



香港城市大學
City University
of Hong Kong

**Annual Report on
Knowledge Transfer for 2012-2013**

to

University Grants Committee



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1. Technology Licensing

In response to the new Initial Statement, the Knowledge Transfer Office (KTO) devised a new licensing strategic plan for this triennium called “IDEA”, an acronym for Intellectual Property and New Technology Scouting, Deepening Licensing Network, Empowerment of Technology Transfer and Advancement for Novelties. We are pleased to report that there are currently 39 active licensing agreements and six of them are newly signed licensing agreements during the reporting year. The total licensing income for this year is HK\$5.87m, exceeding the target income of HK\$5m as shown in the Initial Statement for 2012-13. The table below shows the details of the six new licensing deals executed in the reporting year. We have also signed two licensing agency agreements with two companies on the mainland to market our technologies to mainland companies.

Table 1 Profile of the licensees and licensed technologies

Technologies Licensed	Nature of Business of Licensee	Where the Licensee is Based
Coating	Drilling equipment	Hong Kong
Plasma Immersion Ion Implantation	Vacuum plating	Hong Kong
Power electronics	Solar power	Hong Kong
Power electronics	LED lighting	Hong Kong (subsidiary of a company in Huizhou, China)
Power electronics	Electronic	Hong Kong (headquarters in Singapore)
5 patents of assorted technologies	IP capitalist	International

2. Capacity Building in IP Management and Technology Transfer

2.1 IP Training Workshop

A full-day Intellectual Property Rights (IPR) Training Workshop for staff and students was held on 1 March 2013. It covered three topics: (1) Introduction of IPR protection; (2) Introduction of Patent Search Online Tools and Patent Search Techniques; and (3) Basics on Trademark and Copyright Protection. Participants rated the quality of the workshop as 86 over a score of 100. Our technology transfer officers also participated in a number of licensing training courses and conferences for professional development. Some examples include “Business of IP Asia Forum” hosted by the Hong Kong Trade Development Council (HKTDC) and “Patent Litigation in Europe and Asia – Today and Tomorrow” hosted by the Hong Kong Science and Technology Parks (HKSTP).

2.2 Technological Entrepreneurship Workshop

A full-day Technological Entrepreneurship Workshop for staff and students was held on 9 April 2013. The workshop covered several topics: (1) the intellectual property rights strategy, (2) successful entrepreneurship stories and lessons learnt, (3) technology commercialization, and (4) technological entrepreneurship in China. Participants rated the quality of the workshop as 81 over a score of 100.

2.3 Exchange with Overseas Institutions

To enhance our knowledge on the worldwide trends of IP licensing, KTO executives visited some overseas leading universities every year. Through the exchanges with their technology transfer offices, we learnt more about the design and implementation of good technology transfer and commercialization practices. In the year under review, we visited six universities in Australia and compared our practices with theirs. In general, we found they are more liberal in technology transfer.

2.4 Enhancements in Infrastructure and IP Management

a. KTO Website Revamp

The KTO website has undergone a major revamp, with enhancements made in the search engine for the *Patent*, *Professional Expertise* and *Technology for Licensing* databases.

b. Legal Documents Review

From the experience we gained in the last few years, we realized that some of our licensing related legal document templates required updating. Therefore we carried out a thorough review and made appropriate revisions to them. The documents include the Income Sharing Agreement, the Joint Ownership Agreement, and the Technology Licensing Agreement.

c. Audit Exercise by ICAC

The Corruption Prevention Department (CPD) of the Independent Commission Against Corruption conducted a review on our technology transfer and commercialization procedures to ensure adequate control measures are in place to prevent corruption and conflicts of interest. CPD made a number of recommendations to the University. We duly considered the recommendations and incorporated most of them in our processes. We also cross-checked our practices with the ICAC's publication "Partner for Excellence – A Corruption Prevention Guide for Tertiary Education Institutions" as a reference.

3. Prospecting of Patentable IP

3.1 Invention Disclosure and IP Excavation

The University encourages faculties to report their inventions through the invention disclosure process. However, not all faculties follow this practice and so some

valuable inventions are not known to us. To supplement this practice, KTO will proactively approach academic and research staff members on a regular basis to learn from them their latest research topics and deliverables. This way, we can discover more inventions from faculties than just leaving it to them to report.

3.2 Applied Research Funding Schemes

a. Applied Research Grant (ARG)

The University places strong emphasis on application-oriented research that brings true benefits to the community, and the Applied Research Grant (ARG) was launched in 2005-06 to promote applied research initiatives. ARG fosters university-industry links by supporting projects with potential for application or commercialization of resulting outputs. It also supports projects which would lead to ITF applications. In the year of 2012-2013, the University offered funding support for 16 ARG projects with the total amount of HK\$3.2m.

b. Innovation to Realization Funding (I2RF) Scheme

The University continues to support proof-of-concept and prototyping projects to bridge the gap between laboratory results and marketable technologies through the Innovation to Realization Funding (I2RF) Scheme. Five research projects in the areas of concrete structure, air pollution, network security, biotechnology and nano-coating were funded in the fourth and fifth rounds of I2RF application.

Of the 24 proof-of-concept projects approved in previous years, four invention disclosures were generated and filed for patent application. The research results of three projects were successfully licensed to six local and international companies. More prospective licensing deals are expected.

A forum to promote some of the research deliverables of I2RF projects on meat ingredients rapid-identification kits, ZigBee technologies, super elastic knee support and surface coating was held in June 2013. Recently the I2RF project “Development of a Rapid-identification Kit for Meat Ingredients in Processed Food” gained wide media coverage in newspapers and radio channels.

c. KT Funding Scheme for Non-technology Disciplines

The College of Liberal Arts and Social Sciences carried out the second round of project solicitation last year and the scheme was extended to other non-science and engineering disciplines, including the College of Business and School of Law. Under the leadership of the Dean, each college held an internal competition to prioritize the applications before submission to the Office of the Vice-President for Research and Technology. Four projects were approved in this year. They are:

- C.A.R.E. Home Cares Children and Adolescents at Risk Education

C.A.R.E. was a project funded by the Quality Education Fund a couple of years ago on pioneering work in school bullying. The project provided 132

therapeutic groups to 1,167 children and their parents in 77 participating primary and secondary schools and delivered 136 workshops to 5,883 school teachers. Up to 39,746 students and 6,246 parents were involved in the project. This KT project, an extension and promotion of Project C.A.R.E., aims at extending its social impact to the Greater China, and other countries in Asia and the West.

- Narrative Therapy in Action: Strength-based “Train the Trainer” in Practice

The project aims to train and collaborate with professional health and social workers, nurses and other paramedical professions in working with stroke survivors and the carers to co-construct and discover positive and appreciative perspective of life within the limits of disability through narrative therapy conversations.

- Portable Knowledge; Portable Teaching: Creating a “Case Study Library” for Pedagogical Sharing in Liberal Arts and Social Sciences (Phase II)

The project creates a case study library for students and practitioners of counselling and social work.

- Supply Chain Energy Efficiency Initiative: From Multinationals to State-owned Enterprises

Guangdong is one of the areas seriously affected by China’s aggressive energy and carbon intensity reduction programme. A number of multinational corporations have successfully implemented supply chain energy efficiency initiatives in China. The project aims to facilitate transfer of experience of supply chain energy efficiency from multinational corporations to Chinese state-owned enterprises and private companies of small and medium size.

d. Contract Research and Innovation and Technology Fund (ITF) Project

Contract research for industries and ITF projects are two good sources for licensing. Outputs from contract research projects can be licensed to the company which funds the project, and sponsors to ITF project usually take an interest in licensing the project deliverables. This year, we arranged for the licensing of the project deliverables of a contract research project related to cutting tool hardness enhancement to the project sponsor. We lined up the Federation of Hong Kong Watch Trades and Industries and 14 of its company members to sponsor the ITF project on zero defect coating technology for the watch industry. These companies are keen on licensing the research deliverables.

4. Marketing of IP

4.1 Direct Marketing

a. Personal Network

Relationship building forms an important part of the team's strategy to promote licensing. Therefore, we sent our technology transfer officers to numerous conferences and exhibitions to expand our networks.

b. Direct Sales

This year, we arranged meetings and visits for 168 corporations to assess how CityU technologies can meet their needs. This year 64 companies or 38% are from the mainland as compared to 18% of last year. We find face-to-face meetings very effective and they often led to some collaboration with industry in the form of research sponsorship, donation, student placement/internship and licensing.

c. Exhibitions

To extend our licensing activities to China and the overseas market, the team participated in a number of exhibitions, including some well-known national and international product shows. To showcase CityU's research outputs, a large-scale exhibition on innovations and technologies was organized in May 2013 on campus. The list of exhibitions participated is shown below:

- China Hi-Tech Fair in Shenzhen
- Shenzhen International Biotech Innovation Forum and Exhibition
- The International ICT Expo
- Hong Kong International Medical Devices and Supplies Fair
- International Conference and Exhibition of the Modernization of Chinese Medicine & Health Products
- Eco Expo Asia
- Hong Kong Electronics Fair (Autumn Edition)
- Inno Design Tech Expo
- InnoCarnival organized by the Innovation and Technology Commission
- Expanding Sphere of Innovation@CityU, organized by CityU

d. Forums

We organized three technology forums this year to stimulate exchanges between our faculties and industries.

