	**298**
	Master of Public Management (MPM)	43	
	Master of Public Policy (MPP)	139	

INTERDISCIPLINARY EDUCATION PIONEER

607 Undergraduates 24 Nationalities

428 Postgraduates 29 Nationalities

62% Regular faculty with interdisciplinary joint appointments

BEST Faculty-Student Relationship

STRONG Partnership with Industry

TRUE Interdisciplinary Education and Research

IPO has led the way in many ways in Hong Kong and the region:

1st IN HONG KONG
- to establish an interdisciplinary academic unit at a Hong Kong university
- to create an undergraduate dual degree program integrating technology and business knowledge - Dual Degree in Technology and Management
- to start an undergraduate program nurturing ecologically and economically sound future leaders to embed and advance sustainability - Environmental Management and Technology
- to introduce a novel academic framework "Major + X" as a new degree option for undergraduates to excel in an extended major of an emerging hot topic such as Artificial Intelligence or Digital Media and Creative Arts, in addition to a traditional major program

1st IN GREATER CHINA
- to offer an undergraduate program that allows students to create their own majors and curricula - Individualized Interdisciplinary Major

OUR DIVISIONS

DIVISION OF ENVIRONMENT AND SUSTAINABILITY

Climate change, pollution, and demand pressures on key natural resources pose serious challenges to sustainable development. The Division of Environment and Sustainability (ENVR) seeks to solve these issues and serve as a platform, within HKUST and externally with industry, government and non-government organizations, to build a more sustainable environment locally and globally through research, education and knowledge transfer. The Division's stimulating interdisciplinary undergraduate and postgraduate programs are led by world-class faculty members with backgrounds in science, engineering, business and social sciences, providing leading education on environmental issues as well as encouraging dialogue with policy-makers and society at large.

Research

The Division's main areas of focus are:

Air and water, including interrelations with climate change

Environmental changes on regional and local scales, and their global interrelations

Economic and social impact and solutions for environmental problems

We also work where these areas intersect, on areas such as the scientific understanding of management strategies and policy formulation.

Facilities

The HKUST Air Quality Research Supersite Facility is the first such facility in Hong Kong, focusing on real-time characterization of air pollutants, especially particulate pollutants, and housing over HK$17 million of equipment. Other facilities and equipment include: the Environmental Central Facility; Coastal Marine Laboratory; environmental monitoring facilities; real-time air quality and meteorological forecasting systems; satellite receiving systems; and Geographical Information System.

DIVISION OF PUBLIC POLICY

Ageing, climate change, economic crises, terrorism and other global challenges call for policy responses beyond institutional and disciplinary boundaries. The Division of Public Policy encourages close collaboration across disciplines and Schools at HKUST to contribute to policy development both locally and globally, with a particular emphasis on the impact of science and technology advances on policy-making. The Division complements HKUST's Institute for Public Policy and Leadership and Public Policy Executive Education by driving interdisciplinary policy research at the University.

Research

The Division's main areas of focus address key challenges in Hong Kong, Greater China, and the region:

- **SCIENCE, TECHNOLOGY AND INNOVATION POLICY:** Smart city, research policy, regulatory policy for technological innovations, higher education policy, knowledge transfer, privacy and security

- **ENVIRONMENTAL POLICY AND SUSTAINABILITY:** Environmental policy and sustainability; transboundary pollution, climate change, environmental policy instruments, energy security, urban resilience, water security, green finance

- **SOCIAL CHANGES AND PUBLIC POLICY:** Population policy, ageing, elderly care, health policy reforms, migration, social stratification, social inequalities

- **CHINA'S DEVELOPMENT POLICY:** Infrastructure development, land, human resource development, regional integration, local government and development, public private partnership

DIVISION OF EMERGING INTERDISCIPLINARY AREAS

Technology is evolving faster than ever and shaping the rules and future of our society. Organizations that do not keep up with some of the major tech trends run the risk of being left behind. Agility is essential to identify and grasp these opportunities. In collaboration with different Schools at HKUST, the Division of Emerging Interdisciplinary Areas (EMIA) envisions to foster and advance interdisciplinary innovation in education programs and currently offers MPhil/PhD in Individualized Interdisciplinary Program (Research Area) (IIP), BSc in Individualized Interdisciplinary Major (IIM), the Extended Majors, and many more in future. EMIA also serves as an incubator of new interdisciplinary education and research and a driver of interdisciplinary activities in emerging areas like Artificial Intelligence and Digital Media and Creative Arts.

