

Overview of Research Activities of The University of Hong Kong 2013–14

1. Institutional Policy on Research

1. The University of Hong Kong (HKU) strives to attract and nurture outstanding scholars from around the world through excellence and innovation in teaching and learning, research and knowledge exchange, contributing to the advancement of society and the development of leaders through a global presence, regional significance and engagement with the rest of China.

2. HKU's research policy, flowing directly from this institutional vision, aims to strengthen its capabilities in both basic and applied research within a culture that strives for excellence and innovation in knowledge advancement and exchange, and enables our researchers to flourish. The University emphasises innovative, high-impact and multidisciplinary research, and believes that a fine research record enhances the quality of research postgraduate education. It recognises that it must be fully accountable for the effective management of the public and private resources it deploys towards its research aims, and welcomes the opportunity to act in partnership with the wider community to generate, disseminate and apply knowledge.

3. Five strategies have been developed by the University Research Committee (URC) to further cultivate a supportive, dynamic environment in which staff and students can excel in research at an international level and realise their full potential in advancing and transferring knowledge:

- (a) to develop strategic research areas and themes;
- (b) to support 'blue-sky' and curiosity-driven research;
- (c) to nurture next-generation scholars and researchers;
- (d) to encourage knowledge transfer to community and society; and
- (e) to enhance international and Mainland collaborations.

4. The University's Strategic Research Themes (SRTs) initiative, launched in 2004, places particular emphasis on strategic interdisciplinary research in selected fields for the valuable synergies it can produce. The third round of this initiative, with focussed support over a three-year period, was underway during the reporting period. For this cycle, 16 strategic research themes and 5 emerging strategic research themes have been identified, grouped under the 5 areas of *Community, Biomedicine, Environment, Frontier Technology* and *China*.

5. While strengthening its research focus in this way, the University is also investing in the human resources necessary to sustain a research culture dedicated to excellence. As reported previously, it has been aiming to recruit additional professoriate faculty members internationally through a recruitment plan; increase the proportion of full professors; and increase the number of postdoctoral fellows and research postgraduate students.

6. Within this broad strategic framework the University continues to encourage research excellence in a number of important specific areas. It continues to fund curiosity-

driven research with small project grants, and to incubate new research initiatives with seed-funding grants. It continues, through its RPg reform policies, to develop a culture of student-centred, performance-based, and shared-responsibility research.

7. The following institutional policy developments took place during the report period.

Strategic Research Areas and Themes

8. Through the University's strategic research areas and themes, prioritised support is given to collaborative, interdisciplinary research. In the current third cycle, 16 themes have been identified along with 5 emerging themes. The five broad areas of focus are Community, Biomedicine, Environment, Frontier Technology and China. New themes in this round include Neuroscience, with new emerging themes on Food; Law, Literature, Language; and Integrative Biology. A new publication on the themes—*Excelling Together: Strategic Research at The University of Hong Kong*—has been produced during the reporting year, along with an accompanying website that can be viewed at www.hku.hk/research/strategic-research.

Research Integrity

9. Promoting responsible academic conduct has been made a top priority of the research management at the University. While achieving excellence, HKU hopes to establish a culture of upholding research integrity among the university community.

10. Professor Frederick K.S. Leung has been appointed as the Director of Education and Development for Research Integrity since June 2011. His remit includes looking into areas covering RCR training and education for staff and students, as well as the latest developments in research and good practice elsewhere, while research ethics compliance will continue to be handled by the relevant ethical approval bodies, namely the Human Research Ethics Committee for Non-Clinical Faculties (HRECNCf), the Institutional Review Board of the University of Hong Kong/Hospital Authority Hong Kong West Cluster (HKU/HA HKW IRB, the "IRB"), and the Committee for the Use of Live Animals in Teaching and Research (CULATR).

11. A number of on-going and new initiatives have been undertaken during the past year to promote responsible conduct of research. Since March 2010, eleven Responsible Conduct of Research (RCR) seminars have been organised, two of which were held in the reporting year in October 2013 and May 2014. More than 940 academics at all grades, from Postdoctoral Fellows to Chair Professors, have attended these eleven RCR seminars. The RCR seminar has now become a regular event that is held twice yearly. Since July 2012, all new staff are required to attend an HKU RCR session/seminar within 12 months of assuming duty at the University to be eligible for internal research and conference support and research postgraduate student supervision.

12. In 2012–13, the Research Integrity Funding Scheme was established to encourage Faculties to tailor research integrity education and training programmes/activities for their members to promote their awareness of research integrity. In view of the positive response from the Faculties, funding proposals were invited again for 2013–14. A total of eight

proposals have been funded in the first two rounds.

13. The URC supported a delegation consisting of Faculty representatives, research postgraduate students and administrative staff to attend the 3rd World Conference on Research Integrity on May 5–8, 2013 in Montreal, Canada. Arising from the comments and suggestions received from the delegation in the joint report on the conference, Professor Leung and his advisory group is now considering whether some of the suggestions could be taken on board for implementation.

HKU–SPACE Research Fund

14. Through the HKU SPACE Research Fund—established since 2007–08 to support research activity at the University—HK\$2.5 million is made available every year to all newly appointed staff within the first twelve months of assuming duties to apply for a top-up grant of up to HK\$114,450 to support a Type B RPg place. All awards are made on condition that the top-up grant will be matched dollar-for-dollar by the applicant's Faculty/Department, and the associated Type B RPg quota place should be from the Faculty's main pool allocation for the current quota year.