- A Technology Transfer Forum (TTF) on the research deliverables of I2RF projects, including meat ingredients rapid-identification kits, ZigBee technologies, super elastic knee support and surface coating, was held in CityU. This forum was supported by the Shenzhen Venture Capital Association (深圳市創業投資同業公會).
- Two Emerging Technologies Forums (ETF) where we invited industrial and business executives to speak on the latest market trends and technologies were organized this year. The ETF on printed electronics technology was supported by the Hong Kong Electronic Industries Association (HKEIA) and Hong Kong Electronics & Technologies Association (HKETA). The ETF on air pollution monitoring and purifying technologies was held at the CityU

(Shenzhen) Research Institute Building in Shenzhen. Participants of the Shenzhen Forum comprised top level mainland and Hong Kong technology and management executives. Co-organizers of the event included the Shenzhen Technology Market Promotion Center 深圳市技術轉移促進中心, a unit under the Shenzhen Science & Technology Innovation Committee 深圳市科技創新委員會, Shenzhen Virtual University Park, and Hong Kong Trade Development Council (HKTDC). The event was also part of the HKTDC BIP (Business of Intellectual Property) Asia Seminar Series.

4.2 Web Marketing

Several databases are set up at the KTO's website and our partners' websites to allow interested parties to search for CityU technologies available for licensing.

a. Technologies for Licensing Database

Members of the industrial and business sectors can easily access the *Technologies for Licensing* database at the KTO website to search for marketable patents, technologies and know-how of the University that match their businesses. The database is frequently updated.

b. List of Patents

A *List of Patents*, written in laymen's terms, provides information about CityU patents and patent applications. The list is updated every quarter, and is available at the KTO website.

c. IP Listing

CityU's IP ready for licensing is listed or linked in local and international IP platforms including the website of Association of University Technology Managers (AUTM), IP Net developed by the University of Manchester Intellectual Property Limited, websites of global IP traders Tynax and Tech Transfer Online, Intellectual Property Portal of the HKTDC, and University IP Listing website of the HKSTP.

4.3 IP Agencies

a. Overseas Agent

Although priority is given to local companies, it was found that many of our research outputs could not be used in Hong Kong because there are no such industries in Hong Kong or the local companies may not have the necessary R&D resources and expertise to apply the technology to develop advanced products. Hence, we have to explore the markets abroad. We continue to employ the services of five well-known global IP management firms and technology trading exchange service providers as our agents. They have access to multinational companies and can broaden our IP licensing channels, helping us promote our technologies to the international markets.

b. Mainland Agent

To further extend our licensing channels in China, we have newly appointed two mainland institutions engaging in licensing and incubating businesses to provide licensing services for us. The two institutions are located in Shanghai and Zhejiang Province.

5. Outreach and Partnership

5.1 CityU Business and Industrial Club

Through the CityU Business and Industrial Club (CUBIC), we have forged close ties with senior business executives and industrialists. CUBIC regularly organises events (e.g. Technology Transfer Forums, Emerging Technologies Forums, Special Interest Group gatherings, company visits) for its members, and aligns industrialists and academics from CityU and other institutions to build platforms to advance technological development and promote cross-institution collaboration. Newsletters and flagship magazines of the University were also sent to the members regularly. This year, the membership of CUBIC has grown from 852 to 954, i.e. an annual increase rate of 12%. During the year CUBIC has organized three technology forums, three Special Interest Group gatherings and a visit to a leading manufacturer of high density flexible substrates. CUBIC also supported four external events as a supporting organization.

5.2 Collaborating Partners

We continued to develop collaboration and partnership with government bodies, strategic technology transfer players and industry supporting organizations to leverage on their strengths for mutual benefits. During the year, we worked with sixteen organizations in different forms of collaboration such as technology licensing, organization of training programme and events, consultancy, marketing of technology, committee, project assessment etc. They are:

- The Chinese Manufacturers' Association of Hong Kong(CMA)
- Higher Institution Library RFID Technology Application Alliance 高校圖書館 RFID 技術應用聯盟
- Hong Kong Critical Components Manufacturers Association (HKCCMA)
- Hong Kong Electronics and Technologies Association (HKETA)
- Hong Kong General Chamber of Commerce (HKGCC)
- The Hong Kong Institution of Engineers (HKIE)
- The Federation of Hong Kong Watch Trades and Industries Limited (HKWATCH)
- Overseas Chinese Affairs Office of Yangzhou Municipal People's Government 揚州市人民政府僑務辦公室
- Shenzhen Venture Capital Association 深圳市創業投資同業公會
 - The Association supported our TTF on I2RF projects.

- The Trade Association of Hong Kong Industrial and Business Sectors 香港工商界商會
- Canadian Chamber of Commerce (CCC)
- The Chinese Manufacturers' Association of Hong Kong (CMA)
- Federation of Hong Kong Industries (FHKI)
- Hong Kong Intellectual Property Exchange, Ltd. (HKIPX)
- Licensing Executives Society (LES)

6. IP Policy

To support and align with the University's new curricular direction of "Discover and Innovate", the University have critically reviewed and revised its IP policy. In general, inventions by students belong to the students themselves, except if significant university resources have been used. We also take this opportunity to refine and expand the IP policy for better clarity.

7. Mainland Research Development

As a result of the National 12th Five-Year Plan (2011-2015) of mainland China, research activities in Shenzhen continued to undergo a rapid expansion in the year under review. A record high of 57 new contract/collaborative research projects were obtained via the research platform in Shenzhen, the CityU Shenzhen Research Institute (CityUSRI), with a total funding of RMB23m. Of the new projects contracted, 22 were funded under the National Natural Science Foundation, one under the "973" Programme, and 20 under the Science Technology and Innovation Committee of the Shenzhen Municipal Government. Apart from the government funded research projects, the CityUSRI also provided research services for private enterprises. One notable example is a multi-million dollar project relating to structural construction monitoring and environmental quality control for a project constructing the highest building in mainland China.

	2012/13	2011/12	% change
Number of active research projects	90	41	+120%
Total grants of the active research projects	RMB48m	RMB29m	+66%

To support full-fledged development in research, a number of new research centres/laboratories were established under the CityUSRI during the year under review, bringing the number of research centres/laboratories to a total of 13.

1. Advanced Transportation Information Systems Research Centre
2. Biotechnology and Health Centre
3. Centre for Advanced Structure Materials

4. Centre for Robotics and Automation
5. Centre for System Informatics Engineering
6. Centre of Super-Diamond and Advanced Films
7. CityU HK-UESTC Joint Research Center on Optical Fiber Sensing and Communications
8. Futian-CityU Mangrove Research and Development Centre
9. Future Networking Centre
10. Information and Communication Technology Centre
11. Research Centre for Oceans and Human Health
12. Architecture and Civil Engineering Research Laboratory
13. Laboratory on Enterprise Process Innovation and Computing

Apart from the above, the State Key Laboratory in Marine Pollution of City University of Hong Kong partnered with the Shenzhen Virtual University Park and other leading national universities to form the **Shenzhen Marine Research and Technology Consortium** in January 2013. SMART is the first of its kind in Shenzhen which aims to promote innovative development in marine science on the mainland. Member institutes of SMART include Tsinghua University, Shenzhen Institutes of Advanced Technology of the Chinese Academy of Sciences, Xiamen University, Shenzhen University and Peking University.

To further enhance the University's development on the mainland, a second research institute will be established in the western part of China. The University partners with the Shuangliu Government in Chengdu, Sichuan, to establish the CityU Chengdu Research Institute later this year. This strategic development will further promote the University's profile and impact on the mainland, contribute to knowledge transfer, and enable us to recruit high-quality students for our academic programmes.

8. High-Level Consultancy Services

City University of Hong Kong is committed to contributing its expertise to support industry, commerce and the community. To achieve this goal, the University promotes high level consultancy and professional services, and encourages its faculty members to engage in such activities for the benefit of society and the University. In the year 2012-13, the University solicited 58 consultancy projects.

9. Technology Transfer through Spin-off Companies

With the wide acceptance and growing popularity of technology licensing, the University decided to use licensing as its main vehicle for technology transfer rather than setting up subsidiaries or associate companies with faculties under its wholly-owned company CityU Enterprises Limited (CityUE). As a result, no new companies have been formed during the past few years. In the year 2012-13, six active group companies remain under the aegis of CityUE.

10. Knowledge Transfer in Colleges/Schools

10.1 College of Science and Engineering and School of Energy and Environment

The College of Science and Engineering and School of Energy and Environment are active in knowledge transfer through contract and collaborative research, consultancy and other professional services, patenting, technology licensing, and business enterprising, etc.