OUR PROGRAMS

UNDERGRADUATE PROGRAMS

T&M-DDP
DUAL DEGREE PROGRAM IN TECHNOLOGY AND MANAGEMENT

In today's knowledge society, a thorough understanding of technology and management paves the way to success. The Dual Degree Program in Technology and Management, the first of its kind in Hong Kong, enables high-flying students to gain two internationally recognized degrees in five years: Bachelor of Engineering (BEng) or Bachelor of Science (BSc), and Bachelor of Business Administration (BBA).

Going beyond traditional boundaries to answer the need for innovative vision in the workplace, Dual Degree students learn how to analyze issues from technological and business viewpoints and solve both quantitative and qualitative problems. Students also enjoy wide-ranging experiences of how the world works, develop awareness of different cultures and global perspectives, and foster a willingness to serve, gaining much more than two degrees.

⚙ Engineering Degree Options

1. BEng in Aerospace Engineering
2. BEng in Bioengineering
3. BEng in Chemical Engineering
4. BEng in Civil and Environmental Engineering
5. BEng in Civil Engineering
6. BEng in Computer Engineering
7. BEng in Computer Science
8. BEng in Decision Analytics
9. BEng in Electronic Engineering
10. BEng in Industrial Engineering and Engineering Management
11. BSc in Integrative Systems and Design
12. BEng in Mechanical Engineering

OR

⚗ Science Degree Option

13. BSc in Biotechnology

+ AND

📈 Business Degree Options

1. BBA in Economics
2. BBA in Finance
3. BBA in General Business Management
4. BBA in Management
5. BBA in Marketing

EVMT
BSC IN ENVIRONMENTAL MANAGEMENT & TECHNOLOGY

Sustainability and the protection of our environment are among the greatest global concerns of today and tomorrow, with an ever-more pressing need to find a balance between human development and environmental well-being. Climate change, pollution, energy consumption, and water resources are just some of the many issues that we must urgently address to ensure a habitable world for our own and future generations. The pace-setting BSc Environmental Management and Technology (EVMT) program educates a new generation of environmental professionals with cross-disciplinary knowledge to deliver ecologically and economically sound solutions and to take up the role of sustainability managers in corporations in Hong Kong and around the globe. EVMT is accredited by the Hong Kong Institute of Qualified Environmental Professionals (HKIQEP).

SCIENCE

BUSINESS

EVMT

SOCIAL SCIENCE

ENGINEERING
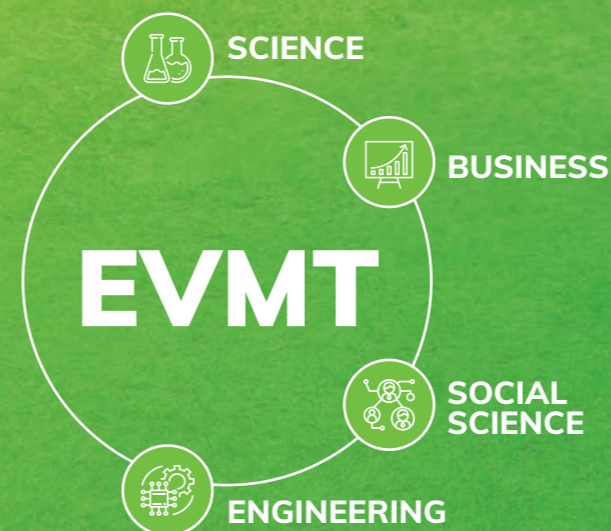
EVMT COURSES

- Energy Resources and Usage
- Environmental Economics
- Environmental GIS
- Environmental Law
- Environmental Technology
- ESG Management and Reporting
- Green Business Strategy
- Sustainable Development

IIM
BSC IN INDIVIDUALIZED INTERDISCIPLINARY MAJOR

Today, there is a critical need for incisive next-generation front-runners, who can integrate knowledge from different fields and devise original approaches to problem-solving. The Individualized Interdisciplinary Major (IIM), currently the only program of its kind in Greater China, offers a non-traditional, cross-School academic pathway for exceptional students with the vision, talents and character to initiate an interdisciplinary major tailor-made to their intellectual interests. Joining this exciting degree program will enable those selected to subsequently pursue a novel interdisciplinary research field or a career in an area of emerging significance.