2. Collaborative Research

15. Collaboration in research at a wide range of levels is highly valued by the University's management and by individual researchers. Internationalisation has been a key feature embedded in many aspects of the University's strategic development. HKU has positioned itself to be a globally competitive, regionally engaged university, and in the face of the challenges ahead, we very much value the enhancement of collaboration with our international and Mainland partners. In addition to joining forces with local institutions, the University is an active participant in Universitas 21 (U21), a consortium of leading universities around the world dedicated to the internationalisation of higher education. HKU is also a member of the Association of Pacific Rim Universities, a regional network of 42 world-class institutions.

16. HKU also collaborates with a number of leading institutions, laboratories, pharmaceutical companies, research institutes and government bodies, both overseas and in mainland China. The University currently has 5 Partner State Key Laboratories—Brain and Cognitive Sciences, Emerging Infectious Diseases, Liver Research, Synthetic Chemistry, and Pharmaceutical Biotechnology—and will continue to make good use of the prestigious status of Partner SKLs to reinforce our research collaborations with Mainland partners for greater impact. Partnership with industry is also an ongoing focus to promote the application of research results.

17. Another form of international partnership by the University to enhance research collaborations with other world-class higher education institutions is through Joint PhD Degree programmes. Currently, the University has signed agreements for joint PhDs with King's College London and Imperial College London, and for joint educational placements for PhD students with the University of Toronto. These initiatives offer students opportunities to benefit from shared research excellence in a wide range of disciplines between HKU and its partners and to acquire enriching international experience.

18. During the reporting year, new initiatives for international collaboration included the signing of a memorandum of understanding (MoU) by the HKU Faculty of Medicine with the London School of Hygiene & Tropical Medicine to further strengthen their collaborative research activities. This builds on longstanding collaboration in teaching and research between the two institutions, which was initiated many years ago, and it is hoped that scholars on each continent can collaborate on public health issues of global significance and contribute towards the advancement of medical science and medical education. HKU also has renewed its research partnership with the Institut Pasteur. The partnership was formed in 1999 with the creation of the HKU-Pasteur Research Centre. The HKU-Pasteur Research Pole will be a fully integrated laboratory in the Centre of Influenza Research and the School of Public Health under the agreement. Also in the reporting year, the University held a joint symposium with the University of Liverpool, the latest in a series of joint meetings held between the two institutions with the aim of strengthening their longstanding relationship and promoting research partnership between the two universities.

19. The University of Hong Kong Shenzhen Institute of Research and Innovation (HKU-SIRI, www.siri.hku.hk) continues to maintain HKU's research vitality on the Mainland. Since its inception in 2011, HKU-SIRI has attracted considerable funding at both local and national levels such as the National Basic Research program of China (973 Program) (國家重點基礎研究發展計劃–973 計劃), the National Natural Science Foundation of China (NSFC) (國家自然科學基金), and the Shenzhen Science and Technology Program (i.e. Basic Research Project, Peacock Program). For example, in the past reporting year, HKU-SIRI received total funding of RMB 5.45 million for the first two years for 3 tasks under 973, over RMB 14 million for 27 projects under NSFC and RMB 350,000 for 2 basic research projects under the Shenzhen Science and Technology Program.

20. The University of Hong Kong-Zhejiang Institute of Research and Innovation (HKU-ZIRI, www.ziri.hku.hk) was incorporated in 2012 and provides the University a unique opportunity to set up an R&D base in the Yangtze River Delta Region and to facilitate knowledge and technology transfer of the University on the Mainland. HKU is partnering with the Department of Science and Technology of Zhejiang Provincial People's Government, in collaboration with Hangzhou Municipal Government and Lin'an City Government. The progress of the first stage of construction work for HKU-ZIRI has been undertaken successfully, and the move into the building is scheduled for the end of 2014. A total of five research laboratories will be established to fulfil industry and societal needs in the area. Three of these—the Research Laboratory for Aerodynamics and Acoustics, the Research Laboratory for Nanofluids and Thermal Engineering, and the Research Laboratory for Physical Internet—have been established, and during the reporting year they have begun staff recruitment and relevant research works. The University is also planning to establish two additional laboratories, i.e. biochemistry and chemistry laboratories.

21. Large numbers of individual researchers undertook collaborative projects during the report period with researchers in the PRC or elsewhere in the world across a wide range of activities, including joint research projects, co-authoring of papers, teaching or lecturing, providing consultancy or peer review services, supervising research students, and serving as external examiners.

22. To help increase research competitiveness and international collaboration, HKU has in place a number of initiatives. The application rounds for these initiatives during the reporting period are detailed below.

(a) *Visiting Research Professors Scheme*

Since its inception in 2009, the Visiting Research Professors Scheme (VRPS) has attracted 43 leading scholars from around the world. In this reporting year, 10 nominations were received, and 5 awards were made to prominent professors from, inter alia, the University of Iowa, the University of Manchester, the Smithsonian Institute, the University of the Basque Country, and Cardiff University. The mid-term/final reports on VRP appointments received from Faculties demonstrated the VRPs' valuable contributions, particularly in enhancing the research profile and international collaborations of Faculties through co-authoring papers and collaborating in projects, giving feedback on research proposals, and strengthening/developing links between HKU and their host institutions.

To allow more comprehensive review of nominations submitted under the Distinguished Visiting Scholars Scheme (DVSS) and the VRPS, the application and selection cycle of the two schemes are now synchronised. In 2014, 5 distinguished scholars were selected under the DVSS Scheme.

