RESEARCH INSTITUTE FOR SUSTAINABLE URBAN DEVELOPMENT

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Innovative Solutions for Sustainable Cities
There has been much discussion about sustainable development. However, the world is in a situation that is more dire than ever. Apathy and inaction will only hinder advancement, incur far greater costs in the future and result in a degraded planet. While addressing the challenge will take the active engagement of all sectors of society, the key to success is innovation.

Innovation is not just about developing new technology but also new ways of thinking to solve problems. In this connection, the higher education sector certainly has a pivotal role to play. Universities are the world’s greatest source of innovative ideas, and are armed with the greatest freedom to move ideas through to application. The Hong Kong Polytechnic University, in particular, is a place where innovation meets application.

PolyU has responded proactively to the issue of urban sustainability by setting up the Research Institute for Sustainable Urban Development. With this Institute, we can capitalize on the living laboratory of Hong Kong’s urban environment and the multi-disciplinary expertise of PolyU, and fulfill our Motto “To learn and to apply, for the benefit of mankind”.

Marjorie Yang Mun-tak, JP
Former Council Chairman
The Hong Kong Polytechnic University
Message from President for the Inauguration of RISUD

Sustainable development is one of the most important and most pressing challenges facing the world. High-density urban development not only brings economic growth, but also generates problems in relation to preserving the environment for the generations to come.

The Hong Kong Polytechnic University (PolyU) is a place where innovation meets application. Innovation is more than developing new technology, new skills and new processes; it also involves creating new ways of thinking about how to solve problems. It is in this context that PolyU has established the Research Institute for Sustainable Urban Development with a view to creating sustainable solutions to problems generated by high-density urban development.

Through research and knowledge-transfer activities, consultancy services and professional training provided by the 33 research groups in five divisions, the Institute is committed to multi-disciplinary collaborations to address major urban planning and environmental issues. The Institute will translate research findings into action and then transfer the technologies that are subsequently developed, thus contributing to the enhancement of Hong Kong’s competitiveness as well as China’s socio-economic development.

The establishment of the Institute aptly demonstrates the University’s dedication to making sustainable development a strategic priority. Through this initiative, PolyU will spare no effort in creating innovative solutions for the development of sustainable cities.

Timothy W. Tong, Ph.D.
Message from Vice President (Research Development) for the Inauguration of RISUD

With urban population in the Asia-Pacific region totaling 1.4 billion and expected to rise to 2 billion by 2020, sustainable development has become a very important subject to the future of cities in the Asia-Pacific region and the world at large. Some cities are on track to becoming fully sustainable and many will have their own research centers to develop renewable energy and clean environmental technologies. In view of the rapid urbanization and growing pressures on natural resources, there is an urgent need for coordinated action on urban sustainability. Only if national, regional and local governments work together with public institutions, business, industry, and other stakeholders will we be able to reach the goal of fully sustainable cities.

Hong Kong, a city of high population density, is in a very good position to conduct research on urban sustainability as well as promote and facilitate the transfer of environmentally sound technology and expertise in support of local governments, particularly the Mainland, in the implementation of sustainable urban development plans and strategies. “Sustainable development in Hong Kong balances social, economic, environmental and resource needs, both for present and future generations simultaneously achieving a vibrant economy, social progress and a high quality environment, locally, nationally, and internationally through the efforts of the community and the Government.” – defined in the Study on Sustainable Development for the 21st Century (SUSDEV 21), a study commissioned by the Hong Kong Government in 1997.

Sustainable urban development is one of the strongest research areas in PolyU. We hope the Research Institute for Sustainable Urban Development (RISUD) can cope with the needs of the society in Hong Kong and the Region. With its mission to (i) create sustainable solutions to problems generated by high-density urban development through multi-disciplinary, cutting-edge research; (ii) engage in knowledge transfer activities through specialist consultancy and continuing professional training; and (iii) create significant positive impact on government policies and societal culture for sustainable urban development through services to professional and government organizations; as well as the support from the University, we are confident that the RISUD will become a world leader in the development and dissemination of technologies and systems for sustainable high-density urban development.

Ping-kong Alexander Wai
Vice President (Research Development)
The Hong Kong Polytechnic University
Message from the Director

Among the world-class metropolises, Hong Kong has the highest population density: over 7 million people live on just 1,104 square kilometers of hilly land. The city is characterized by high-rise residential blocks made up of relatively small-size flats, creating an urban living environment not commonly found in other developed regions. Even Singapore, with more usable land and a smaller population, pales in comparison with Hong Kong. This high density brings with it many challenges and opportunities. Air pollution, heat island effects, solid waste management, aging infrastructure, and shortages in housing supply are just some of the issues we have long contended with. Along the way we have accumulated extensive experience and expertise that we can now share with many developing cities in mainland China and some other parts of Asia as they become increasingly like Hong Kong. To continue to lead the development of high-density urban cities, we need multi-disciplinary, cutting-edge research.

With its motto being “To learn and to apply, for the benefit of mankind”, The Hong Kong Polytechnic University (PolyU) sees as its obligation the sustainable development of Hong Kong as well as other high-density cities in mainland China and other parts of the world through its research and knowledge transfer activities. The Research Institute for Sustainable Urban Development (RISUD) was established by PolyU to realize this obligation and to elevate itself to a world-leading role in this area. While RISUD was initially nurtured primarily by researchers from the Faculty of Construction and Environment who are all heavily focused on sustainable urban development in one way or another, it has by now expanded to include a significant number of active researchers from other departments of the university.

With Hong Kong serving as a living laboratory for the studies of technologies and systems that are indispensable for high-density urban development, we have great confidence that RISUD will succeed in its mission with the support of both industry and community. This booklet is one of our attempts at introducing RISUD to you to sow the seeds for potential long-term partnership.

I look forward to hearing from you about suggestions for collaboration in different ways in the future.