To showcase the collective research outputs and state-of-the-art technologies of our faculty members, an Innovation Centre was established. Many local and overseas delegations from industry, secondary schools, educational organizations, professional bodies and government departments visited the Innovation Centre and were impressed by the exhibits there.

Faculty members maintain close links with industry and serve advisory and professional roles in trade and industrial organizations, government committees, and professional bodies, etc. With support from them, five training centres have been established, namely :

- a. CityU-Microchip Centre
- b. CityU-TI Educational Training Centre
- c. Acoustic and Audio Centre
- d. Compens Electronic Product Design Laboratory
- e. Cloud Computing Laboratory

These training centres not only provide advanced infrastructure to support research and industrial projects, but also help our faculties stay tuned with the pulse of industry.

Taping the opportunities provided by the National 12th Five-Year Plan and the research platform offered by CityUSRI, colleagues from the College and School actively solicited research funds and established joint research collaboration programmes with mainland institutes and enterprises.

10.2 School of Creative Media

The School of Creative Media (SCM) achieved notable outcomes in knowledge transfer in the areas of cultural heritage conservation and visualization. Since its opening in 2011, Run Run Shaw Creative Media Centre (CMC), in which SCM is permanently housed, has grown in reputation and recognition as an international hub for art events and exhibitions. The school put together numerous world-class conferences and exhibitions including NODEM 2012 Hong Kong, Microwave International New Media Arts Festival and Wikitopia, in which the public was exposed to latest developments in the media art field. The school's renowned project of heritage conservation, *Pure Land – Inside the Mogao Grottoes at Dunhuang*, re-opened to cater to the growing cultural and historical consciousness of the public. The Applied Laboratory for Interactive Visualization and Embodiment (ALiVE) has continued to advance research in visualization of arts and sciences.

To reward faculty's artistic achievements, SCM has revised its staff appraisal criteria to recognize artistic creations of faculty members, whose works were shown in regional and/or international exhibitions and/or in venues of global visibility and renown.

10.3 College of Business

The College of Business and its six member departments organized a variety of knowledge transfer activities over the year 2012-2013. These activities generated local and global impact on a range of business-related areas such as:

- social enterprise consultancy
- public lecture in Economics by the 2011 Nobel Prize in Economics Laureate
- implementation and utilization of the ScholarMate system for grant proposal submission in Mainland China, involving over 1000 universities and a million researchers
- government bureau and business community engagement (e.g. Hong Kong Examination Authority, Transportation Logistics Training Board, Hong Kong Education Bureau) and professional accreditation establishment.

Specific activities include collaborative research, consultancy projects (e.g. East West Hospitality Group Limited, GP Acoustics (HK) Limited, Human Health Limited, TSL Jewellery (H.K.) Ltd, among others), joint education programmes, professional development programmes, executive education programmes, internship programmes, overseas volunteer work programmes, and community services.

The college cultivated and continued to build on its student exchange and internship programmes in universities and companies both locally and internationally. In addition, the college and its member departments organized a number of public lectures, symposiums, speeches to the community audience and exhibitions of creative works as our KT endeavors. Faculty members also served as members of various governmental advisory bodies, editors and editorial board members of academic journals, committee of professional societies, and held influential positions in policy making and professional accreditation bodies.

10.4 College of Liberal Arts and Social Sciences

During the reporting period, the College of Liberal Arts and Social Sciences (CLASS) established a Knowledge Transfer Committee (KTC) to make recommendations on policies and strategies to promote and facilitate KT activities. The college offered the second round of the "Excellence in Knowledge Transfer Award 2013", and faculty members were encouraged to share their innovative KT projects / activities to cultivate more innovative ideas. The college KT website was enhanced to showcase outstanding knowledge transfer projects.

Apart from traditional KT activities, CLASS faculties were actively engaged in

public activities and services, and had been interviewed by the local and overseas media on a broad range of cultural and social issues. CLASS departments conducted 438 KT events such as public lectures, performance arts, exhibition of creative works and other means. Seventy-one staff members served on around 300 external advisory bodies, for Australian Research Council, Appeal Board Panel (Town Planning) of the Development Bureau, British Psychological Society, Equal Opportunities Commission, and the Hong Kong Housing Authority. They also participated in public exhibitions, took up editorial responsibilities, and delivered public lectures and speeches. Some members of CLASS were invited to media interviews hosted by BBC TV, CNN International, Singapore Radio, RTHK Radio, South China Morning Post, and Hong Kong Education Bureau English ETV programmes. Some staff members sat on the editorial boards of top journals and held important positions in international academic and education advisory bodies such as Quacquarelli Symonds (QS), as well as advisory bodies/committees for government and social organizations.

Regarding student-related KT activities, 680 student placements or internships were arranged in 2012-13, and it is estimated that around 723 places will be offered in the following year. CLASS students participated in study tours and internships at overseas corporations such as the New Media Department of the Israel Museum in Jerusalem, participating in the Dead Sea Scrolls Digital Project and serving as interpreters in the Symposium NODEM (Nordic Digital Excellence in Museums).

Other new KT initiatives worth mentioning here are the Japanese tea room project, the social entrepreneurship initiative “Project Flame”, Programme for at risk children, and TV documentaries on Tibetan and contemporary Chinese history, and a summer institute on teaching university writing.

10.5 School of Law

The School of Law has been providing postgraduate courses for Chinese judges since 2009, as a result of the agreements signed between the National Judges College and the Supreme People’s Court of China. By January 2014, 146 students are expected to have graduated from its Master of Laws programme. Seven rounds of Advanced Programme for Chinese Senior Judges were held from June 2009 to May 2013, and a total of 213 senior judges joined the programme. Since September 2011, the School has been offering the Doctor of Juridical Science (Chinese Judges) programme in collaboration with the National Judges College and the Supreme People’s Court of China. Of the 45 Chinese judges admitted, 43 were mainland senior judges. Apart from courses for Chinese judges, the School also organized workshops and conferences on issues including China’s legal system, human rights, arbitration, and shipping litigation. Students on placement and internship had opportunities to practice in law firms, banks, and public and policy making bodies. The School is the first law school in Hong Kong to incorporate legal placements into the credit-bearing curriculum of the LLB programme where students experience first-hand the operation of law offices, chambers, corporations, and courts. Students can do internship in mainland China and Hong Kong.

11. Knowledge Transfer by Students

11.1 Student consultancy projects

While the student consultancy project scheme allows students to put to use classroom knowledge, the participating organizations may also benefit from the fresh ideas brought by the students. For this reason, the Department of Marketing has been running the Marketing Company Consultancy Project for over 18 years and more than 30 mainland and Hong Kong companies benefitted from the programme. The Department of Accountancy runs a similar programme and partnering organizations include social enterprises such as Blue House and an NGO restaurant that helps mentally-challenged individuals.

11.2 Invest in CityU Students and Projects Scheme

Through the Discovery-enriched Curriculum (DEC), the University provides opportunities for early engagement of our students in research and development. Under the DEC, each student is given the opportunity to make an original discovery during his/her study at the University. A programme known as “Invest in CityU Students and Projects” has recently been rolled out to attract donations to support more research and development projects, thereby helping to train up a younger generation of scientists and researchers with broadened horizons.

11.3 Revised Intellectual Property Policy

To align with the above strategic development, the University’s IP policy has also been relaxed to allow students to own the IP created during their course of studies at the University.

11.4 Idea Incubator Scheme

The Idea Incubator Scheme is another new initiative built on the Discovery-enriched Curriculum to nurture new ideas and innovations from students and staff. Three rounds of applications have been called and a total of 18 projects funded, spanning a wide spectrum of areas such as social and environment, health, building safety, language learning, and career planning, etc.

11.5 Student Placement and Internship Schemes

The University places strong emphasis on student placement and internship. Shown below is a table listing the major placement and internship schemes that CityU is now running.

	Organiser	Name of programme	Duration and brief description
1	Co-operative Education Centre, College of Science and	Industrial Attachment Scheme (IAS)	Minimum nine weeks during summer holiday. It is a training programme for students

	Engineering		who have completed their second year of study. Students are supervised by mentors of the hosting companies and CityU teachers.
2	Same as above	Co-operative Education Scheme	Eight to 12 months full-time internship. Students take university courses on a day-release basis during internship. They are also guided by their industrial co-supervisors in their final-year projects.
3	Same as above	Overseas Internship Scheme (OIS)	Summer holiday. Operates on a similar model as of IAS. However, students under OIS conduct their placement overseas. Apart from real work experience, OIS students also gain the valuable opportunity to appreciate life in a different culture and develop a global perspective.
4	College of Business	Business Practice Internship	Six to 13 weeks plus a two-day skills training workshop. Students work full-time at multi-national corporations during internship.
5	Department of Accountancy	Professional Internship and Professional Attachment	The internship/attachment provides accounting-related working experience in local/overseas organizations for at least one month during which students would apply their knowledge and skills to solve real-life problems in a professional setting.
6	College of Liberal Arts and Social Sciences	Professional Internship offered by various departments of the College	Six to eight weeks usually during summer holiday. Students participate in internship at selected organisations in Hong Kong, China and overseas.
7	Department of Computer Science	IT Professional Placement	10 months. Students who have completed their second year of study spend one year working at an IT company.
8	Department of Electronic Engineering	Industrial Placement Scheme	The Scheme encompasses three parts namely group industrial projects, summer placement and Industrial Final Year Project.
9	School of Creative Media	Internship Programmes	Students work full-time in digital and traditional media, art, and cultural

			companies and organisations during summer term.
10	School of Law	Legal Placement for LLB and JD students	Students work a minimum of 160 contact hours for full-time or part-time legal placement within two semesters of an academic year.
11	Same as above	Internship for LLM students	Chinese judges in the LLM programme join a 10-day court internship to be supervised by Hong Kong judges.
12	School of Energy and Environment	Internship programme	Eight weeks during summer break. The programme aims at fostering students with a clear understanding and appreciation of energy and energy-related environmental issues encountered by the government, business, industry and the community at large.