Common Core and fundamental courses	**48-49** credits
Major courses planned by student	At least **48** credits
Elective courses planned by student	At least **18** credits
Interdisciplinary Capstone Project	**6** credits

Approved IIM Program Examples

- Anthropomorphism in Interactive Systems
- Behavioral Consumer Science
- Bioenergy Management
- Bionics
- Brain Computer Interface
- Built Environment Design
- Computational Cognitive Science
- Environmental Geoscience
- Human-Computer Interaction
- Medical Engineering

SGFN
BSC IN SUSTAINABLE AND GREEN FINANCE

The BSc in Sustainable and Green Finance program is jointly offered by the Division of Environment and Sustainability (ENVR) and the School of Business and Management (SBM). The first of its kind in Hong Kong, this program is designed to equip students with the essential knowledge and skills to fill the global talent gap for top level green and sustainable finance experts and help develop Hong Kong into a leading green finance center.

The interdisciplinary nature of the program will provide students with a broad-based learning experience that cuts across business as well as environment, science, and technology. The program covers a wide range of topics related to Sustainable and Green Finance, spanning multiple disciplines including climate and ESG, finance and risk management, statistics and programming, big data, operations management, public policy, among others.

The holistic program will equip students with a solid foundation of knowledge and skills to function effectively in related fields, enhance students' creativity and critical thinking skills, and provide students with a global outlook on the development of Sustainable and Green Finance. The graduates of this program will contribute to the economic and social development of Hong Kong, the Greater Bay Area, and beyond.

MAJOR + X EXTENDED MAJORS

HKUST is the first in Hong Kong to introduce a novel academic framework "Major + X" as a new degree option for undergraduates to excel in an extended major of an emerging hot topic such as Artificial Intelligence in addition to a traditional major program. Blending traditional programs with the emerging hot topics, this new degree structure not only offers students with greater flexibility, but also allows timely curriculum adjustment and better integration between existing and new knowledge to meet with the emerging need of the society.

The Extended Major framework (Major+X) offers an organic study pattern for students from different disciplines to learn solid knowledge from their own Majors PLUS innovative application of "X" in their Major areas. Students need not take a full degree of "X" to learn about emerging technologies.

Currently, we offer two Extended Majors: Artificial Intelligence and Digital Media and Creative Arts. For more details, please refer to:
https://emia.hkust.edu.hk/extended-majors

AES
MPHIL/PHD IN ATMOSPHERIC ENVIRONMENTAL SCIENCE

The Master of Philosophy (MPhil) Program aims to train students to conduct independent research in Atmospheric Environmental Science. The Doctor of Philosophy (PhD) Program seeks to train students in original research in Atmospheric Environmental Science and to cultivate independent and innovative thinking that is essential for a successful research career in environmental science.

Currently, the research concentrations include:
• Aerosol physics and chemistry
• Air quality modeling and data analysis
• Atmospheric chemistry
• Environmental sensing and measurement technology
• Global and regional climate modeling
• Health effects of air pollutants

ESPM
MPHIL/PHD IN ENVIRONMENTAL SCIENCE, POLICY AND MANAGEMENT

ESPM is an interdisciplinary research and education program covering a wide spectrum of environmental interests. The research programs focus on the dynamics and interconnection of scientific, technological, environmental socio-economic and policy challenges facing the world. Co-supervision on student thesis work is a core feature in the program, an approach that enhances the interdisciplinary education experience for students.