(b) *King's/HKU Fellowships*

HKU and King's College London established reciprocal King's/HKU Fellowships to strengthen their partnership by enabling their academic staff members to visit the partner institution. In the reporting period, 5 HKU members visited King's. In the latest application round, 2 Fellowships were awarded to HKU staff who will visit King's within the academic year 2014–15.

(c) *HKU Overseas Fellowships*

To support academic staff members to visit overseas institutions over a period of one to two months for research collaborations, HKU established the Overseas Fellowship awards. In 2013–14, 6 HKU staff visited overseas universities—including the University of Michigan, the University of Southern California, the Gastrointestinal Unit of the Royal Marsden, the National Institute on Drug Abuse, National Institutes of Health, and Imperial College—while 5 awards were freshly given to support 5 HKU staff to visit overseas institutions within the 2014–15 academic year.

(d) *Doris Zimmern HKU-Cambridge Hughes Hall Fellowship*

To forge closer ties, and foster cultural exchange and academic excellence, between HKU and Hughes Hall, University of Cambridge, HKU offers co-funding alongside the Doris Zimmern Charitable Foundation to enable teaching and research staff of the University to spend a period of time at Hughes Hall, as visiting fellows, for research collaboration and other academic exchange. The cost of the accommodation and a pro-rata College

fee in respect of individual fellows is covered by the University. Since its inception in 2009, 38 HKU members have been awarded the Fellowships to reside at Hughes Hall for research collaboration and academic exchange, and 9 of them paid their visits within the academic year 2013–14

3. University–Industry Partnership

23. The commercialisation of its intellectual property through technology transfer is encouraged by HKU, as the practical application of technological advances benefits both the University and the community as a whole. The Technology Transfer Office (TTO), established in 2006, carries out technology transfer, legal, and liaison operations, while commercial operations come under Versitech, a wholly-owned subsidiary of HKU.

24. TTO continues to strengthen professional capabilities in technology transfer in support of the University’s mission of knowledge exchange. In the past reporting year, TTO has organised the following training courses and events:

(a) Entrepreneurship Academy

TTO re-run the Entrepreneurship Academy in 2013–14. An eight-week workshop series in Entrepreneurship was organised for research staff, RPg students and alumni of related postgraduate programmes of the University. The invited speakers were either seasoned practitioners or academics specialising in entrepreneurship. This year, postgraduate students who have completed the workshop will have their participations recognized in their transcripts. Of the over 100 registered participants, 22 attended all the eight sessions of the workshop, 19 of which were postgraduates. The sessions also provided plenty of networking opportunities for the speakers and participants.

(b) Seminar on “Intellectual Property Strategy: Helping Start-ups Get Funded and Beyond”

TTO invited Dr Jasmine Chambers, the Of Counsel in the Washington DC office of Wilson Sonsini Goodrich & Rosati, to give a seminar on IP Strategy for startup companies on December 11, 2013. Dr Chambers has expertise in both domestic and international intellectual property systems, laws, and policies, as well as two decades of experience in the US Patent and Trademark Office (USPTO) practice and procedures. She was the deputy administrator in the Office of Policy and External Affairs at the USPTO prior joining her current law firm. A total of 96 students and staff attended the seminar.

(c) InnoCarnival 2013

TTO coordinated the University’s participation in the InnoCarnival 2013, which was organised by the Innovation and Technology Commission and held from November 2–10, 2013 in the Hong Kong Science Park. HKU showcased 6 projects from the Faculties of Engineering, Medicine and Science.

25. During the reporting year a number of examples of successful university-industry

partnership took place. Versitech Ltd undertook a total of 17 contract research projects within 2013–14 with various industrial sectors. As of 2013–14, Versitech Ltd has licensed a cumulative total of 114 inventions and know-hows to industry, representing an overall commercialisation rate of 34.5%.

4. Knowledge Exchange

26. Knowledge exchange (KE) is the third core mission of the University alongside research and teaching and learning, and HKU is strongly committed to building KE into the University's culture. The HKU Strategic Development Plan 2009–14 explicitly recognises knowledge exchange as one of the three pillars underpinning all of the University's activities, and one of the University Research Committee's five strategies is "to encourage knowledge transfer to community and society". Since 2009, the University has put in place infrastructure to support KE, including a KE Office and counterpart units within each faculty. KE activities are reported to UGC annually. Some highlights from the 2013/14 reporting year include the following:

- (a) *Impact as the priority aim:* The key element underpinning HKU's KE strategy in the 2012–15 triennium is the emphasis on the communication and evaluation of impacts of the University's excellent research. Impact case histories (submitted to UGC as part of the annual KE report) illustrate the reach and significance of the University's research to various sectors of society. To enhance HKU's capabilities in the analysis and communication of the broad impacts of the University's research, during the reporting year 4 Arts Engaged Research Fellows of the University of Leeds were invited to conduct impact workshops to share their experience in preparing impact case studies. The benefits of these visit arrangements extended beyond HKU as the Fellows also visited other institutions to discuss research and KE collaborations.
- (b) *Embedding KE in the HKU culture:* KE has been embedded in the University's structures, processes, systems, calendar as well as regular activities. An important development in the reporting year is that KE has been fully encompassed in the performance review process for individual academic and academic-related staff. KE performance and plans are also included in the annual Faculty Development Plan exercise, alongside teaching and research, which are factored into the University's internal budget allocation mechanism. Awards under the annual KE Award Scheme, launched in 2011, were presented in March 2014 at an annual ceremony for excellence in teaching, research and KE.
- (c) *Making knowledge accessible:* In addition to KE newsletters and websites, the production of KE videos has been initiated to help communicate the impacts of HKU KE projects to the public. The first KE video is entitled "Hong Kong Seeks to Update Animal Welfare Laws to International Standards" (<http://www.youtube.com/user/hkukeoffice/videos>). More are planned, which will become complementary to the research at HKU videos. The HKU Scholars Hub (<http://hub.hku.hk/>) is the visible expertise directory of HKU and a unique one-stop online platform for searching our