Jin-Guang Teng (Professor)  
Director of RISUD

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Introduction

As a result of the rapid economic development on the Chinese mainland, a massive urbanization process has been under way. Over the next 25 years, it is estimated that around 300 million rural dwellers in China will become urban residents. The scale of this process is unprecedented in human history, and the challenge is how to achieve it in a sustainable manner so that the natural environment is well protected and the built environment functions in an efficient manner in terms of energy and resources.

This massive urbanization process in China presents many opportunities for Hong Kong because many mainland cities are developing according to Hong Kong’s high-density urban development model. Such cities are characterized by a great number of high-rise residential buildings and present many unique challenges for both construction and management.

Against the above background, the Research Institute for Sustainable Urban Development (RISUD) was established by The Hong Kong Polytechnic University (PolyU) to develop innovative solutions for sustainable high-density cities by capitalizing on the living laboratory of Hong Kong’s urban environment and the multidisciplinary expertise of PolyU.

Our Vision

To be a world leader in the development and dissemination of innovative solutions for sustainable high-density urban development.

Our Mission

• To create innovative solutions to problems generated by high-density urban development through multi-disciplinary, collaborative research;
• To engage in knowledge transfer activities by collaborating with industry and government; and
• To make an impact on societal cultures of urban sustainability through community engagement and services.
Organizational Structure and Research Areas

RISUD is led by Prof. Jin-guang TENG as Director and Prof. Xiang-dong LI as well as Prof. Albert P. C. CHAN as Associate Directors. It includes 33 research groups which are organized into five divisions.

The 33 research groups of RISUD are each led by a senior researcher who is an internationally recognized scholar in the area. The research groups, as the nodes of a dynamic interactive network, organize themselves by common interest to form strong teams for major multi-disciplinary research projects to advance the frontiers of knowledge and technologies. The five divisions and the research groups under each division are listed below.

**Division of Urban Systems (Coordinator: Prof. Geoffrey Q. P. SHEN)**
- Smart Construction (Group Leader: Prof. Heng LI)
- Infrastructure Planning and Management (Group Leader: Prof. Geoffrey Q. P. SHEN)
- Sustainable Land Use (Group Leader: Prof. Edwin H. W. CHAN)
- Sustainable Public Design (Group Leader: Prof. Kin Wai Michael SIU)
- Sustainable Transportation Systems (Group Leader: Prof. William H. K. LAM)
- Sustainable Urban Design (Group Leader: Prof. Timothy JACHNA)
- Urban Housing Policies (Group Leader: Prof. Eddie C. M. HUI)

**Division of Urban Infrastructure (Coordinator: Prof. Jin-guang TENG)**
- Advanced Composites and Technology (Group Leader: Prof. Limin ZHOU)
- Construction Health and Safety (Group Leader: Prof. Albert P. C. CHAN)
- High-speed Railway Safety (Group Leader: Prof. Yi-qing NI)
- Infrastructural Monitoring (Group Leader: Prof. You-lin XU)
- Sustainable Materials and Structures (Group Leader: Prof. Jin-guang TENG)
- Urban Geo-Hazards (Group Leader: Prof. Jian-hua YIN)

**Division of Urban Environment (Coordinator: Prof. Tao WANG)**
- Corporate Environmental Management (Group Leader: Prof. Eric W. T. NGAI)
- Environmental Energy (Group Leader: Prof. Meng NI)
- Nano-materials for the Environment (Group Leader: Prof. Pauline Pei LI)
- Regional Air Quality (Group Leader: Prof. Tao WANG)
- Sustainable Waste Management (Group Leader: Prof. Chi-Sun POON)
- Urban Ecosystems (Group Leader: Prof. Xiang-dong LI)
- Urban Noise Mitigation (Group Leader: Prof. Shiu-keung TANG)
- Urban Water and Wastewater Treatment (Group Leader: Prof. Wei CHU)

**Division of Green Buildings (Coordinator: Prof. Hong-xing YANG)**
- Building Energy and Automation (Group Leader: Prof. Shengwei WANG)
- Building Thermal Environment and Urban Climate (Group Leader: Prof. Jian-lei NIU)
- Environmental and Energy Economics (Group Leader: Dr David BROADSTOCK)
- Indoor Air Quality (Group Leader: Prof. Shun-cheng LEE)
- LED Based Energy Efficient Communication Systems (Group Leader: Prof. Chao LU)
- Renewable Energy (Group Leader: Prof. Hong-xing YANG)

**Division of Smart Cities (Coordinator: Prof. Xiao-li DING)**
- Geo-spatial Technology in Urban Development (Group Leader: Prof. John W. Z. SHI)
- Management of Underground Utilities (Group Leader: Prof. Wu CHEN)
- Internet Service Monitoring and Diagnostics (Group Leader: Dr Rocky K. C. CHANG)
- Unmanned Airborne System for Urban Monitoring (Group Leader: Prof. Chih-Yung WEN)
- Urban Big Data Computing and Wireless Networking (Group Leader: Prof. Jiannong CAO)
- Urban Navigation and Mobility (Group Leader: Prof. Xiao-li DING)
Organization Chart of RISUD

- International Advisory Committee
- Director, Associate Directors, Executive Committee
- Division of Urban Systems
- Division of Urban Infrastructure
- Division of Urban Environment
- Division of Green Buildings
- Division of Smart Cities
Multi-Disciplinary Research in Focus Areas

The development and management of high-density cities present many major challenges that need to be addressed by RISUD’s research. Some of the potential research focus areas for RISUD have been identified as follows:

- Building energy technology
- Life-cycle performance of infrastructures
- High-speed railway technology
- Regional air quality
- Space creation and reuse
- Solid waste management
- Urban computing

- Urban geo-hazard reduction
- Urban health
- Urban informatics
- Urban infrastructure economics
- Urban mobility
- Urban resilience
- Underground asset management

To achieve breakthroughs in such focus areas, expertise is needed from a wide range of disciplines including chemistry, material science, environmental science, geo-science, urban planning, engineering, information technology, health sciences, and social sciences. Therefore, the research agenda of RISUD is focussed on major multi-disciplinary projects. These projects are expected to fall into two categories:

- Multi-disciplinary research projects funded by government funding bodies for knowledge discovery and/or technology development
- Collaborative/contract multi-disciplinary projects with specific organizations or sectors for problem-driven research

Partnerships with Industry and Society

RISUD provides services to industry and society through knowledge transfer activities. Such activities aim to address major societal issues using a multi-disciplinary approach, thereby contributing directly to Hong Kong’s competitiveness as a world-class metropolis and to the socio-economic development of China as a whole as well as the rest of the world. Therefore, partnerships with industry and society for collaborative research and knowledge transfer are highly valued and vigorously pursued by RISUD. Members of RISUD have had extensive experience and success in knowledge transfer. Their success stories include the development of energy-saving strategies for the International Commerce Centre and the turning of wastes into a new type of brick known as the Eco-block, which has been used in many projects in Hong Kong.

Other Scholarly Activities

Members of RISUD are encouraged to engage in a wide range of scholarly activities such as organizing international conferences and workshops, offering short training courses for local professionals, and delivering seminars to disseminate the latest research outcomes. It is expected that these activities will create a positive impact on public opinions and policies.
Research Group for Smart Construction  
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Professor Li has established an international reputation in the area of construction management research through developing innovative IT solutions to enhance project delivery processes. He probably holds the highest record of journal papers and citations in his research field. His recent research interest has been developing the construction virtual prototyping technology. Virtual Prototyping or VP technology enables contractors to identify construction problems and explore possible solutions and improvements to the construction plan before the actual work begins. His future research plan is to develop innovative solutions to transfer the construction industry to the digital age.

Research Group for Infrastructure Planning and Management  
Group Leader: Professor Geoffrey Q. P. SHEN

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Professor Geoffrey Shen has a proven track record in academic and research leadership in construction management with a special interest in value management and collaborative working in construction, supported by information and communication technologies. He pioneered the development of an innovative Interactive Value Management System, which utilizes group decision support technologies to improve the effectiveness and efficiency of value management workshops in construction. He has led a large number of research projects with total funding over HK$25 million, including five RGC-CERG grants in a row since 2002/03, and has authored more than 300 publications, including 160+ papers in academic and professional journals and 30+ scholarly books and research monographs. He has been invited to deliver keynote presentations for a number of international events, as well as chaired or co-chaired major international conferences. He teaches extensively in these fields at both postgraduate and degree levels, and has successfully supervised countless PhD and MPhil students. Professionally, he is a Fellow of several professional organizations, including the Hong Kong Institute of Value Management (HKIVM), the Royal Institution of Chartered Surveyors, and the Chartered Institute of Building (CIOB) as well as a former president of HKIVM.
**Research Group for Sustainable Land Use**  
**Group Leader: Professor Edwin H. W. CHAN**

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Professor Edwin Chan studied Architecture in England and then learnt Law in London and Hong Kong. He has carried out a wide range of research relating to urban development including: Sustainability policy for urban environment; Urban renewal/ heritage conservation; Low carbon cities; Healthy/Green building; Institutional analysis and transaction costs for “Green” promotions; Dispute management; and Community issues. He has published his work in over 120 international journal papers and many book chapters. He serves as an editor or editorial board member of several research journals and has edited many books related to his research. To enrich teaching/research that is relevant to industry, he plays active roles in professional bodies and serves a number of government boards/ committees, including the Town Planning Board and the Housing Authority. Recently, he has focused his research efforts on sustainability issues in urban renewal and governance for urban land supply, as well as policies for compact cities and the promotion of sustainable buildings.

**Research Group for Sustainable Public Design**  
**Group Leader: Professor Kin Wai Michael SIU**

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Prof. Kin Wai Michael Siu is Chair Professor of Public Design. He is a professional designer and chartered engineer. He has conducted research on public design. He has published 25 research monographs, and over 250 journal papers in respective journals, including Design Issues, The Design Journal, Landscape and Urban Planning, Facilities, Applied Ergonomics, Journal of Engineering Design. He has solely owned over 50 international and US patents and design registrations related to public facilities and street furniture. He has received over 50 US /international design and invention awards, including Red Dot, D&AD, Good Design, Geneva Expo Industrial Design Prize, JIPA Industrial Design, Crystal Cabin Awards. He was just awarded the HK UGC Humanities and Social Sciences Prestigious Fellowship Scheme 2016/2017. He has been a Fulbright Scholar at the Massachusetts Institute of Technology, an ASIA Fellow at the National University of Singapore, and visiting professor/scholar at the University of California at Berkeley, the University of Cambridge, Tsinghua University, Central Academy of Fine Arts. He focuses his work on user reception, everyday space, inclusive design, and FlexiDesign. His current research projects include the public policy of public space, street furniture for densely populated urban areas, inclusive recycling facilities. His recent design, FlexiBOL®, has been well received by the Highways Department and widely installed in the urban areas of Hong Kong for flexible management of circulation.
Professor Lam is Chair Professor of Civil and Transportation Engineering and Head of the Department of Civil and Environmental Engineering (CEE) at The Hong Kong Polytechnic University. He is currently the President of the Hong Kong Society for Transportation Studies (www.hksts.org) and the Past Chairman of Civil Division and of Logistics and Transportation Division, the Hong Kong Institution of Engineers (www.hkie.org.hk). He is the Editor-in-Chief of Journal of Advanced Transportation, the founding Editor-in-Chief of the SCI Journal – Transportmetrica and is now one of the Editors-in-Chief of Transportmetrica A: Transport Science. Professor Lam is also the Convenor of the International Advisory Committee of the International Symposium on Transportation and Traffic Theory (ISTTT) (www.isttt22.org) and a member of the International Scientific Committee of the International Symposium on Transportation Network Reliability (INSTR) (www.instr.org). He has been appointed as Chang Jiang Chair Professor at the Beijing Jiaotong University from 2010 to 2013. He has received the State Natural Science Award (2nd Prize) from the State Council of the People’s Republic of China in 2011. Professor Lam has over 35-year professional experience and is the author of more than 280 SCI papers together with 70 consultancy reports. His research interests include transport planning and traffic forecasting, transport network modeling and reliability analysis, traffic surveys and simulation, Intelligent Transportation Systems (ITS) technology and planning, public transport and pedestrian studies (www.cee.polyu.edu.hk/~cehklam).