Currently, the research concentrations include:
• Air quality and built environment
• Climate change and adaptations
• Environmental data analysis
• Environmental economics
• Environmental microbiology
• Environmental policy and management
• Environmental pollution and health
• Physical/Biophysical oceanography and ecosystem modeling
• Planning and design for sustainable development
• Sustainability, energy and environment

PP
MPHIL/PHD IN PUBLIC POLICY

Rigorous research training for academically outstanding students aspiring to pursue a career in policy research and teaching. Given the breadth and depth of HKUST faculty expertise across departments and Schools, Public Policy students can specialize in one of the following policy areas:

• Science, Technology and Innovation
• Environmental Policy and Sustainability
• Social Changes and Public Policy
• China's Development Policy

Like other interdisciplinary research programs, to facilitate interdisciplinary research, students will be co-supervised by Division faculty members and faculty members appointed jointly with other Schools.

IIP
MPHIL/PHD IN INDIVIDUALIZED INTERDISCIPLINARY PROGRAM (RESEARCH AREA)

This program offers students a broad academic freedom to create a unique research postgraduate program focused on a specialized area of research in ways that best suit their own intellectual interests and passion, by working on an interdisciplinary research topic and using courses from different Departments / Divisions and Universities to fulfill the curriculum requirement. It aims to create an organic curriculum to facilitate students' intellectual growth, exploration into novel research direction and a long term commitment in an interdisciplinary research field bridging seemingly unrelated areas.

IIP would make an ideal choice for these students with academic and research interests which extend beyond the boundaries of HKUST's existing research postgraduate programs. IIP students work closely with their primary supervisor and co-supervisors to develop a research plan and framework to explore their unique research interests and complete their degree.

TAUGHT POSTGRADUATE PROGRAMS

EVSM
MSC/PGD IN ENVIRONMENTAL SCIENCE AND MANAGEMENT

EVSM is a multi-disciplinary program that emphasizes application of both environmental science knowledge and environmental management skills to solve local, regional and global issues. While core courses in both science and management areas are required for this program, there is also a wide range of elective courses to cater to students of a diverse background. It aims to strengthen students' understanding about important environmental concepts and enhance their ability to apply them.

The program objectives of EVSM are:
- To strengthen students' professional status with updated and advanced knowledge and development in important and emerging environmental issues and concepts.
- To enhance students' ability in applying latest environmental concepts (technologies or management strategies) to local, regional and global environmental problems.
- To provide professional and interdisciplinary training for graduates to prepare themselves to tackle the rapidly developing environmental issues in Hong Kong and the surrounding region.
- To cultivate students' stewardship towards sustainable development in their professional industries and sectors.

MPM
MASTER OF PUBLIC MANAGEMENT

The Master of Public Management (MPM) program is designed to prepare students to operate and thrive in a complex, rapidly changing and disruptive world. The program will prepare them for senior management roles in organizations that deliver public services or interact frequently with governments and regulatory authorities. It aims to equip students with the skills, knowledge and habits of mind to deal with the fast changing and contested environments that governments, as well as their stakeholders, partners, and regulated entities face.

In this program, students will have the opportunity to develop their managerial capabilities such as their analytical skills, operational competence and political acumen—all of which are essential for successful careers in the public or private sectors. Leveraging the strengths at HKUST, the program also aims to give students the interdisciplinary perspectives that will enable them to explore the policy, operational, regulatory and political issues associated with technology advances and sustainability.

MPP
MASTER OF PUBLIC POLICY

The Master of Public Policy (MPP) is an interdisciplinary program that equips students with knowledge of the full impact of science and technology innovations and professional skills in the formulation and implementation of innovative solutions to current and emerging global challenges. Situated in HKUST, the program draws from research and teaching excellence from across a diverse range of disciplines to equip students with a set of core skills in data analytics, economic analysis and management to become effective policy professionals.

Designed for students with diverse educational backgrounds, including social science, science, engineering, business, and other fields of study, this two-year full-time program consists of a core curriculum, an optional summer internship upon completion of first year, a second year client-based policy analysis project and elective courses allowing students to develop their areas of specialization. The first of its kind in Hong Kong, this program provides students with complete professional training that focuses on problem-solving skills with real-world cases and examples.