experts. The view count of the HKU ResearcherPages in the Hub has increased from 1,057,210 in 2012/13 to 1,554,400 in 2013/14. Faculties and staff make continuous efforts to disseminate the latest research discoveries and expert views to the public through the media. According to the media impact study coordinated by the Communications and Public Affairs Office, there were 24,846 news items relating to HKU knowledge in 2013/14, which is a 20% increase over the number (20,744) in 2012/13.

- (d) *Broadening KE opportunities:* The University continues to make use of the UGC KT funding to run the Competitive Impact Project Funding Scheme in 2013/14. 64 proposals were received, of which 42 were supported. The KT funding was again used in the reporting year to run the Student KE Project Grant Scheme, under which 33 proposals were received, of which 28 were supported.

5. Undergraduate Research

27. The third round of the Undergraduate Research Fellowship Programme (URFP) was undertaken in September 2013. The URFP was launched in 2011 with the aim of enhancing the learning experience of undergraduate students and nurturing the next generation of researchers/scholars through providing opportunities for students to undertake research study under the guidance and supervision of academics who have a strong research track record and experience in training research postgraduate students. In the first two rounds of the exercise, 106 academically outstanding undergraduate students successfully completed the programme, 62 of whom were granted awards and successfully completed internships locally, in the Mainland or overseas. For the third round, 71 students were selected for enrolment in the URFP 2014–15, of which 23 were granted awards to undertake internships. These students are expected to complete their research study within the 2014–15 academic year.

6. Research Highlights

28. A number of research highlights in 2013–14 are listed below:

Theme-based Research Scheme (TRS)

29. The Theme-based Research Scheme (TRS) was introduced in 2010–11 to support themes of strategic importance to the long-term development of Hong Kong. In the fourth round of the scheme, the results of which were announced in July 2014, 4 successful projects were selected from 37 applications. HKU will participate in all 4 projects and is the co-ordinating institution of 3. The following 3 HKU-led projects received total funding of \$184.54M for a period of 5 years, representing 90% of the allocation in this round:

- (a) “Viral, Host and Environmental Determinants of Influenza Virus Transmission and Pathogenesis”, HK\$75.06M, Project Co-ordinator: Professor J.S.M. Peiris (School of Public Health);

- (b) “Genetics and Functional Genomics of Neural Crest Stem Cells and Associated Disease: Hirschsprung Disease”, HK\$62.36M, Project Co-ordinator: Professor P.K.H. Tam (Department of Surgery); and
- (c) “Sustainable Power Delivery Structures for High Renewables”, HK\$47.12M, Project Co-ordinator: Professor D.J. Hill (Department of Electrical and Electronic Engineering).

30. The RGC has awarded funding to a total of 18 projects in the 4 rounds of TRS. HKU is the co-ordinating institution of 9 awarded projects, which have received total funding of \$454 million, with HKU researchers also involved in a further 6 projects.

Areas of Excellence (AoE)

31. Since its inception in 1997, the Areas of Excellence (AoE) scheme has provided support for 18 projects over 6 funding rounds to nurture areas of international excellence through high-quality research and inter-institutional collaboration. Of these 18 AoE projects, HKU is the co-ordinating institution of 8 projects, representing total funding of \$605 million, and is also participating in a further 6 co-ordinated by other institutions. During the reporting year, the HKU-led AoE project “Centre for Marine Environmental Research and Innovative Technology” was completed.

2014–15 General Research Fund / Early Career Scheme (GRF/ECS) Exercise

32. In the 2014–15 General Research Fund (GRF) exercise, HKU again received the largest share of the funding amongst the institutions (now for seventeen of the last eighteen exercises). HKU Principal Investigators secured a quarter of the total number of projects supported and were awarded HK\$164.695 million out of HK\$591.841 million (excluding on-costs). HKU submitted 601 applications in this round, and 240 were approved, representing a success rate of 40%. As with last year, the University received the largest amount of funds for projects under the Biology and Medicine Panel.

33. RGC supported 154 projects in the latest funding round of the Early Career Scheme (ECS) (2014–15). HKU submitted 61 applications to this scheme, of which 31 were approved securing HK\$19.905 million in funding (excluding on-costs), which was the largest share of approved funding in this round

2013–14 Collaborative Research Fund (CRF) Exercise

34. HKU is the lead institution of 3 of the 14 projects funded in the 2013–14 round of the RGC’s Collaborative Research Fund (CRF), and is participating in a further 8 projects as a collaborating institution. The 3 projects for which HKU is the lead institution are as follows:

- (a) ‘Regulation of heterochromatin remodeling in DNA repair and aging’, HK\$6.9 million*, Project Coordinator: Professor Z. Zhou (Department of Biochemistry);
- (b) ‘Mechanism of potentiating HIV antigen-specific CD8⁺ T cells’, HK\$7.98 million*, Project Coordinator: Professor Z. Chen (Department of

Microbiology), in collaboration with CityU and CUHK; and

- (c) ‘Two-Dimensional Transition-Metal Dichalcogenides — from Materials, Physics to Devices’, HK\$8.52 million*, Project Coordinator: Professor M.H. Xie (Department of Physics), in collaboration with PolyU and HKUST.