Professor Timothy Jachna holds degrees in Architecture from the University of Illinois at Chicago (BArch), the Architectural Association in London (AA Diploma) and RMIT University in Melbourne (PhD). He has practiced as an architect and urban designer in the USA, Greece and Germany, including as Design Director of an architecture and urban design firm in Berlin. He joined the PolyU as an Assistant Professor in 2002 and is currently Associate Dean (Academic Programmes) of the School of Design and Co-leader of the Urban Environments Research Lab and the Master of Design (MDes) Urban Environments Design specialism. His research deals broadly with psychosociological aspects of the design of the urban environment. In this vein, he has presented and published in disciplines as diverse as urban theory, tourism, digital culture, computer semiotics, art, architecture, planning, and human-computer interaction. Prof. Jachna is the current Vice-president of the American Society for Cybernetics, and his recent research and publications explore the application of principles of second-order cybernetics in understanding urban processes and practices, and envisioning possible urban futures. A predominant stream of his work investigates the implications of digital technologies for the ways that cities are planned, designed and inhabited.
Professor Hui is an all-round professional with diverse experience in research and consultancy projects. Before joining PolyU, he was responsible for research and development for a major professional surveying firm in Hong Kong. At The University of Hong Kong, he obtained his BSc (first class honours) with the “Chan Kai Ming Prize” and the “Building Management Prize”. At the University of Cambridge, he finished his MPhil in Land Economy (first class) with a Commonwealth Scholarship. With another Commonwealth Scholarship, he completed his PhD in the Department of Land Economy at the University of Cambridge, where he is a fellow of the Cambridge Commonwealth Trust.
Research Group for Advanced Composites and Technology
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Prof. Limin Zhou received his BEng and MEng from Harbin Institute of Shipbuilding Engineering (current name: Harbin Engineering University) in 1982 and 1988 respectively, and his PhD from The University of Sydney in 1994. He was appointed as an Assistant Professor in 1996 and became a Professor in 2005 in the Department of Mechanical Engineering, The Hong Kong Polytechnic University. Prof. Zhou’s major research interests include fibre-reinforced polymer composites, smart materials and structures; nanomaterials and nanotechnology for energy storages and conversions, and guided-wave based structural health monitoring techniques. He has published more than 250 technical articles including over 170 SCI refereed journal papers. After assuming the current appointment with The Hong Kong Polytechnic University, he received an Engineering Faculty Best Research Award in 1999 and the President’s Award for Outstanding Achievements in Research in 2000. Prof. Zhou currently is a Vice President of Chinese Society for Composite Materials and a member of Engineering Panel, Hong Kong Research Grants Council.

Construction Health and Safety Research Group
Group Leader: Professor Albert P. C. CHAN

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A Chartered Construction Manager, Engineer, Project Manager, and Surveyor by profession, Ir Prof. Chan has worked in a number of tertiary institutions both in Hong Kong and overseas. Ir Prof. Chan joined the Department of Building and Real Estate of the Hong Kong Polytechnic University in 1996 and is currently Head of Department of Building and Real Estate and Associate Director of Research Institute for Sustainable Urban Development. Ir Prof. Chan’s research and teaching interests include project management and project success, construction procurement and relational contracting, construction management and economics, construction health and safety, and construction industry development.
Research Group for High-speed Railway Safety
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Prof. Ni is a professor at the Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University, and the Director of the Hong Kong Branch of National Rail Transit Electrification and Automation Engineering Technology Research Centre. He is a council member of International Society for Structural Health Monitoring of Intelligent Infrastructure (ISHMII), and a co-chair of the International Structural Health Monitoring (SHM) Guidelines Standing Committee, ISHMII. He serves as an associate editor of Journal of Vibration and Control and an editorial board member for four refereed journals: Structural Control and Health Monitoring, Advances in Structural Engineering, Advanced Steel Construction, and Structural Monitoring and Maintenance. He has published over 140 SCI journal papers with an H-index of 29, and more than 250 international conference papers. He is a recipient of the 2016 State Scientific and Technological Progress Award (Second Class), China. His “Mega-Structure Diagnostic and Prognostic System” received a Gold Medal and a Grand Prize at the 37th International Exhibitions of Invention, New Techniques and Products in Geneva in 2009; and his “Intelligent Ship-Bridge Anti-Collision Surveillance System” received a Gold Medal and a Grand Prize at the 41st International Exhibitions of Invention, New Techniques and Products in Geneva in 2013.

Research Group for Infrastructural Monitoring
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Professor You-Lin Xu is Chair Professor of Structural Engineering, Dean of Faculty of Construction and Environment, and Director of the Research Centre for Urban Hazards Mitigation at The Hong Kong Polytechnic University. He has conducted research and consulting in structural engineering for over three decades with special interests in structural dynamics, wind engineering, structural health monitoring, and structural vibration control. He has been engaged in many high-level projects, including the projects on the Tsing Ma Bridge and the Stonecutters Bridge in Hong Kong, the New CCTV Tower in Beijing, and the Shanghai Tower in Shanghai. He has published over 200 SCI journal papers and served in various capacities in many international associations and journals. He has received several prestigious awards, including the 2006 Croucher Senior Research Fellowship, the 2010 Qian Ling Xi Computational Mechanics Achievement Award, and the 2012 Robert H. Scanlan Achievement Award of American Society of Civil Engineers in recognition of his outstanding research achievements.
Research Group for Sustainable Materials and Structures
Group Leader: Professor Jin-guang TENG

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Professor Jin-Guang Teng has conducted research over the past three decades on a wide range of topics within the broad field of structural engineering. He has authored/co-authored over 190 SCI journal papers, leading to over 7,400 citations and an H-index of 43 according to the Web of Science. He is on both the Civil Engineering and the Mechanical Engineering lists of Most Cited Researchers developed for ShanghaiRanking’s Global Ranking of Academic Subjects 2016 by Elsevier. Many of his research findings have been adopted by relevant design guidelines/codes in China, Australia, Europe, the United Kingdom and the United States. His current research interests include the use of FRP composites and other high-performance materials to achieve sustainable structures, life-cycle performance of structures, and recycling of construction materials for structural use.