The number of student placements and internships in 2012-13 was :

College/School	Number of student placements and internships
College of Business	486
College of Liberal Arts and Social Sciences	680
College of Science and Engineering	623
School of Creative Media	57
School of Energy and Environment	18
School of Law	99
Total	1963

12. Summary of Knowledge Transfer Performance Indicators

(Amounts are in Hong Kong dollars)

Performance Indicators	2011/12 (actual)		2012/13 (actual)		2012/13 (target)	2013/14 (target)
No. of patents filed in the year	53		¹ 70		46	50
No. of patents granted in the year	41		² 19		20	20
No. of active licenses during the reporting year (inclusive of newly granted ones)	Type	No.	Type	No.	45	36
	Exclusive	7/(6)	Exclusive	³ 9/(4)		
	Non-exclusive	8/(16)	Non-exclusive	³ 11/(15)		
	Total	15/(22)	Total	³ 20/(19)		
Income generated from intellectual property rights	\$18.95m		\$5.87m		\$5m	\$5.5m
Expenditure involved in generating income from intellectual property rights	\$5.5m		\$3.72m		\$4.5m	\$5m
No. of economically active spin-off companies	11		⁴ 10		11	10
Net income generated (or net loss arising) from spin-off companies	-\$5.63m		⁵ 0.04m		-\$1.29m	\$0.5m
No. of collaborative research projects and income thereby generated	15 / \$17.01m		20/\$19.77m		17/\$18m	22/\$21m
No. of contract research projects (other than those included in “collaborative researches” above), and income thereby generated	85 / \$18.99m		90/\$22.89m		90 / \$20m	92/\$24m
No. of consultancies, and income thereby generated	56 / \$14.06m		58/\$9.9m		55 / \$12m	62 / \$10m
No. of student contact hours in short courses or e-learning programmes specially tailored to meet business or CPD need	1.61m		1.2m		1.48m	1.23m
No. of equipment and facilities service agreements, and income thereby generated	376 / \$0.79m		224 / \$0.58m		390 / \$0.83m	223 / \$0.55m

¹ See breakdown by country and type in Appendix 7.

² See breakdown by country and type in Appendix 8.

³ Figures in brackets indicate the number of licenses of IP not protected by patents.

⁴ See breakdown by type in Appendix 9.

⁵ Financial data of some spin-off companies is not obtainable due to sensitivity of the information.

Performance Indicators	2011/12 (actual)	2012/13 (actual)	2012/13 (target)	2013/14 (target)
Income received from Continuing Professional Development (CPD) courses	\$195m	\$159.31m	\$192m	\$168m
No. of public lectures/symposiums/exhibitions and speeches to a community audience (seminars and workshops are included)	648	566	638	589
No. of performances and exhibitions of creative works by staff or students	225	95	215	124
No. of staff engaged as members of external advisory bodies including professional, industry, government, statutory or non-statutory bodies	169	211	183	230
No. of student placement/internship	1912	1963	2031	2060

College of Business

The College of Business (CB) and its 6 member departments have organized a variety of knowledge transfer (KT) activities over the past year, 2012-2013. These activities have generated and also demonstrated local as well as global impact on a range of business-related areas including social enterprise consultancy, public lecture in Economics by the 2011 Nobel Prize in Economics Laureate, implementation and utilization of the ScholarMate system for grant proposal submission in Mainland China involving over 1000 universities and a million researchers, government bureau and business community engagement (e.g. Hong Kong Examination Authority, Transportation Logistics Training Board, Hong Kong Education Bureau) and professional accreditation establishment. Specific activities include collaborative research, consultancy projects (e.g. East West Hospitality Group Limited, GP Acoustics (HK) Limited, Human Health Limited, TSL Jewellery (H.K.) Ltd, among others), joint education programmes, professional development programmes, executive education programmes, internship programmes, overseas volunteer work programmes, and community services. CB has cultivated and continue to build on its student exchange and internship programmes in Universities internationally and companies both locally and internationally. In addition, CB and its member departments have organized a number of public lectures, symposiums, speeches to the community audience and exhibitions of creative works as our KT endeavors. Faculty members are also engaged in numerous KT activities, served as members of various governmental advisory bodies, editors and editorial board members of academic journals, committee of professional societies, and hold influential positions in policy making and professional accreditation bodies working towards the social and economic advancement of Hong Kong.

CB will continue to encourage our faculty members and staff to work closely with governmental offices and departments, local and international business organizations, and professional associations to contribute their expertise to a variety of activities and services that meet the educational, business and professional needs of the Hong Kong society as well as international communities. With the existing infrastructure and scope of KT activities in CB and support from the University, KT capabilities are expected to continue to flourish.

Highlights: KT Activities in CB

- Contribution in high-level committees and advisory bodies of the Hong Kong Government
- Contribution in professional organizations, in areas such as accounting, banking, finance, economics, human resource management, marketing, statistics, transport logistics, operations management, e-commerce, information systems, etc.
- Organized local and international academic conferences/workshops/symposiums/press release conferences/breakfast seminars/research consortiums.
- Organized local and overseas internship programmes for students at College and Departmental levels.
- Executive education programmes for corporate clients in Hong Kong, Mainland China, and Russia.
- Business Analytics Unit (BAU) for conducting large scale business analytics research to facilitate effective and efficient company operations.

- Energy and Environmental Policy Research Unit (EEPRU) that conducts research on energy and environmental policy of the Hong Kong Government and Industry.
- Statistical Consulting Unit (SCU) that provides statistical consultations for university research, administration, and numerous external organizations that include various Government departments.
- Hong Kong Consumer Satisfaction Index (CityU-HKCSI) that tracks the business performance indicator of the satisfaction level of Hong Kong consumers towards the quality of products sold in Hong Kong. The results of the Index have been publicized in the local news media and cited by some major local firms.
- Consumer Confidence Index (CCI) that tracks consumer confidence level as an economic indicator on a quarterly basis. It enjoys wide media coverage in the various Greater China regions including the Mainland, Hong Kong, Taiwan and Macau.
- Transfer of new marketing knowledge to the business community through public lectures, executive education, consultancy projects, and professional conferences.

Outstanding KT activities

Example 1: Contribution as Members of External Advisory Bodies and Government Bureau

Faculties of the Department of Management Science contributed to various government bureau including the Transportation Logistics Training Board, Education Bureau and the HK Examination Authority. They also served as judging panels for competitions held by trade associations, such as the excellent services awards organized by HK Retail Management Association. Being member of the VTC steering committee of the Retail Trade Manpower Survey, colleagues of the Department of Management Science contributed knowledge and experience in conducting surveys, which added value to the committee.

Professor Richard Ho served as member of Quality Assurance Council of the University Grant Council, the Process Review Panel Securities & Futures Commission, the HKCAAVQ, the Energy Advisory Committee, Standing Committee on Disciplined Services Salaries and Conditions of Service, Convenor of the University Grants Committee “3+3+4” Group, Director of the JUPAS Board of Management at the Joint University Programmes Admission System (JUPAS) Office, and as Honorary Advisor of The Hong Kong Chamber of Small and Medium Business Limited.

Professor Jeong Bon Kim of Department of Accounting has served as a member of the Advisory Committee on Human Resources Development in the Financial Services Sector of the Hong Kong Government. Professor Phyllis Mo has served as member of the Auditing & Assurance Standards Committee of The Hong Kong Institute of Certified Public Accountants (HKICPA), as Specialist of the Validation Panel of the Hong Kong Council for Accreditation of Academic and Vocational Qualifications (HKCAAVQ), and Council Member of the Association of Women Accountants (Hong Kong) Ltd.

Professor Cheung Yin Wong served as member of Multinational Finance Society, Methods in International Finance Network, Honorary Member of CEANA, member of CESifo Munich, Academic Coordinator and Member of Program Steering Committee of the Applied International Monetary Economics Consortium, and as Member of the Council of Advisor to the Hong Kong Institute of Monetary Research.