* excluding on-costs

Humanities and Social Sciences Prestigious Fellowship Scheme (HSSPFS)

35. In the Humanities and Social Sciences Prestigious Fellowship Scheme, 3 of the 6 funded projects in the 2014–15 round were awarded to HKU. The 3 successful projects were awarded a total of HK\$1.81 million:

- (a) ‘Defining Fundamental Concepts: The Legal Personhood of Animals’, Principal Investigator: Professor C.M. Hutton (School of English);
- (b) ‘Towards a new paradigm of education evaluation: diagnosing educational reform as assessment of learning at multiple levels of the system’, Principal Investigator: Professor N.W.Y. Law (Faculty of Education); and
- (c) ‘Rejuvenating Chinese higher education: Juggling internationalization, institutional autonomy, and educational sovereignty’, Principal Investigator: Professor G.A. Postiglione (Faculty of Education).

NSFC/RGC Joint Research Scheme

36. In 2013–14, funding of HK\$23.01 million was awarded to 23 projects from 6 UGC-funded institutions through the National Natural Science Foundation of China/Research Grants Council (NSFC/RGC) Joint Research Scheme. HKU submitted 35 initial applications, of which 10 were shortlisted and 4 funded, receiving total funding of HK\$4.37 million:

- (a) “Key technology in time-reversal based optical scanning holography and its application on fluorescent biological specimens”, Professor E.Y.M. Lam (Department of Electrical and Electronic Engineering);
- (b) “Research problems on carving and tamper detection of fragmented multimedia evidence for forensic investigation”, Dr. S.M. Yiu (Department of Computer Science);
- (c) “Identifying critical transitions and gene regulatory networks controlling phases of chondrocyte differentiation in the growth plate”, Professor K.S.E. Cheah (Department of Biochemistry); and
- (d) “Study Role of PCNA-binding protein TRAP1 in Replicative Stress Responses and Tumor Suppression”, Dr. M.S.Y. Huen (Department of Anatomy).

ANR/RGC Joint Research Scheme

37. HKU received HK\$2.63 million for a project out of the 3 funded in the 2013-14 round of the French National Research Agency and the Research Grants Council Joint

Research Scheme (ANR/RGC). The project is titled “The gut microbiota-adipose tissue axis in the pathogenesis of obesity and its related metabolic disorders: molecular mechanism and clinical implications” and is being undertaken by Professor A. Xu of the Department of Medicine

SRFDP/RGC ERG Joint Research Scheme

38. In the 2013-14 round of the Specialized Research Fund for the Doctoral Program of Higher Education and RGC Earmarked Research Grants Joint Research Scheme (SRFDP/RGC ERG), HKU received a total of HK\$0.66 million for 2 awarded projects:

- (a) “In search for critical Inflammatory modulator regulated by MT1-MMP”, Professor Z. Zhou (Department of Biochemistry); and
- (b) “Magmatic conduit system of the Jinchuan Cu-Ni-(PGE) sulfide deposit (NW China) with implication for exploration”, Professor M.F. Zhou (Department of Earth Sciences).

National Natural Science Fund—National Natural Science Foundation of China (NSFC)

39. HKU-SIRI members are also eligible to apply for funding through the National Natural Science Fund of the National Natural Science Foundation of China (NSFC). In the reporting year, HKU-SIRI received total funding of over RMB14 million for 27 projects under NSFC, the results of which were announced in August 2013.

Innovation Technology Support Programme (ITSP)

40. HKU has had 156 projects approved since the introduction of the Innovation and Technology Fund’s Innovation Technology Support Programme (ITSP) in 1999 (up to the end of June 2014). This represents 20% of the 789 projects approved under ITSP. The total funding granted to the University for these projects is \$402.99 million.

Health and Medical Research Fund

41. The Health and Medical Research Fund (HMRF), created in December 2011, consolidates the former Health and Health Services Research Fund (HHSRF) and the Research Fund for the Control of Infectious Diseases (RFCID). In the 2012–13 HMRF funding round, HKU had a total of 101 projects approved, with funding of \$81.09 million. (Note: The results of the 2013–14 HMRF funding round were released in September 2014 and have hence not been included for this reporting period.)

Public Policy Research

42. During the reporting year, the University was awarded total funding of HK\$4.6m for nine projects under the Public Policy Research (PPR) funding scheme, which is now administered by the Central Policy Unit (CPU).

Croucher Foundation ASIs

43. Each year the Croucher Foundation sponsors a number of Advanced Study Institutes (ASIs) with the aim of enabling experts in a particular field to meet and conduct advanced tuition on a defined topic. Two ASIs, each with funding of HK\$600,000, were organised by HKU researchers during the report period:

- (a) December 15–17, 2013, Chemical Biology, by Professor D. Yang (Department of Chemistry); and
- (b) December 16–20, 2013, Integrative Approaches to Understanding Disorder of the Skeleton, by Professor D. Chan (Department of Biochemistry).

44. A grant of HK\$590,000 was awarded to the University in May 2014 for an ASI on “Advances in Nasopharyngeal Carcinoma Studies”, to be organised by Professor M.L. Lung (Department of Clinical Oncology) in November 2014.