IMPACT OF INTERDISCIPLINARY RESEARCH AND EDUCATION

IMPACTING SOCIETY THROUGH RESEARCH
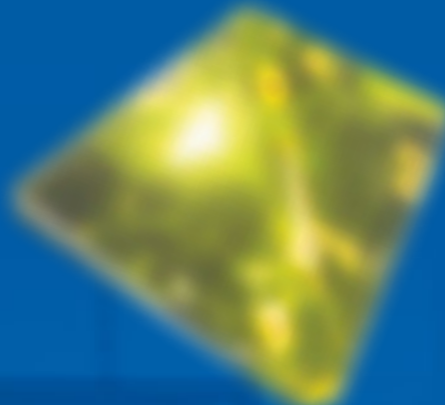
New Smart Anti-Microbial Coating in the Fight Against COVID-19

A research team led by Prof. YEUNG King Lun, Professor of the Division of Environment and Sustainability, has developed a Multilevel Antimicrobial Polymer (MAP-1) coating that is effective in killing viruses, bacteria and even hard-to-kill spores. MAP-1 can inactivate* up to 99.9 per cent of highly-infectious viruses such as measles, mumps and rubella, and 99.99 per cent of the surrogate feline calicivirus (FCV) - a gold standard for disinfection efficiency and is more resistant than coronaviruses such as the one responsible for the COVID-19 epidemic.

MAP-1 coating is confirmed to be effective against drug-resistant microorganisms and is highly versatile with an effective period of up to 90 days. It provides lasting protection and surface disinfection against microbial contamination. According to the Technical Standard for Disinfection issued by the National Health Commission in Mainland China, the coating is proven to be non-toxic and is safe for skin and the environment, hence it also allows MAP-1 to be made into hand sanitizers, paints and coating, filter materials for air and water purification, as well as clothing and surgical masks to safeguard the health of the individual and public.

In efforts to help the society fight the COVID-19 outbreak, HKUST, in collaboration with its industrial partner Chiaphua Industries Limited (CIL), has applied the smart coating to over 70 daycare centers, elderly homes, kindergartens, primary and secondary schools. Other venues include shopping malls, school buses, churches and sports training facilities.

* Inactivating a virus literally means killing it, but it's more proper to use the word 'inactivate' as virus is not considered alive, they only replicate and propagate when they find a host.

Population Ageing

Population ageing is one of the 21st century's great global social and economic challenges. Starting from 2015, Prof. Stuart GIETEL-BASTEN, Professor of the Division of Public Policy, and his international collaborators (Prof. Sergei SCHERBOV and Prof. Warren SANDERSON) have conducted a series of international analyses of demographic data on ageing in different policy contexts. They explored why established population ageing measures and concepts, such as the standard transition to "old age" at 65, defined more than a century ago, are not fit for purpose today. They also proposed new approaches that considered the revolution in health and longevity in advanced economies. This interdisciplinary research has evidenced the case for an alternative, holistic way of grasping the social, economic, and political challenges of population ageing to replace the single-dimensional demographic measures in place for more than a century and still widely used by policymakers, employers, and care organizations in devising strategies. The research has had a range of impacts on diverse beneficiaries in and outside Hong Kong. Specifically, 1) it has influenced global policy debate on data collection and assessment methods related to ageing at United Nations forums and Austria's wide-reaching federal economic chamber; 2) directly contributed to new strategic thinking on ageing among Asian equity staff at global financial institution and through dissemination by Prof. GIETEL-BASTEN to investors; 3) enhanced the work of NGOs and business stakeholders; and 4) widened public understanding of alternative thinking on ageing and indicators through a popularly written book "Why Demography Matters" and media dissemination.