Professor Leung Kwok served as member of International Advisory Panel of the Behavioral Sciences Institute of Singapore Management University, Advisory Committee of the Institute of Ethnology of Academia Sinica of Taiwan, President of the International Association for Cross-Cultural Psychology, members of the Executive Committees of the Asian Association of Social Psychology, Division of Industrial-Organizational Psychology of the Hong Kong Psychological Society, International Advisory Panel of the International Testing Commission 2012 Conference, member of selection panel of the President’s Award for Outstanding Performance in Research of Hong Kong Institute of Education, amongst others. He has also served on the editorial boards of numerous reputable journals.

Example 2: Breakfast Seminar Bridging Academic and Practitioners

The Department of Management organized a breakfast seminar for over a hundred industry practitioners, during which they disseminated relevant current research findings and professional knowledge in an accessible manner to the participants. The audience receptivity to this popular annual event is very encouraging. Members of the academic staff co-hosted the Hong Kong Macro Researcher Consortium as well as the Cross University Organizational Behavior/Human Resource Consortium with fellow-researchers in the region. These were suitable occasions for knowledge transfer and sharing in the disciplines that they have engaged in vigorously.

Example 3: Student Internships and Exchanges

CB, and the six member Departments have made numerous exchange and internship arrangements, both locally and internationally for students at the undergraduate and postgraduate levels. For instance, the Department of Management Science has internship opportunities for 50 students at multi-national enterprises and government organizations during the period. The opportunity was a valuable experience for applying learnt theories to practice.

Example 4: External Projects

The ScholarMate project led by Professor Jian Ma is currently used for research proposal submissions by the NSF China, involving over 1000 universities and a million researchers throughout Mainland China.

Example 5: Company Consultancy Projects

The Department of Marketing has students engaged in consultancy projects and internships involving various local, Chinese and overseas companies, such as East West Hospitality Group Limited, Zuji Limited, Human Heath Limited, Gimmick House Limited, GP Acoustics (HK) Limited, Radica Systems Limited, Suzuran Bed (HK) Limited, amongst others. They can apply the knowledge gained in their education to the resolution of real business problems. A salient case is the BBA Marketing Company Consultancy Project which has been conducted for over 18 years in Hong Kong and Mainland China. In these business investigations, students innovatively worked out practical business solutions for the various company's strategic problems. During the past few years, the Department of Marketing has offered business consulting services to over 30 companies in Hong Kong and Mainland China. Professors Zhou Nan, Professor Su Chenting and Professor Yang Zhilin from the Department of Marketing has also engaged in invited lectures and seminars in numerous Mainland universities such as Peking University (or Beijing University), Fudan University, Zhongshan University, Wuhan University, Sichuan University, Huazhong University of Science & Technology, Southwestern University of Economics & Finance, amongst numerous others.

The Department of Accountancy has students engaged in student consultancy projects in various social enterprises including Blue House, and an NGO restaurant that helps mentally-challenged individuals.

College of Liberal Arts and Social Sciences

The College of Liberal Arts and Social Sciences (CLASS) and its member departments have been actively engaged in a wide variety of knowledge transfer (KT) activities. Knowledge transfer has been and will continue to be a vital part of the College's and individual department's strategic plan. In 2012/13, CLASS departments conducted 438 KT events through public lectures, performance arts, exhibition of creative works and other means; and 71 staff served as members of around 300 external advisory bodies, for example Australian Research Council, Appeal Board Panel (Town Planning) of HKSAR Development Bureau, British Psychological Society, Equal Opportunities Commission and Hong Kong Housing Authority. 680 student placements/internships arranged in 2012/13 and it is estimated that around 723 student placements/internships will be offered in 2013/14.

Apart from traditional KT activities like contract research, licensing, consultancy and patent application, some academic members of CLASS have been engaged in media interviews including *BBC TV*, *CNN International*, *Singapore Radio*, *RTHK Radio*, *South China Morning Post* and *Hong Kong Education Bureau English ETV Programme*; public exhibition; recording lecture video for future course development; editorial responsibilities; delivering public lectures, symposia and speeches to the community. Some academic staff also sat on the editorial boards of top journals, for example *TESOL Quarterly*, *World Englishes*, *RELC Journal*, *Applied Linguistics Review*, *English Today*, *Journal of Fashion, Style and Popular Culture*, *Health, Risk and Society*, and *Writing and Pedagogy*. In addition, some hold important positions in international academic and education advisory bodies such as *Quacquarelli Symonds (QS)*.

CLASS students were also involved in KT through study tours, internship at overseas corporations like New Media Department of the Israel Museum in Jerusalem, on the Dead Sea Scrolls Digital Project and served as interpreters in the symposium NODEM (Nordic Digital Excellence in Museums). Some students were involved in community sharing via Facebook.

During the reporting period, CLASS established a Knowledge Transfer Committee (KTC) to make recommendations on policies and strategies to promote and facilitate KT activities. To further promote and facilitate KT activities across departments, the College offered the second round of the "Excellence in Knowledge Transfer Award 2013". All CLASS faculty members have been encouraged to share with each other their innovative KT projects/activities in order to cultivate more innovative ideas. The College has enhanced the College website by listing the awardees of the "Excellence in Knowledge Transfer Award 2012", to showcase the excellent Knowledge Transfer projects.

Some of the outstanding KT activities carried out by individual departments are highlighted below:

1. Produced two TV documentaries: *The Sixth Dalai Lama - A Poet from the Himalayas* (with the cutting-edge 3D technology) and *Our Fathers' Cultural Revolution* (11 episodes). The former has been shown through in-house 3D display facilities to over 1,000 audiences in 56 groups over the last 12 months. The latter has been broadcast to the worldwide audience through the Sun Satellite TV.
2. Established a Japanese tea room in collaboration with the Chado Urasen.ke Tankokai Hong Kong Association, which was the first Japanese tea room on a local university campus. An interview with CityU staff, segments on the tea room and a tea ceremony, was broadcast by NOW TV. Traditional tea gatherings and practices for educational and cultural purposes will be organized regularly at the tea room.

3. Promoted social entrepreneurship on CityU campus: Academic departments and administrative units joined forces to develop a core platform for education, research, student learning, and community engagement under the framework of social entrepreneurship and innovation.
4. Project C.A.R.E.: Children and Adolescents at Risk Education: This project has received three rounds of funding totaling \$11 million from the Quality Education Fund (QEF) from September 2006 to August 2011. 77 secondary and primary schools had participated in this project. Six sets of manuals, 11 booklets, and DVDs were published since its inception to reduce aggressive and bullying behavior in schools.
5. Hosted the first Summer Institute on Creativity and Discovery in Teaching University Writing: This event had a strong connection to the university's discovery-enriched curriculum, with its goal of enhancing creativity and discovery-oriented practice in the teaching of university writing. Participants included teachers of tertiary or university-level from local and regional universities, especially in China, recent MAIMEd/PhD graduates or candidates planning to go into tertiary teaching, and graduate teaching assistants teaching Gateway Education English courses in City University. The programme included lectures and workshops offered by a distinguished group of international writing and education specialists, including our own distinguished faculty members from the English Department.

College of Science and Engineering

Outstanding Knowledge Transfer Initiatives

1. Gene Therapy

Dr. Eddie Ma and his researchers from the Department of Biology and Chemistry have developed an innovative form of gene therapy that accelerates the regeneration of injured peripheral nerves. It can help alleviate the damage by enhancing the recovery process.

2. Food Testing

Dr. Michael Lam and his research team from the Department of Biology and Chemistry have found a design of chemodosimeters to detect the freshness of food. This quick, simple, convenient and low-cost method is very suitable for food safety monitoring. It has the potential of reducing food poisoning in the community. This chemodosimetric technology can also be applied to the early detection of illness.

A research team led by Prof. S H Cheng has developed the use of molecular biotechnology to rapidly identify different meat species in food products consisting of mixed meats. The new technology will have a positive and significant impact on public health. It can also provide better protection for consumers and people who have food allergies or special dietary needs.

3. Valorization of Biomass

Prof. István T. Horváth and his colleagues from the Department of Biology and Chemistry published a review on “Valorization of Biomass: Deriving More Value from Waste” in Science. The increasing cost and shrinking supply of oil make scientists to explore alternatives to making chemicals, fuels and solvents from biomass instead.

4. Establishments of Acoustic and Audio Centre, Complens Electronic Product Design Laboratory and Cloud Computing Laboratory

Apart from the two training centres (CityU-Microchip Centre and CityU-TI Educational Training Centre) which have been set-up in the Department of Electronic Engineering in the last academic year, three more training centres/ laboratories, namely Acoustic and Audio Centre, Complens Electronic Product Design Laboratory and Cloud Computing Laboratory, have been established with the full support from Gold Peak Industries Ltd., Complens Shares Ltd. and EMC2 respectively. With the provision of resources, both hardware and software, the centres/ laboratories on one hand facilitate the research and industrial project activities in the Department; on the other, the up-to-date technologies are inspiring to staff on developing courses that enhance the specialised technical knowledge of engineers - a role to play on providing continuing professional education.