Croucher Foundation Sponsorship of Conferences, Workshops and Symposia

45. The Croucher Foundation also provides sponsorship for international conferences and seminars in the fields of natural science, technology or medicine. Such events must be of direct benefit to Hong Kong, and preferably have a strong research emphasis. Four conferences, each with funding of HK\$100,000, were organised by HKU researchers during the report period:

- (a) November 24–27, 2013, 9th Pan Pacific Connective Tissue Societies Symposium – The extracellular matrix niche, by Professor D. Chan (Department of Biochemistry);
- (b) December 13–14, 2013, Frontiers in Biomedical Research, HKU 2013 – From Gene Hunting to Genomic Medicine: a Celebration with Lap-Chee Tsui and Friends, by Dr. W. Tu (Department of Paediatrics and Adolescent Medicine) and Professor K.S.E. Cheah (Department of Biochemistry);
- (c) March 28, 2014, Advances in Live Cell and Intravital Imaging in Biomedicine, by Professor G.S.W. Tsao (Department of Anatomy); and
- (d) June 16–18, 2014, International Food Safety Conference - From Experience to Perspectives by Dr. H.S. El-Nezami (School of Biological Sciences).

46. Sponsorship grants of HK\$100,000 each were also approved by the Croucher Foundation during the report period for the following events:

- (a) International Conference on Biodiversity, Ecology and Conservation of Marine Ecosystems 2015, by Professor K.M.Y. Leung (School of Biological Sciences), to be held on June 1–3, 2015; and
- (b) 5th Asian Conference on Coordination Chemistry, by Professor V.W.W. Yam (Department of Chemistry), to be held on July 12–16, 2015.

Croucher Summer Courses

47. To educate and inspire promising postgraduate students and early career researchers from Hong Kong and the wider region, funding is provided for summer courses in a particular field of natural sciences, technology and medicine. The Croucher Foundation provides successful applicants with a grant of HK\$600,000 per course for three courses to be held once every two years over a period of six years.

48. Led by Professor I.O.L. Ng (Department of Pathology) and co-directed by Professor T.W. Mak (University of Toronto), a summer course entitled “Cancer Biology”, was held on August 14–18, 2013. The second summer course is scheduled to be held in 2016.

49. In November 2013, the Croucher Foundation approved two new grants:

- (a) Performance-Aware Computer Programming with Application Accelerators, led by Dr. H.K.H. So (Department of Electrical and Electronic Engineering) and co-directed by Dr. Martin Herbordt (Boston University), with the first course held in July 28–August 1, 2014; and
- (b) Advances in Immunology in Health and Disease, led by Professor C.S. Lau (Department of Medicine) and co-directed by Professor T.W. Mak (University of Toronto), with the first course held in July 23–28, 2014.

CAS - Croucher Funding Scheme for Joint Laboratories

50. This funding scheme aims to encourage researchers in Hong Kong universities and the research institutes of the Chinese Academy of Sciences (CAS) to work together on highly specific scientific topics. The Croucher Foundation and the CAS supported the joint project on “Organic/Inorganic Soft Matter Based Green-energy Optoelectronics”, led by Dr. W.C.H. Choy (Department of Electrical and Electronic Engineering) and Dr. Jianhui Hou (Institute of Chemistry, CAS). The 3-year project has been awarded HK\$1,000,000.

Croucher Innovation Awards

51. The Croucher Foundation offers substantial support to a small number of exceptionally talented scientists at a formative stage in their careers, in order to enable them to pursue their own scientific, intellectual and professional inclinations. Dr. S.K.Y. Ma (Department of Anatomy) was awarded HK\$5,000,000 over a 5-year period for her research entitled “A multidisciplinary study on hepatic cancer stem cells”.

Start-up Allowance for Croucher Fellows

52. A start-up allowance is offered for recipients of the Croucher Fellowship for Postdoctoral Research upon their return to Hong Kong to take up tenure-track faculty positions in UGC-funded institutions. Dr. H.Y. Au Yeung (Department of Chemistry) and Dr. K.W. Kwok (Department of Mechanical Engineering) were each awarded

HK\$500,000 to be used over 5 years for their research.

HK Scholars Program

53. The HK Scholars Program is a cross-border initiative—introduced by the Society of Hong Kong Scholars and the Office of the National Administrative Committee of Postdoctoral Researchers under the Ministry of Human Resources and Social Security—that aim to nurture outstanding postdoctoral fellows (PDFs) from the Mainland in Hong Kong. In the fourth round of this initiative (the results of which were announced in August 2014, slightly out of the reporting period), 9 HKU researchers were selected to supervise PDFs for a period of 2 years.

External Academic Honours

54. The University has a proud record of academic recognition. HKU has been awarded more Croucher Foundation Senior Research Fellowships (42 out of a total of 99 fellowships awarded since 1997, including Senior Medical Research Fellowships) than any other local institution.