Prof. Teng has received a number of prestigious awards for his research, including the State Natural Science Award of China, the Distinguished Young Scholar Award from the National Natural Science Foundation of China, and the IIFC Medal from the International Institute for FRP in Construction (IIFC). Professor Teng is a Co-Editor-in-Chief of the international journal Advances in Structural Engineering and a member of the editorial boards of 7 other SCI journals. He was elected a Fellow of the Hong Kong Academy of Engineering Sciences in 2013 and a Corresponding Fellow of the Royal Society of Edinburgh in 2015.

Urban Geo-hazards Research Group
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Professor Jian-Hua Yin received a BEng degree in 1983, an MSc degree in 1984 from Mainland China, and a PhD from The University of Manitoba, Canada in 1990. After four years in a consulting firm and a research centre, Dr Yin came to work in Hong Kong in 1994 and later joined The Hong Kong Polytechnic University in 1995. Professor Yin is Vice-President of International Association for Computer Methods and Advances in Geomechanics (IACMAG). He is an Associate Editor of Canadian Geotechnical Journal and the International Journal of Geomechanics and GeoEngineering, and serves on the Editorial (Advisory) board of eight other journals. Dr Yin received the 2000 Mao Yi-Sheng Soil Mechanics and Foundation Engineering Youth Award in China from the Mao Yi-Sheng Science Education Fund. In October 2008, Dr Yin received the prestigious John Booker Medal of IACMAG. In May 2011, he received the Chandra S. Desai Excellence Award “for excellent contributions in experimental study of the nonlinear and time-dependent stress-strain behavior of soils, development and applications of elastic visco-plastic constitutive models, and innovative development of laboratory testing facilities and optical fibre sensing technologies”. Professor Yin delivered the 2011 Huang Wen-Xi Lecture entitled “From Constitutive Modelling to Development of Laboratory Testing and Optical Fibre Sensor Monitoring Technologies” on 9 April 2011 in Nanjing, China. He is Chair Professor of Soil Mechanics since May 2014. He is leading a RGC Collaborative Research Fund (CRF) project entitled “A Unique Multi-Functions Large-Scale Physical Model Testing Facility for Study of the Impact of Debris Flow on Flexible Barriers and Geo-Hazards in Hong Kong” with a total funding of more than HK$8 millions.
Research Group for Corporate Environmental Management
Group Leader: Professor Eric W. T. NGAI

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Prof. Eric Ngai is a Professor and Associate Head in the Department of Management and Marketing at The Hong Kong Polytechnic University. He has over 130 refereed international journal publications including four papers awarded among the Top 10 most-cited articles published in the Journal of Operations Management, International Journal of Production Economics and Decision Support Systems. He has obtained 10 GRF/CERG, ITF and other external competitive grants, acting as a principal investigator in all of them. In the last 5 years, he has got 6 external funded projects with a total amount over HKD 10 million. He serves on editorial board of four international journals and an Associate Editor of Information & Management. Prof. Ngai has attained an h-index of 33, and received 3600 citations, ISI Web of Science, rendering himself as an established scholar in the areas of management support systems for big data analytics and sustainability development, sustainable supply chain management, energy and environmental informatics and RFID technologies and applications.

Environmental Energy Research Group
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Prof. Meng NI studied Aero-engine engineering in China and obtained his PhD in Mechanical Engineering from The University of Hong Kong (HKU) in 2007. He worked as a Post-Doctoral Fellow in HKU, before joining BRE as an Assistant Professor in July 2009. He was promoted to Associate Professor in July 2012 and Professor in July 2016. Prof. Ni was dedicated to teaching and his Student Feedback Questionnaire (SFQ) scores were within top 10% in the faculty. Prof. Ni focused his research on solid oxide fuel cells (SOFCs) and other electrochemical systems for energy conversion/storage. His research has received funding support from RGC (GRF, ECS, SFC/RGC joint scheme, and France/HK Joint Scheme), ECF, NSFC, and ITF. Prof. NI has published over 100 papers in prestigious scientific journals with over 4800 SCI citations, and his H-index is 29. He serves as an Associate Editor for 4 journals, an Editorial Board Member for 7 journals, and a reviewer for over 60 journals. Prof. Ni has been invited by 17 times to deliver keynote/invited lectures at different international conferences. He received the Young Scientist Award from the Hong Kong Institution of Science in 2007. In 2011, he received “Top Reviewer Award” from Applied Energy (a top Energy Journal). In June 2016, Prof. Ni was listed in the World’s Highly Cited Researchers in Energy Science and Technology by ShanghaiRanking. Prof. Ni was awarded the prestigious Humboldt Fellowship in July 2017. In August 2016, Prof. Ni was awarded “Best Associate Editor Award” by Science Bulletin.
Research Group for Nano-materials for the Environment
Group Leader: Professor Pauline Pei LI

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Prof. Pauline Pei Li joined the Department of Applied Biology and Chemical Technology in 1991. She has conducted a wide range of research focusing on key material challenges of synthetic polymer and biopolymer through design and development of novel synthetic strategies. Potential applications of her research are in controlled drug release, gene therapy, enzyme immobilization, biomolecular and chemical separations, surface coatings, and wastewater treatment. The core-shell particle platform technology has been licensed to companies for various commercial applications. A pilot plant for scale-up production of nanomaterials has also been setup in China for commercial production. Prof. Li has over 80 publications in internationally refereed journals, book chapters and book, and holds 17 U.S. patents with 1 more pending. She has been invited to give over 40 keynotes and invited presentations at international conferences and received many awards for her research and technology transfer, such as The President’s Award for Research and Scholarly Activities (2008) and the Distinguished Knowledge Transfer Excellence Awards (2012) of the Hong Kong Polytechnic University.