UAV-borne Sensor Sniffing System Technology

Hong Kong air quality is of significant concern to its residents due to fast-paced urbanization. While roadway vehicle emissions have been largely controlled by the Hong Kong government, the efforts to control marine vessel emissions are still in its preliminary stages. The Air Pollution Control (Fuel for Vessels) Regulation (Cap. 311AB) came into force on 1 January 2019, where all vessels are required to use fuel with sulphur content not exceeding 0.5% by weight when they are within the Hong Kong waters. However, the enforcement of the non-compliance high sulfur fuel usage has been difficult with the large volume of incoming and outgoing vessels and the tedious testing process in the laboratory. Prof. Zhi NING, Associate Professor of the Division of Environment and Sustainability, and his team have developed the use of the UAV-borne Sensor Sniffing System protocol in measuring marine vessel plume and fuel sulphur contents (FSC) as a smart enforcement tool for fast screening the non-compliant

ships. A total of 122 transiting Ocean Going Vessels (OGVs) or OGVs at berth within Hong Kong waters were tested, all OGVs were found to be compliant with the set limit of 0.5% FSC. These results provided a clear profile of the fuel sulphur content data of the OGVs in Hong Kong waters, and thereby further developed the investigation of the practical limit of the sensor sniffing methods. This sensor sniffing measurement is proved to be practical and could be an effective approach for identification of non-compliant OGVs in future, which will assist the law-enforcing bodies in their FSC screenings.

Prof. NING will keep exploring the deployment of the mobile sensor technology in different fields. Recently, the technology has been used to preserve the world heritage "Last Supper" by Leonardo DA VINCI. Prof. NING designed a miniature, quiet, multi-pollutant sensor package with wireless data transmission for detecting pollutants onsite.

Governing Data-Driven Innovation for Sustainable Smart Cities

Smart cities will play a crucial role in tackling sustainability challenges, such as reducing air pollution, increasing energy efficiency, mitigating traffic congestion, and maintaining resilience to accidents and natural disasters. Data-driven innovation, including the Internet of Things (IoT), blockchain, and artificial intelligence (AI), has great potential to address these multifaceted, interdependent challenges. Vast amounts of different types of data are increasingly available from a variety of sources through sophisticated equipment and devices installed in buildings, automobiles, and infrastructure. Effective collection, sharing, and use of data through cooperation and collaboration among stakeholders would be critical for facilitating innovation for sustainable smart cities. While open data access and management can contribute to promoting societal benefits, stakeholders in various sectors have different interests and motivations and would not necessarily be willing to disclose or exchange data with each other, as a balance

needs to be made between open and proprietary data. There are various types of issues concerning the use of data, such as metadata tagging, quality control, cleaning and error elimination, and interoperability between various standards, which must be addressed to support data sharing. Serious risks are involved in collecting, sharing, and using sensitive data including personal data in terms of safety, security, and privacy. Prof. Masaru YARIME, Associate Professor of The Division of Public Policy, conducts theoretical and empirical studies to examine key opportunities and challenges in the collection, sharing, and use of data in smart cities and the effects of organizational and institutional arrangements for data governance on innovation for sustainability. It is of critical importance to facilitate stakeholder collaboration among academia, industry, government, and civil society for maximizing the potential of innovation while minimizing risks to individuals and communities. As technological change is getting rapid and unpredictable, novel policy approaches such as regulatory sandboxes are explored to encourage learning from real-world experience and adaptation through experimentation.

Personal Air Exposure Management

According to the World Health Organization, air pollution is the single largest environmental health risks in the world. Air quality management from national strategy down to personal level are all important for the well-being of every individual. Through a science-to-policy collaboration with government agencies, mathematician and atmospheric meteorologist, Prof Jimmy FUNG, Associate Head and Chair Professor of the Division of Environment and Sustainability and his team used novel mathematical approaches to develop a regional fine-scale air-quality forecast system. Combining this fine-scale air quality forecast system with state-of-the-art technologies in mobile device personal tracking, urban informatics, transport modeling, big data analytics, and health impact assessments, the research team has created a fine-scale air


quality modeling system, and innovative mobile app "PRAISE" to provide highly accurate real-time and forecast air quality, and personal exposure health risk information down to street level. With resolution between two to 20 meters, users can better understand where and when they are exposed to the largest amount of air pollutants in their daily activities, and plan healthier routes to avoid pollution hotspots. These developments to tackle air pollution have significant health and related economic benefits for the whole community in Hong Kong (population 7.4 million), another 12.5 million in Shenzhen, and millions more in wider regions of China.