55. Over the reporting period, a number of important academic awards and honours have been bestowed on HKU researchers. These include the following examples:

- (a) Professor Y. Chan, Director of the Journalism and Media Studies Centre, received the 2013 Lifetime Achievement Award at the Asian-American Journalists Association's national convention in New York. This prize—awarded to an Asian American or Pacific Islander who has demonstrated courage and commitment to the principles of journalism over the course of a life's work—recognises her contributions to the media and society, as well as her efforts in developing professional journalism in Asia.
- (b) Professor K.S.E Cheah, together with other 51 outstanding scientists, was elected as a Fellow of the World Academy of Sciences (TWAS) at its 24th General Meeting. Her research focusses on the regulation and function of genes and mechanisms of disease with an emphasis on the skeletal system, human degenerative skeletal disorders and the inner ear. The elected Fellowship recognises the scientific excellence of her work and her long-standing contributions to the advancement of science.
- (c) Professor A.G.O. Yeh was named an Academician by the United Kingdom's Academy of Social Sciences. He was among 51 leading social scientists who were awarded with this prestigious honour in 2013. Aiming to promote social sciences in the UK for the benefit of the public, the Academy has over 900 Academicians from universities and the policy and practice communities, and 46 member learned societies, representing almost 90,000 social scientists.
- (d) Professor S. Kwok, Dean of Science and Chair Professor of Physics, received the Outstanding Achievement Award from his alma mater, the University of Minnesota. The award recognises his research contributions to

astrochemistry and stellar evolution, science education, the popularisation of science, and his service to the development of astronomical research in Asia.

- (e) Professor F.K.S Leung, Professor of the Division of Science, Mathematics and Computing in the Faculty of Education, was awarded the Hans Freudenthal Medal for 2013 by the International Commission on Mathematical Instruction. The medal, regarded as the highest international accolade in mathematics educations, recognises his long-standing contributions and groundbreaking research in comparative studies of mathematics education.
- (f) Professor L.C. Tsui, then President and Vice-Chancellor, was named the winner of the 2014 Henry G. Friesen International Prize in Health Research. The Prize, established by Friends of the Canadian Institutes of Health Research (FCIHR), in collaboration with the Canadian Academy of Health Sciences, recognises leaders of exceptional achievement in science and health policy of international stature.
- (g) The Liver Transplantation Team of the Li Ka Shing Faculty of Medicine, led by Professor C.M. Lo, was presented with the 2013 Higher Education Outstanding Scientific Research Output Awards (Science and Technology) by the Ministry of Education. The Team is the first in the world to demonstrate the mechanism of small-for-size liver graft injuries, and the first to report Hepatitis B adoptive immunity transferred from the donor to the patient after liver transplantation, providing a solid foundation for the treatment and prevention of tumour recurrence in the future.
- (h) Five HKU academics have been named among the world's top scientists whose work have been highly cited by fellow academics and are hence making a significant impact in ongoing research in their respective fields of study. The HKU academics featured in *The World's Most Influential Scientific Minds 2014*, compiled by Thomson Reuters, are (for Engineering) Professor J. Lam of the Department of Mechanical Engineering; (for Geosciences) Professor M. Sun and Professor G. Zhao, both of the Department of Earth Sciences; and (for Microbiology) Professor Y. Guan and Professor J.S.M. Peiris, both of School of Public Health.

Outstanding Researcher Award Scheme

56. The University gives recognition to the outstanding work of its researchers through the annual internal awards for research excellence. At a ceremony on March 26, 2014, the following awards, for research achievements during and prior to the report period, were presented:

(i) Outstanding Researcher Award

Professor L. Lu, Department of Pathology
Professor S. Shen, Department of Physics
Professor W.P. Wang, Department of Computer Science

(ii) *Outstanding Young Researcher Award*

Mr. T.K.H. Cheng, Department of Law
Dr. Z. Liu, Department of Earth Sciences
Dr. S.K.Y. Ma, Department of Anatomy
Dr. Y.C. Wu, Department of Electrical and Electronic Engineering
Dr. W. Yao, Department of Physics

(iii) *Outstanding Research Student Supervisor Award*

Professor H. Sun, Department of Chemistry

57. To reward the author (or team of authors) for a single outstanding item of research output (such as a publications, artistic production or patent), the HKU Research Output Prize has been included in the Outstanding Researcher Award Scheme since 2005. Individual Faculties select an output item for the prize, and they can determine the research output form that best represents their research achievement. Ten Research Output Prizes were awarded at the ceremony in March 2014 for the following research output items:

Faculty of Architecture: Shijia Village House Prototype: “House for all Seasons”, Project duration: April 2009 to March 2012, by John Lin

Faculty of Arts: Jean-Jacques Rousseau and botany: *the salutary science*, UK: Voltaire Foundation, University of Oxford, 2012, 436pp, by Alexandra Cook

Faculty of Business and Economics: 'Did Subjectivity Play a Role in CDO Credit Ratings?', *Journal of Finance*, Vol. 67, No. 4, August 2012, pp.1293-1328, by John M. Griffin and Dragon Yongjun Tang

Faculty of Dentistry: 'Purpurin Suppresses *Candida albicans* Biofilm Formation and Hyphal Development', *PLOS ONE*, 2012, Vol. 7, Issue 11, e50866, by Paul Wai-Kei Tsang, H.M.H.N. Bandara and Wing-Ping Fong

Faculty of Education: 'Is Something Better Than Nothing? An Evaluation of Early Childhood Programs in Cambodia', *Child Development*, Vol. 83, No. 3, May/June 2012, pp. 864-876, by Nirmala Rao, Jin Sun, Veronica Pearson, Emma Pearson, Hongyun Liu, Mark A. Constas and Patrice L. Engle

Faculty of Engineering: 'Dual Plasmonic Nanostructures for High Performance Inverted Organic Solar Cells', *Advanced Materials*, 2012, Vol. 24, pp. 3046-3052 (May 2012), by Xuanhua Li, Wallace C.H. Choy, Lijun Huo, Fengxian Xie, Wei E.I. Sha, Baofu Ding, Xia Guo, Yongfang Li, Jianhui Hou, Jingbi You and Yang Yang