Research Group for Regional Air Quality
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Professor Wang obtained a BSc in Chemistry from Nankai University in 1985, a PhD in Atmospheric Chemistry from Georgia Institute of Technology in 1992, and did postdoctoral research at the University of Michigan, Ann Arbor. He studies air pollution problems in Hong Kong and other mega cities in China. He has led a number of research projects, including serving as chief scientist for China’s National Basic Research Project on acid rain and the Principal Investigator of a photochemical study funded by the Environmental Conservation Fund. He is an Associate Editor for the Journal of Geophysical Research: Atmospheres, a leading international geosciences journal, a scientific advisor to the Hong Kong Observatory, a member of Scientific Steering Committee of of the International Global Atmospheric Chemistry Program. He is also a guest/adjunct professor at several leading Chinese mainland universities/research institutions. Prof. Wang has published over 130 papers in international journals.
Research Group for Sustainable Waste Management  
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Professor Poon obtained his PhD from Imperial College. He is currently Chair Professor of Sustainable Construction Materials and Director of the Research Centre for Environmental Technology and Management at the Civil and Environmental Engineering Department. Prof. Poon specializes in the research and development of environmental-friendly construction materials, waste management and recycling technologies, and sustainable construction. He has published over 400 papers in international journals and conferences. He is a Fellow of the Hong Kong Institution of Engineers (HKIE) and a Past Chairman of the HKIE Environmental Division. He is also a Fellow of the Hong Kong Concrete Institute (HKCI) and currently the President of the HKCI.

Urban Ecosystems Research Group  
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Professor Xiang-dong Li teaches in the Department of Civil and Environmental Engineering at The Hong Kong Polytechnic University. He obtained his BSc in Earth Sciences, his MSc in Geochemistry from Nanjing University, and his PhD in Environmental Technology from Imperial College London. His major research interests include regional environmental pollution, urban environmental geochemistry, and phyto-remediation of contaminated soils. Prof. Li has published more than 160 papers, mostly in leading international journals. He is highly cited in the field of Environment/Ecology, with six publications listed as the top 1% cited paper in the field. His recent research projects have mainly focused on environmental changes in the fast developing Pearl River Delta (PRD) region of South China. Prof. Li's research team has been engaged in the study of trace metals and organic pollutants in soils, sediments, biological samples, and atmospheric particles, including their impacts on human health and ecological systems.
Research Group for Urban Noise Mitigation  
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Professor Tang obtained his BSc(Eng) from the Mechanical Engineering Department of The University of Hong Kong in 1987. He finished his PhD in acoustics and fluid dynamics from the same department in 1992. He joined the Department of Building Services Engineering at The Hong Kong Polytechnic University in July 1993. He is currently the leader of the Building Acoustics and Vibration research group in the Department and is a member of a number of research centres at the University. He is also active in organising acoustics conferences and providing services to the industry. Prof. Tang has published over 109 research papers devoted to the science and applications of fluid mechanics, acoustics and mathematics. He has also completed over 100 consultancy projects. His current research interests are aeroacoustics, building acoustics and ventilation-enabling façade sound insulation devices.

Research Group for Urban Water and Wastewater Treatment  
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Professor Chu is the Program Leader of MSc in Environmental Management and Engineering, and the Lab-in-Charge of Water and Waste Laboratory in the Department of Civil and Environmental Engineering at The Hong Kong Polytechnic University. He has more than twenty years of experiences in the water and wastewater treatment technologies with special interests in advanced oxidation processes, catalytic reaction, and treatment plant design. He has been involved in many high-level consultancy projects for the Hong Kong government and private companies. He has published more than 140 SCI journal papers, in which most of them are published in the most critical Class-A journals, and the citations are over 3600, according to the Scopus. He has received several awards, including the Keynote Speaker of the Distinguished Alumni at Tunghai University; Medal Award of Contribution and Outstanding Achievement in Environmental Engineering and Technology of Taichung in Taiwan. Faculty Award for Excellent Performance/Achievement in research and scholarly activities of HKPolyU (Twice); Young Scientist Paper Award of American Academy of Science; and Civil Engineering Award of Purdue University.
Building Energy and Automation Research Group
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Prof. Wang is extensively involved in building energy research and applications. He has obtained over thirty research grants, including 14 GRF grants from the Research Grants Council (RGC) of Hong Kong. He is a recipient of the “Overseas Outstanding Young Talents” research grant of NSFC (2011). He published two books, co-authored four books, and published over 320 papers in refereed journals (including over 190 papers in SCI journals). He is one of the top 150 most highly-cited scholars in “Energy Science and Engineering” (Elsevier, 2016). He also received significant amount of funding from industry (totally over HK$ 17 millions over last 12 years) for technology development and applications. He has been achieved great success in enhancing the energy efficiency of new/existing buildings, including the International Commerce Centre (ICC), New World Centre redevelopment, MTR station, PolyU campus buildings and industrial buildings with energy savings from 15% to 40%. He has received a number of international and national awards for building energy research and technology development and applications, such as ASHRAE Technology Award (2014). He is an associate editor of “Science and Technology for the Built Environment” and serves on the boards of a few other journals. He holds guest/adjunct professorships in ten leading universities in Mainland of China and US.