School of Creative Media

Introduction

Transfer of knowledge (knowledge in a broad sense) is a strategic activity for the School of Creative Media (SCM). The strategic purpose is the engagement with the community (especially our key stakeholders) around important societal issues. The medium for knowledge transfer is the development and exhibition of artifacts that encourage the discourse, as well as publication and presentation of research that frame the discourse theoretically and practically.

In this reporting year, SCM has achieved notable outcomes in knowledge transfer through reaching out extensively to the public, driving effective initiatives within the School and gearing research towards excellence in cultural heritage conservation and visualization. Since its opening in October 2011, Run Run Shaw Creative Media Centre (CMC), in which the School is permanently housed, has grown in reputation and recognition as an international hub for art events and exhibitions. Either being an organizer or a supporting organization, SCM has put together numerous world-class conferences and exhibitions including NODEM 2012 Hong Kong, Microwave International New Media Arts Festival and Wikitopia, in which the public was exposed to latest developments in the media art field. The symposium NODEM 2012 Hong Kong, which was well-received far and wide, exemplified the School's knowledge transfer of global academic excellence in 2012 by bringing together leading theorists, practitioners and artists in conversation about the future of digital heritage, creative practices, design and emerging technologies. The exhibition *Tunnels Around the World*, run by Prof Maurice Benayoun of the School, also contributed to the School's internationalization and global knowledge transfer by providing a virtual platform for global partners to collaborate with each other.

SCM's renowned project of heritage conservation, *Pure Land – Inside the Mogao Grottoes at Dunhuang*, re-opened to cater to the growing cultural and historical consciousness of the public. *Pure Land* was not only showcased in CMC Summer Festival and Cyberport, Hong Kong on 20-21 April 2013, celebrating the opening of the first Mobility Experience Centre in Hong Kong, but also toured internationally to meet with foreigners' anticipation. *Pure Land* was selected as the centerpiece exhibit for the 25th anniversary celebrations of the Arthur M. Sackler Gallery on 1-9 December 2012. Making its debut in the US, *Pure Land* was described by Julian Raby, director of the Freer Sackler Galleries of Art, "the exhibition experience of the future" and by Huffington Post "incredible". The exhibition was also highly recognized by Keith Kennicott in the Washington Post as "... at last we have a virtual reality system that is worthy of inclusion in a museum devoted to the real stuff of art." (Nov 30, 2012). *Pure Land* continued to travel to make its Australian debut in the 19th International Symposium on Electronic Art (ISEA) on 7-16 June 2013.



To embrace this summer with artistic imagination, SCM has organized a series of exhibitions and lectures in the CMC Summer Festival 2013 from 21 May to 22 June at the Run Run Shaw Creative Media Centre for locals and tourists to enjoy, learn and appreciate art in a festive atmosphere. This exciting programme of media art from Hong Kong, China and abroad introduced 6 innovative and thought-provoking exhibitions, 3 talks and 1 performance by emerging and established artists of international renown. Crowned by Hong Kong Economic Journal in 2011 as a “mini West Kowloon Cultural District”, CMC has continued to serve the community by offering a creative nexus for public to appreciate art, meet with artists and exchange novelty.

By involving staff and students in home-grown exhibitions, performances, symposiums and conferences, SCM has continued to expand the knowledge transfer capacity of staff and students by keeping a vibrant ambience for idea exchange and collaboration. Within the School, faculty was encouraged to participate in University initiatives for knowledge creation and transfer (e.g., Idea Incubator scheme) and successful applicants were provided with resources (space). Laboratory for Ubiquitous Musical Expression (LUME), designed and implemented by Dr Samson Young, is considered an exceptional idea incubator project in which students has applied their classroom knowledge into tailor-made interactive musical artworks for nurturing children’s creativity. In addition, SCM has introduced the use of citation measurement system “Google Scholar” to keep track of faculty’s publication citations as a record of knowledge transfer. To recognize faculty’s achievements in artistic outputs, SCM has revised its PBPR criteria in recognition of artistic creations of faculty, whose works were shown in regional and/or international exhibitions and/or in venues of global visibility and recognition.

Regarding SCM’s research portfolio, Applied Laboratory for Interactive Visualization and Embodiment (ALiVE) has continued to advance research in visualization of arts and sciences, which integrates research from SCM, Centre for Innovation in Galleries, Libraries, Archives and Museums (iGLAM) and the LUXLAB. The research conducted there has been sought after internationally both for research expertise and applied outcomes. iGLAM, in particular, has offered intellectual and pragmatic resources for the delivery of cutting-edge products and services to this sector. It has also focused on pioneering digital tools for new types of cultural experiences responding to the worldwide intensification of demand for the interpretation of tangible and intangible heritage. The two exhibitions that SCM presented at Maritime Museum, *We are like vapours (Pacifying the South China Sea)* and *The Scroll Navigator*, were produced with this technique.

Summary of Knowledge Transfer Activities

Total figures of participants in knowledge transfer activities:

No. of Faculty Engaged in Knowledge Transfer Activities	19
No. of Posts of Faculty’s Participation in External Advisory Bodies	38
No. of Students Participating in Internship Programmes	57
No. of Companies Participating in Internship Programmes	38

Outstanding Knowledge Transfer Initiatives for 2012-13

- 1) *We are like vapours (Pacifying the South China Sea)* and *The Scroll Navigator* at Maritime Museum

The Applied Laboratory for Interactive Visualization and Embodiment (ALiVE) of SCM presented in February the energetic exhibition *We are like vapours (Pacifying the South China Sea)* and *The Scroll Navigator* in partnership with the Hong Kong Maritime Museum. *We are like vapours* is a 360-degree digital presentation that is based on The Pacifying the South China Sea Scroll painted

by an anonymous Qing painter almost two hundred years ago. The exhibition uses a series of vapours that have been digitally superposed over the original 18-meter scroll. As the vapours are dispersed, they reveal each of the twenty scenes of the scroll. And within each scene, selected portions are brought to life with animation. *The Scroll Navigator* explores another interactive modality for revealing the twenty narrative sequences of the same scroll. A reduced scale photograph of the entire scroll is presented in a five-metre long light-box. Above this, a motorized 4000-pixel resolution, 42" LCD monitor is mounted on a track, and it is able to move freely above the entire length of the photograph. Any particular section of the scroll that is seen on the monitor is simultaneously illuminated in that section of the light box, and the visitor uses a handheld iPad to control the movement of the LCD screen from one narrative zone to another.



Pacifying the South China Sea Pirates 360-degree scroll experience, Hong Kong Maritime Museum, Feb 2013.

The rare and highly detailed Qing Dynasty scroll is considered one of the “jewels” of the Hong Kong Maritime Museum. And in many ways it is also one of Hong Kong’s most important tangible cultural heritage artifacts. Painted in twenty different scenes with minute detail, it records the Imperial navy’s successful campaign to quell piracy along the Guangdong coast (an area that included what is now Hong Kong). Historians consider the event vital to the Qing Dynasty’s ability to exercise power in the early 19th century. In this exhibition, the digital scanning of the original scroll was provided by SCM’s LUXLAB at ultra-high resolutions with true-colour fidelity. LUXLAB, an initiative of ALiVE and Kyoto University, advances the conservation of Hong Kong history by scanning Flat & 3D objects up to 1200DPI using a variety of non-damaging light sources (three colour, multispectral; polarized) as well as developing iPad and screen-based interaction for zooming in.

This is one of the examples that SCM has contributed significantly to cultural heritage conservation and visualization through integrated and interdisciplinary research by partnership from the School, iGLAM and the LUXLAB with the use of pioneering digital tools for new types of sustainable

cultural experiences on tangible cultural heritage.

2) Run Run Shaw Creative Media Centre (CMC) Summer Festival

To capture the public quest for art and celebrate the festivity of summer, SCM launched the Run Run Shaw Creative Media Centre Summer Festival on 21 May 2013, with support from local and overseas partners including Goethe-Institut and ZKM | Center for Art and Media. The festival, which concluded the creative energies of the School for the reporting year, encompasses all sorts of technologically advanced activities including multimedia and interactive installation, “augmented reality” installation, digital photographic exhibition and sound performance. Being the sole organizer for most of the events, SCM took a leading and active role in promoting the exchange of different art practices, art forms, disciplines, minority cultures and traditional heritage amidst the events. While the festival progressed, it generated massive interest among public and media. Further to the overwhelming response received ever since, *Pure Land – Inside the Mogao Grottoes at Dunhuang* has advanced its technological presentation and its augmented reality edition was re-opened as a highlight in the Festival to meet the high demands from the general public. To further apply SCM’s pioneering 3D technology to preserve local heritage, Prof Tamas Waliczky’s interactive installation *Homes. Wheels* brought to the public the exact and detailed virtual copy of the interior of three Tai O fishermen’s family houses. The visitor could walk through, look around, and examine details of the interiors by using a simple computer interface. It is one of the signature pieces of knowledge transfer in the year and it advances the perpetuation of Tai O history. SCM’s participation in the Summer Festival showcased its achievements in application of advanced technology in various creative media through informed research and artistic creation.