CULTIVATING INNOVATIVE THINKING

Innovative thinking is important for problem-solving in all settings of study and work. The ability to analyze problems from multiple perspectives and fuse knowledge and know-how from different fields in building solutions is essential in tackling the increasingly complex challenges we are facing today. IPO provides worldwide platforms to cultivate students' innovating thinking with interdisciplinary approaches while at the same time broadening their horizons to develop passion and pursue individual goals.
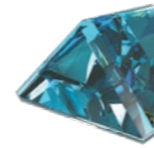
Salzburg Global Seminar

Salzburg Global Seminars (SGS) is an independent non-profit organization founded in 1947 to challenge current and future leaders to shape a better world. Their multi-year program series aim to bridge divides, expand collaboration and transform systems by gathering experts and students around the globe to discuss and exchange views on a wide range of topics under the 7 themes: Media & Voice, Education & Work, Culture & Society, Planet and Health, Justice & Security, Finance & Governance, and Designs on the Future.

To broaden students' horizon and allow them to gain more international exposure, IPO and SGS set up a scholarship to sponsor IPO students to join the SGS programs held at Salzburg in Austria.

Athar MANSOOR, a PhD student in Public Policy (PP), was selected to join the program on "Halting the Childhood Obesity Epidemic: Identifying Decisive Interventions in Complex Systems". It gathered 70 experts and students at Salzburg from 14 to 19 December 2019 to discuss how to manage childhood obesity.

This program connected Athar with like-minded and passionate experts from different fields. With common goal and interest, Athar formed a working group on the theme of 'Overcoming Policy Paralysis' with other 5 participants including Prof. Steve GORTMAKER from Harvard University, USA, Ms Rachel THOMSON from World Obesity Federation, UK, Ms Alexandra CHUNG from Deakin University, Australia, Ms Sarah CZERNIN from Austrian Academic Institute for Clinical Nutrition, Austria, and Ms Louise TULLY from Royal College of Surgeons, Ireland. They successfully applied for a project incubation fund of US$10,000 from SGS and Robert Wood Johnson Foundation to deliver a policy brief with digital assets and 3 podcast episodes. At the policy brief, they identified points of intersection between COVID-19 and childhood obesity prevention and management, and highlighted three priorities: food marketing, taxation and education for government action. The working group has also had their suggestions published at the British Medical Journal in August 2021.

International Business Plan Competition

Students of Dual Degree Program in Technology & Management and participants from overseas universities of US, Germany, Switzerland, Brazil and Singapore etc, work in multicultural teams to develop viable applications and business plans for an emerging technology in hosting countries/ regions. Over the years, students have visited Silicon Valley, Sao Paulo, Bayreuth, Singapore, Shanghai and many more places to work for topics like 3D printing, unmanned aerial vehicles, smart transportation and health tech. The competition is a valuable platform to learn the underlying ingredients for business success, including hard work, building trust across cultures, innovation and mastery of emerging technology. It also generates numerous innovative ideas which are the solid foundations for students to develop creative solutions when tacking real world problems.
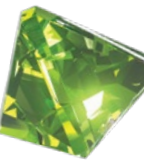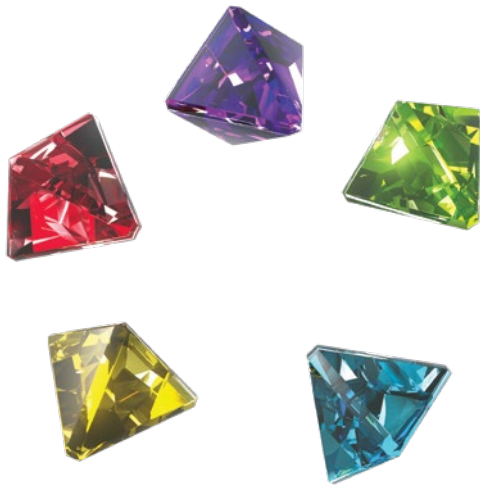
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