Building Thermal Environment and Urban Climate Research Group
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Professor Niu received his BEng and MSc degrees from Tsinghua University and PhD from Delft University of Technology. He also had a brief R&D training from the industry in UK. Since joining PolyU, he has secured 14 RGC CERG/GRF grants, along with two ITF grants, two RFCID/HMRF grants and one RGC/NSFC joint grant. His technology contributions are in a broad area linking thermal and fluid sciences with building environment. He is an editor-chief of the Elsevier journal Energy and Buildings, and sits in the editorial board of the Elsevier journal Building and Environment and Journal of Building Performance Simulation, IBPSA's official journal published by Taylor & Francis Journal. He was awarded the fellowship by three leading societies, CIBSE (Chartered Institution of Building Services Engineers), UK, ASHRAE(American Society of Heating, Refrigerating and Air-conditioning Engineers) and ISIAQ academy of fellows.
Research Group for Environmental and Energy Economics
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David is an Assistant Professor of Economics in the School of Accounting and Finance at The Hong Kong Polytechnic University, where he also serves as Deputy Director [Economic Sustainability] in the department’s Center for Economic Sustainability and Entrepreneurial Research. David’s research interests cover various aspects of the empirical economics of energy and the environment, with a particular emphasis on consumer behavior. David has published in high ranked international journals spanning the fields of energy economics, transportation economics and financial economics including: The Energy Journal, Energy Economics, Energy Policy, The Journal of Cleaner Production, The International Journal of Sustainable Transportation, Transport Research Part A, the Journal of International Financial Markets, Institutions and Money and The British Accounting Review. Prior to becoming a lecturer, David worked as a consultant in industry, providing advice on a wide range of economics and business solutions on projects across the world, and has also contributed to important large-scale research projects including the UK Energy Research Centre project on the rebound effect, the Research project on Lifestyles Values and the Environment (RESOLVE) and most recently an EU/Greek Ministry of Education project on efficiency analysis (THALES).

Research Group for Indoor Air Quality
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Professor Lee, Professor of the Department of Civil and Environmental Engineering at The Hong Kong Polytechnic University since 2005, earned a Doctorate in Environmental Sciences at the University of California, Berkeley in 1994. He was appointed Assistant Professor after graduation and has been working on indoor and outdoor air pollution studies, namely toxic air pollution modelling, emission source characterisation and carbonaceous aerosol characterisation. Apart from air pollution studies, he is devoted to risk assessment research with respect to public health, such as the exposure to volatile organic compounds in indoor environments. He was Chairman of the Air and Waste Management Association in Hong Kong from 1997 to 1999. He obtained a Dean’s Award for Outstanding Achievement in Research Funding in 2008, and a Best Paper Award on Indoor Air Quality Research organised by the Chinese Society of Particuology. In 2016, he became one of 4 winners (Aerosol Field) in the Special Contribution Award of the 30th anniversary of Chinese Society of Particuology. He has recently undertaken a National Key Research and Development Program of China on innovation and application of nanomaterial technology to remove major indoor air pollutants, supported by the Ministry of Science and Technology. All of his achievements are recognitions of his academic standing in the field.
Renewable Energy Research Group
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Prof. Yang received his BEng in 1982 and MEng in 1985 in the Division of HVACR Engineering of Tianjin University, China. He obtained his PhD in 1993 in the Mechanical Engineering Department, University of Wales College of Cardiff, UK. He is now leading the Renewable Energy Research Group (RERG) in the Department of Building Services Engineering, The Hong Kong Polytechnic University. His research interests cover a number of R&D topics in renewable energy applications and energy saving in buildings in urban areas including solar photovoltaic integration in buildings, indirect evaporation cooling, ground-coupled heat pumps and solar cell related materials. He has completed a number of research projects in recent years. He has over 300 academic papers and 5 professional books published. According to the ShanghaiRanking’s Global Ranking of Academic Subjects 2016 conducted by the Center for World-Class Universities of Shanghai Jiao Tong University and Elsevier, he is on the list of 150 world most-cited researchers with impactful research in the disciplines of Civil Engineering. He is serving the International Journal of Applied Energy as associate editor, International Journal of Low Carbon Technologies as section editor and other international journals as editorial board member. He is also the coordinator of the Green Building Division of the Research Institute for Sustainable Urban Development, The Hong Kong Polytechnic University.

Research Group for LED Based Energy Efficient Communication Systems
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Prof. Chao Lu obtained his BEng in Electronic Engineering from Tsinghua University, China in 1985, and his MSc and PhD from University of Manchester in 1987 and 1990 respectively. He joined the School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore as Lecturer in 1991 and has been an Associate Professor since January 1999. From June 2002 to December 2005, he was seconded to the Institute for Infocomm Research, Agency for Science, Technology and Research (A*STAR), Singapore, as Program Director and Department Manager, helping to establish a research group in the area of optical communication and fibre devices. Since April 2006, he has been a Professor in the Department of Electronic and Information Engineering, The Hong Kong Polytechnic University. His research interests are optical communication systems and networks, fibre devices for optical communication and sensor systems.
Research Group for Geo-spatial Technology in Urban Development

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Professor Shi is Chair Professor in GIS and Remote Sensing and Head of Department of Land Surveying and Geo-Informatics at The Hong Kong Polytechnic University. His current research interests include GIS and remote sensing, uncertainty and spatial data quality control, image processing for high resolution satellite images and Lidar. He obtained his doctoral degree from University of Osnabrück in Vechta, Germany in 1994. He has published some 400 research articles (including over 150 SCI papers) and 10 books. He received “Wang Zhizhuo Award”, awarded to only one outstanding scholar per four years, from the International Society for Photogrammetry and Remote Sensing (ISPRS); the State Natural Science Award from the State Council of China in 2007; ESRI Award for Best Scientific Paper in GIS (First place) from the American Society of Photogrammetry and Remote Sensing in 2006; Chang Jiang Scholar (Chair Professor) of the Ministry of Education of China in 2006; and The President’s Award for Outstanding Performance/Achievement from The Hong Kong Polytechnic University in 1999 and 2007. Prof. Shi was President of Technical Commission II, ISPRS (2008-2012), and President of the Hong Kong Geographic Information System Association (2001-2003).