Faculty of Law: 'Deference, expertise and information-gathering powers', *Legal Studies*, Vol. 33 No. 4, 2013, pp. 598-620 (Online publication date: October 25, 2012), by Cora Chan

Li Ka Shing Faculty of Medicine: 'Magnetically controlled growing rods for severe spinal curvature in young children: a prospective case series', *Lancet* 2012, Vol. 379, Issue 9830, pp.1967-1974 (May 26, 2012), by Kenneth Man-Chee

Cheung, Jason Pui-Yin Cheung, Dino Samartzis, Kin-Cheung Mak, Yat-Wa Wong, Wai-Yuen Cheung, Behrooz A Akbarnia and Keith Dip-Kei Luk

Faculty of Science: 'Latitudinal species diversity gradient of marine zooplankton for the last three million years', *Ecology Letters*, Vol. 15, No. 10, October 2012 pp. 1174-1179, by Moriaki Yasuhara, Gene Hunt, Harry J. Dowsett, Marci M. Robinson and Danielle K. Stoll

Faculty of Social Sciences: 'Cultural Meaning of Perceived Control: A Meta-Analysis of Locus of Control and Psychological Symptoms Across 18 Cultural Regions', *Psychological Bulletin*, Vol. 139, No. 1, Jan 2013, pp. 152-188. (E-publication date: May 28, 2012), by Cecilia Cheng, Shu-fai Cheung, Jasmine Hinman Chio and Man-pui Sally Chan

Major International Research Events

58. Various important international research conferences were organised by HKU during the 2013–14 reporting period. These include the following:

- (a) October 25–27, 2013—the 8th Asian Conference on Pharmacoepidemiology was jointly hosted by HKU and the International Society for Pharmacoepidemiology, the Pharmaceutical Society of Hong Kong and the Chinese Pharmaceutical Association. The theme was “Applying Pharmacoepidemiology to Improve Health Care in Asia”, and invited speakers came from Asia, Australia, Europe and North America.
- (b) November 14–15, 2013—the 20th Hong Kong International Cancer Congress, co-organised by the Li Ka Shing Faculty of Medicine and the Centre for Cancer Research, had the theme of “New Horizons in Cancer Care. Alongside local speakers from Hong Kong’s universities, hospitals and hospices, overseas speakers came from Europe, the United States, Asia and Australia.
- (c) December 4–6, 2013—the First International Conference on Teaching Chinese as a Foreign Language brought together nearly 100 academics and teaches of Chinese language from 15 countries/regions to discuss the current situation and cutting-edge developments of teaching Chinese as a foreign language. The event was organised by the Chinese Language Centre of the School of Chinese.
- (c) June 11–14, 2014—the International Conference on Grief and Bereavement (ICGB) in Contemporary Society was held in Asia for the first time, funded by a donation from The Hong Kong Jockey Club Charities Trust and organised by the Faculty of Social Sciences in collaboration with the HKSAR Social Welfare Department and ICGB. This renowned tri-annual international event brought together over 1,000 local and overseas scholars, leading healthcare professionals and experts.
- (d) June 16–18, 2014—the First International Conference on Food Safety: From Experience to Perspectives was organized by the School of Biological Sciences. International and national food safety experts were invited from Mainland China, the USA, Canada, Korea, Germany, and Singapore as

keynote or invited speakers, aiming to address many of the emerging issues and diverse aspects of food safety with special emphasis on global impacts.

Theme-based Research Scheme Public Symposia 2013

59. HKU was the co-ordinating institution for the first Theme-based Research Scheme (TRS) Public Symposia, held at the University on December 14, 2013. Eleven presentations (representing the projects funded in the first two TRS rounds) were given under the three TRS themes of ‘Promoting Good Health’, ‘Developing a Sustainable Environment’, and ‘Enhancing Hong Kong’s Strategic Position as a Regional and International Business Centre’. A poster session was also held. The public symposia are held to communicate and share the achievements of the TRS projects amongst the research community and other stakeholders. More than 200 participants took part in this first event of the series.

Published Research

60. HKU has an excellent record of published research, both in discipline-specific journals and in more high-profile publications such as *Science*, *Nature*, and *The Lancet*. The University has the highest number of refereed publications, both in absolute terms and expressed as a ratio of publications per staff member, of any UGC-funded institution. For 2012–13 (the latest available statistics; see the CDCF data mart website) HKU had 5,694 peer-reviewed refereed publications.

61. The University does particularly well in scientific publications. According to statistics published by Thomson Reuters, there were a total of 385,004 citations of 26,461 HKU papers in journals tracked by Thomson Reuters between January 2004 and June 2014. This was the highest number of citations of any UGC-funded institution. In 2013 the University had 3,822 publications in journals tracked by Thomson Reuters, again more than any other UGC-funded institution. Thomson Reuters also ranked 115 HKU professoriate staff among the world’s top 1% of scientists.

Patents

62. Since 1998, the University has filed 1391 patents in various parts of the world, mostly in the United States (640), the European Union (205) and Greater China (214 in China, including Hong Kong, and 23 in Taiwan). Within the same period 410 patents were granted, 41.4% of which were in the United States (170). During the 2013–14 academic year, HKU filed 94 patents, and 24 patents were granted and 8 patent applications were abandoned.

Agreements/Legal Documents

63. During 2013–14, HKU handled 493 technology/knowledge transfer related agreements/legal documents—such as licensing, consultancy and materials transfer agreements—with counter signing parties mostly in Hong Kong (171), the People’s Republic of China (126.5), North America (101.7) and the European Union (55.8).