3) Laboratory for Ubiquitous Musical Expression (LUME)

The project Laboratory for Ubiquitous Musical Expression (LUME) targets at the needs of individuals who are normatively barred from the act of music making. Academic staffs, undergraduate and graduate students from all backgrounds came together in a highly interdisciplinary, strong community-focused setting. Together they designed, prototyped and tested-drive tailored interfaces that would allow individuals with little to no previous musical training to create music intuitively. LUME manifested in three manners: (a) a year-long undergraduate credit-bearing course (“LUME Workshop”); (b) fully-funded undergraduate research groups; (c) a laptop orchestra (CLOrk) consisted of MFA and Ph.D students.

During the LUME Workshop, student participants were first exposed to basic electronics, Arduino programming, MIDI, principles of HCI and music interaction design. Then they were taken to a kindergarten to observe the coordination skills and musical abilities of young children aged from three to five to assess and comprehend their musical needs. Eventually students tailor-made musical instruments or prototypes for the children, in such a way that the knowledge they absorbed in class was transferred to community service through nurturing the children’s creativity. In addition, students were required to mount an open-to-public exhibition to showcase their designs. Industry experts such as musicians, product designers and early education teachers were invited to the University to provide assessment on the specific areas and enhance the exchange of ideas.

4) *Tunnels Around the World*

Tunnels Around the World (TAW) was a multiple sites interactive telematic installation linking, in Fall 2012, two international art biennial Media City Seoul (Museum of Art), and ZERO1 Biennial in San Jose California, USA, and School of Creative Media, Société des arts et technologies de Montréal (SAT) in Montreal, NYC and La Gaité Lyrique in Paris, France. TAW has been commissioned simultaneously by two biennials, giving five different countries the possibility to

dialogue through cultural heritage.

The spatial organization of content is managed by EGONOMY, a revolutionary AI agent (“Maïeutic Engine”) based on behaviour analysis. TAW was the first public presentation of eGonomy. The material to dig was made of images of arts, combining collections from the Hong Kong Museum of Art, the French Reunion des Musées Nationaux and archive images from each participating institution to telematically connect to live participants at the other end of the tunnel. The dynamic sound and music by Jean-Baptiste Barrière, Benayoun’s long-term collaborator, combined cultural mixing with individual physical and spiritual experience. Obstacles became breakthrough, walls opened cultural doors, and frontiers vanished to be virtually and quite physically in touch.



Different images of art were collected from museums and organizations to be incorporated into the tunnels.

TAW was conducive to exploring the cultural and emotional distance which, beyond the geographical distance, brought people together or drove them apart. The individual experience brought people closer to implicit desires that they were able to share with the others. Tunnels of sense grew around the world, like a cultural virus contaminating individualities and promoting difference. TAW was the feature work of Media City Seoul Website and the first artwork commented in San Francisco Chronicle article about ZERO1 Biennial. It will be presented during next International Symposium on Electronic Art (ISEA) conference and paper. This has proven the School’s contribution in global knowledge transfer and alignment with the University’s internationalization initiatives.



TAW allows people around the globe to communicate with each other through virtual tunnel space.

5) NODEM 2012 Hong Kong

Future Culture Hong Kong was part of the Nordic Digital Excellence in Museums (NODEM) conference series under the stewardship of the Interactive Institute of Sweden. The conference was hosted on 2-5 December 2012 by City University of Hong Kong's Advanced Institute for Cross-Disciplinary Studies in collaboration with the School of Creative Media and the Applied Laboratory for Interactive Visualization and Embodiment (ALiVE), iGLAM and supported by the College of Liberal Arts and Social Sciences, Department of Chinese Translation and Linguistics.

The theme of NODEM 2012 Hong Kong this year, *Future Culture: [In]tangible Heritage | Design | Cross Media*, brought together leading theorists, practitioners and artists in conversation about the future of digital heritage, creative practices, design and emerging technologies. Pioneers from diverse countries and cross-disciplinary fields focused on a range of issues in 32 keynote lectures and 19 discussion sessions to cover new forms of heritage interpretation and the future of new media at the forefront of museum design. Emphasis was placed on cutting edge research and practice from around the world, with a focus on tangible and intangible heritage in Asian contexts. The 4-day symposium attracted 362 participants spanning across 29 countries including museums practitioners throughout Hong Kong, China and Taiwan, researchers interested in forms of cultural mediation, students of cultural heritage and designers of new media.

One of the highlighted exhibits in the NODEM 2012 is *ECloud* which is an interactive spatial browser for the re-discovery of personal cultural data based on the crowdsourced World War 1 archives of Europeana. *ECloud* transforms linear browsing of web-based information into an embodied experience. Inside a custom-designed 9-metres wide and 3-metres high 3D projection environment, seminal datasets from the Europeana archive become a dynamic amalgamation of personal stories, associated image clouds and soundscape. Using the semantic relationships in existing metadata, *ECloud* takes advantage of Europeana APIs and high-resolution content existing in Europeana partner repositories. *ECloud* is a prototype designed to demonstrate for museums and cultural organizations a powerfully situated exhibition for engaging and inspiring visitors with the vast wealth of cultural data available in Europeana.

Before its display in the NODEM 2012, this work was toured to Europeana Plenary on 13-15 June

2012 and Europeana Awareness Day on 9 May 2012 in Belgium. The event was well-attended by luminaries included Neelie Kroes, Vice President of the EC in charge of the Digital Agenda at the High-Level Europeana Awareness Event “Culture for Digital Innovation”.

School of Energy and Environment

Introduction

The School of Energy and Environment (SEE) was founded in July 2009 with the mission to perform cutting-edge research and provide professional education in energy- and environment-related issues. The faculty staff in SEE is proactive in participating in knowledge transfer activities, like contract research, school consultancy, patent application, etc. which developed interactive exchanges with government, collaborators, related organizations, and society in general.

Summary of KT outcomes

Number of contract research: 3

Number of consultancy projects: 5

Number of patent applications: 3

Efforts to build up KT capabilities

1. SEE worked with Metro Daily and South China Morning Post by contributing articles to promote SEE and the respective research areas of faculty staff, and also inspire the general public to care and recognize the importance of energy and environment issues, so as to promote CityU's excellence in research and professional education, and care for the community and environment. Prof. Johnny CHAN, Dean of SEE, contributed monthly articles on different topics to the education column of Metro Daily while the faculty staff in SEE contributed periodic articles on a particular subject to the Young Post (South China Morning Post) as well.
2. Faculty staff in SEE have been interviewed by various media, such as HKTVB, BBC News, CNN News, and newspaper publishers on innovative research and technology. The interview reports help transfer innovative knowledge to the general public.

Outstanding knowledge transfer initiatives

With a view to broadening the knowledge of the younger generation in the fields of energy and environment, ever since 2010, SEE has delivered a number of talks on various topics to secondary school students in summer. Last year, the expert talks were conducted from 25 June 2012 to 6 July 2012, and around 1500 participants attended the talks. SEE has scheduled the expert talks from 21 June 2013 to 5 July 2013 for the current year.

School of Law

The School of Law introduced postgraduate courses for Chinese judges in 2009 as a result of the agreements signed between the National Judges College and the Supreme People's Court of China. By January 2014, there will be 146 graduates from its Master of Laws programme. Seven rounds of Advanced Programme for Chinese Senior Judges were held from June 2009 to May 2013, and a total of 213 senior judges joined the programme. Starting from September 2011, the School offers the Doctor of Juridical Science (Chinese Judges) programme in collaboration with the National Judges College and the Supreme People's Court of China. A total of 45 Chinese judges, out of which 43 are senior judges in the mainland China, have been admitted.