Research Group for Management of Underground Utilities

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Professor Chen joined The Hong Kong Polytechnic University in 2000 and is currently Professor in the Department of Land Surveying and Geo-Informatics at The Hong Kong Polytechnic University. He was awarded a BSc by the Chinese University of Science and Technology in 1982, a MSc by the Institute of Geodesy and Geophysics, the Chinese Academy of Science in 1985, and PhD from the University of Newcastle upon Tyne in 1992. From 1985 to 1988, he worked at the Institute of Geodesy and Geophysics as a research associate, specialising in GPS-related research. From 1992 to 2000, he worked on various research projects related to GNSS at the Institute of Engineering Surveying and Space Geodesy of the University of Nottingham.
Research Group for Internet Service Monitoring and Diagnostics
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Rocky is currently serving as an Associate Professor in the Department of Computing of The Hong Kong Polytechnic University. Prior to returning to Hong Kong, he received his post-doctoral training at the Computer Science Department of the IBM Thomas J. Watson Research Center. He received his PhD and MSc from the Rensselaer Polytechnic Institute and undergraduate education from Virginia Tech and Vincennes University. Rocky has been leading an Internet Infrastructure and Security Research Group for the last twenty years, addressing network measurement, network security, and network operations and management problems. The Group has published their findings in top conferences and journals, such as JSAC, MM, CoNEXT, INFOCOM, ATC, IMC, NDSS, and IEEE Trans Dependable Secure Comput. His recent research activities are generously supported by the Innovation Technology Fund, Areas of Excellence Scheme in Information Technology, the Research Grant Council of Hong Kong, Huawei, and Cisco Inc. He also provides consultancy services to the Joint Universities Computer Centre, ITS of PolyU, and a Hong Kong government department. Rocky has received the Most Active New Consultant Award (Merit) in 2014, the Faculty's Industrial and Engineering Services Grant Achievement Awards in 2012 and 2009, and the First Runner-Up in the Faculty of Engineering's Best Teacher Award in 2001. He was a KTP Visiting Fellow at the University of Technology, Sydney in October 2016 and a Co-Chair of ACM CoNEXT’16 Student Workshop.

Research Group for Unmanned Airborne System for Urban Monitoring
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Professor Wen received his BSc degree from the Department of Mechanical Engineering at the National Taiwan University in 1986 and MSc and PhD from the Department of Aeronautics at the California Institute of Technology (Caltech), U.S.A. in 1989 and 1994 respectively. Professor Wen has solid experience and track records in both research and administration. He had been the Chairman of the Department of Mechanical and Vehicle Engineering from August 1997 to July 2000, and the Provost from August 2004 to July 2006 in the Da-Yeh University in Taiwan. He worked at Caltech as a Research Fellow from February 1994 to July 1994 and then continued his teaching and research works at the Department of Mechanical Engineering at the Da-Yeh University, Taiwan. He was promoted to full professorship in February 2002. In August 2006, Professor Wen joined the Department of Aeronautics and Astronautics of the National Cheng Kung University (NCKU), Taiwan. Professor Wen has authored and co-authored many scientific papers, conference papers and book chapters. He was also awarded 11 patents. His current research interests are in the areas of (1) Aerodynamic applications of plasma actuators in delta-winged UAVs and MAVs; (2) Hypersonic aerodynamics and scramjet engine design; (3) Fuel cell applications in the electric power system of a micro spacecraft; and (4) Flow instabilities of magnetic fluids and their applications in micro-mixers. Professor Wen, currently an AIAA Associate Fellow, serves as a member of, various key professional boards and bodies related to the Aerospace Engineering.
Research Group for Urban Big Data Computing and Wireless Networking
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Professor Jiannong Cao has a wide range of expertise in parallel and distributed computing, wireless networks and mobile computing, big data and cloud computing, pervasive computing, and fault tolerant computing. He has directed numerous research and development and, as a principal investigator, obtained over HK$40 million grants from funding agencies such as National Natural Science Foundation of China (NSFC), Ministry of Science and Technology of P. R. China (MOST), Hong Kong Research Grant Council (RGC), Hong Kong Innovation and Technology Commission (ITC), and industries like Huawei, IBM and Nokia. Professor Cao has won numerous prizes and awards, and is very active in professional organizations locally and internationally. He has co-authored 5 books in Mobile Computing, co-edited 9 books, and published over 500 papers in major international journals and conference proceedings. Professor Cao has served as the Chair of Technical Committee on Distributed Computing (TPDC), IEEE Computer Society from 2012 to 2014 and a vice chairman of CCF’s Technical Committee on Computer Architecture from 2004 to 2007. Professor Cao has served as an associate editor and a member of the editorial boards of many international journals, including IEEE Transactions on Parallel and Distributed Systems, IEEE Transactions on Cloud Computing, IEEE Transactions on Computers, IEEE Network, Elsevier’s Pervasive and Mobile Computing, Springer’s Peer-to-Peer Networking and Applications, and Wiley’s Wireless Communications and Mobile Computing. Professor Cao was the general chair of IEEE INFOCOM 2015 and is the general chair of SMARTCOMP 2017.

Research Group for Urban Navigation and Mobility
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Professor Ding has been carrying out research to develop methods and technologies, especially space geodetic technologies such as global navigation satellite systems (GNSS) and radar remote sensing based technologies for monitoring and studying ground and structural deformation, and geodynamic problems and geohazards such as earthquakes and landslides. He first proposed and developed some specialized GNSS technologies such as the multi-antenna GNSS monitoring system that has been widely used internationally in monitoring ground and structural deformations. Prof. Ding has developed various advanced data processing methods and algorithms for both GNSS and interferometric synthetic aperture radar (InSAR) data processing that help to make GNSS and InSAR measurements more accurate and reliable. Prof. Ding has published extensively in these areas of research.
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