Number of Patents Filed in the Year 2012-2013 (with breakdown by country and type following the Common Data Collection Format (CDCF))

Country	Type	Number
The Mainland of China	B82	1
	C07	1
	C22	2
	F21	1
	G06	3
	G11	1
	H01	1
	H02	1
	H03	1
	H04	1
	H05	1
USA	A61	1
	B82	3
	C07	1
	C11	1
	C12	1
	C22	1
	G06	10
	G07	1
	G08	1
	G11	3
	H01	8
	H02	5
	H03	1
	H04	4
H05	4	
Europe	C23	1
	H03	2
International	H01	1
	H02	1
Malaysia	H03	1
Taiwan	H02	1
Others	H03	4
Total		70

Appendix 8

Number of Patents Granted in the Year 2012-2013 (with breakdown by country and type following the Common Data Collection Format (CDCF))

Country	Type	Number
Hong Kong	G06	1
The Mainland of China	C12	1
	E06	1
	H01	1
USA	A61	1
	C07	1
	D01	1
	F21	1
	G01	1
	G06	3
	G10	1
	H01	3
	H02	2
	H03	1
Total		19

Economically Active Spin-off Companies

Type	Name	Business	Year of formation
Software / Solution Integration	MaCaPS International Ltd	Focus on development of smart-card systems	1996
Software / Solution Integration	Etin Group: Etin City Limited (BVI) & TeleEye Holdings Ltd	Design and develop advanced signal processing technologies	2000
Innovation Technology Solutions	e.Energy Group: e.Energy Technology Ltd , e.Energy Lighting Ltd & e.Energy Double Tree Ltd	Design and develop environmental friendly energy saving devices	2000
Mobile Technology	Shenzhen Goldradio Communication Co Ltd	Design and develop high-performance and low-cost micro-wave and RF products for wireless communication	2002
Mechanical Engineering/ Automation	DynaCity Technology (HK) Ltd	Specialise in the development of a range of advanced motion controller and driver products	2003
Software / Solution Integration	Active & Independent Education Ltd	Design and develop educational software	2006
Innovation Technology Solutions	*ConvenientPower Ltd	ConvenientPower designs and develops innovative, environmentally protective wireless power technologies and applications offering new dimensions in freedom and convenience for users of mobile electronics.	2006
Mobile Technology	*Weecall Technology Ltd	Specialise in 3G mobile surveillance technology	2009
Bio-technology	*Vitargent (International) Biotechnology Limited	Specialise in biosensor technologies for providing testing services for food, pharmaceuticals, cosmetics and the aquatic environment	2010
Bio-technology	*Nelumbo Diagnostics Limited	Specialise in biomedical applications	2012

Remark : *No institutional ownership but using licensed IP only

Impact Case Histories

(A) Pure Land: Inside the Mogao Grottoes at Dunhuang and Pure Land: Augmented Reality Edition

1. Summary

This report covers two research projects that integrate high-resolution digital archeological datasets (photography and 3D architectural models) with immersive, interactive display systems. These analogous immersive installations, Pure Land: Inside the Mogao Grottoes at Dunhuang and Pure Land: Augmented Reality Edition (Pure Land AR) allow visitors to interact in different ways with a full-scale augmented digital facsimile of Cave 220 from the UNESCO World Heritage site, the Mogao Grottoes, Gansu Province, northwestern China.

These peerless treasuries of paintings and sculptures at Dunhuang are extremely vulnerable. Comprehensive digitization has become a primary method of preservation at the site. The digital facsimiles of this cultural paragon can be transformed, providing formative personal experiences for museum visitors. The Pure Land projects contribute to new strategies for rendering cultural content and heritage landscapes. Interpreting these installations through the lens of phenomenology and panoramic immersion helps situate them at the forefront of virtual heritage today.

Pure Land: Inside the Mogao Grottoes at Dunhuang was installed in November 2012 for the 25-year anniversary of the Freer-Sackler Gallery of Asian Art at the Smithsonian Institution. See Smithsonian press release: “New Technology Resurrects Ancient Chinese Cave at Smithsonian's Sackler Gallery: ‘Pure Land’ Digital Installation Brings Buddhist Treasures to Washington, D.C.” Nov. 26, 2012. Accessed at <http://www.asia.si.edu/press/2012/sackler-25-digital-cave-release.asp>.

In a review in the Washington Post of the show’s highlights and the shift that this work represents, Philip Kennicott wrote:

A decade or more of efforts to use virtual reality to reproduce aesthetic experiences have [sic] generally led to unsatisfying, cumbersome and distracting technologies. The transient buzz of interactivity overwhelms the actual content or educational value. But the “Pure Land” cave is different. . . . [I]t points the way forward, demonstrating how the immersion environment can be used to let visitors actively explore and understand complicated cultural objects. . . . [A]t last we have a virtual reality system that is worthy of inclusion in a museum devoted to the real stuff of art (2012).

Pure Land: Inside the Mogao Grottoes at Dunhuang was also installed at the Hong Kong Book Fair, the most widely attended event in the Hong Kong Calendar. Over 10,000 people were able to experience this groundbreaking research work during the four days of the Fair. The exhibit was widely reported in many newspapers and TV media in Hong Kong

The Applied Laboratory for Interactive Visualization and Embodiment (ALiVE) has continued to advance research in visualization of arts and sciences, which integrates research from the School of Creative Media (SCM) and the Centre for Innovation in Galleries, Libraries, Archives and Museums (iGLAM) at CityU. The research conducted there has been sought after internationally both for research expertise and applied outcomes. iGLAM, in particular, has offered intellectual and pragmatic resources for the delivery of cutting-edge products and services to this sector. It has also focused on pioneering digital tools for new types of cultural

experiences responding to the worldwide intensification of demand for the interpretation of tangible and intangible heritage. The two exhibitions that SCM presented at Maritime Museum, We are like vapours (Pacifying the South China Sea) and The Scroll Navigator, were also produced through these research initiatives. LUXLAB, an optical scanning laboratory with Kyoto University has also recently been established. It is the first of its kind in Hong Kong offering services and research to the museums and heritage communities including conservators as well as artists and gallery owners.

See Pure Land: Inside the Mogao Grottoes at Dunhuang, accessed at <http://alive.scm.cityu.edu.hk/projects/alive/pure-land-inside-the-mogao-grottoes-at-dunhuang-2012/>

Pure Land: Augmented Reality Edition, accessed at <http://alive.scm.cityu.edu.hk/projects/alive/pure-land-ii-2012/>.

2. Underpinning research

The Pure Land projects are developed by 30 experts from various fields using more than 7000 high-resolution photos of the north wall of Cave 220 in Dunhuang, advanced virtual reality technology, and digital audio and video effects. It makes advances in augmented reality applications through Pure AR Edition.

3. References to the research

- Kenderdine, S. 2013, “Pure Land”: Inhabiting the Mogao Caves at Dunhuang’, Curator: The Museum Journal, 56/2, April 2012, pp. 199-118. Appendix A
 Kenderdine, S. 2013, “Preservation and Interpretation: Digital Representations of the Mogao Caves at Dunhuang”, Orientations, Volume 44 – Number 4, pp. 84-89.
 Chan, Leith, Kenderdine, S. and Shaw, J. 2013, “Spatial user interface for experiencing Mogao caves”, Proceeding SUI '13, 1st symposium on Spatial user interaction, ACM New York, NY, USA, pp. 21-24.

A full technical report on both projects is currently under review for the ACM Journal of Computing and Cultural Heritage. Kenderdine, S., Chan, L. Shaw, J. 2013 “Pure Land: Futures For Embodied Museography”, ACM JOCCH.

4. Corroboration, of impact or benefit

CMC visitors	2779 (1st July 2012-30th June 2013)
ALiVE visitors	796 (1st July 2012-30th June 2013)
Book Fair visitors	10,680 (17-21 July)
Smithsonian visitors	12,600 (1-9th December 2012)

Total tours 919
 236 (Book Fair)
 420 (Smithsonian)
 170 (CMC, 1st July 2012-30th June 2013)
 93 (ALiVE, 1st July 2012-30th June 2013)

Newspaper articles	71
Magazine articles	17
On-line articles	59

Social media 13500 (facebook) 11400 (twitter)
TV broadcasts 19

Awards

Dr Kenderdine will receive the Tartessos Prize 2013 <http://www.arqueologiavirtual.com/arqueo/> for contributions to virtual archaeology worldwide and the Pure Land projects are recognized internationally as groundbreaking in the field. The prize will be awarded at Digital Heritage 2013, where Pure Land AR has been selected and will be installed at a new museum complex and cultural precinct www.digitalheritage2013.org. It will have a profound impact on the cultural heritage and new technologies community as the largest ever conference in this domain of research.

Training

CityU undertook one week of training for Dunhuang Academy staff in the optimization of 3D laser scan models and texturing as part of the future expansion of the Pure Land projects. Five caves are currently being added to the system.

5. References to the corroboration of impact or benefit.

Some notable examples are:

Phillip, Kennicott, Washington Post 30/11/2012,
http://www.washingtonpost.com/entertainment/museums/pure-land-tour-for-visitors-virtually-exploring-buddhist-cave-its-pure-fun/2012/11/29/3d30c13c-3a62-11e2-8a97-363b0f9a0ab3_story.html

Melinda Liu Dec 17, 2012 “Virtual Tourism: China’s Dunhuang Buddhist Caves Go Digital”
Newsweek,
<<http://www.thedailybeast.com/newsweek/2012/12/16/virtual-tourism-china-s-dunhuang-buddhist-caves-go-digital.html>>.

Heta Shah, 2013, “Perfect Copy” Silk Road (Dragon Air Magazine), August 2013 issue
pp.31-35

(B) Control Circuit for LED Street Lamp

1. Summary

LED technology has been promoted as a promising lighting technology to replace the energy-inefficient incandescent lamps and mercury-based linear and compact fluorescent lamps. It is obvious and clear that the street light market is under transformation and on the transition path from traditional lighting method to LED for energy saving. However, the transition of the LED street lamp market was not as smooth as most people thought. While the LED itself could last for more than 10 years, a large number of LED street lamps were reported failures in the electronic control circuit after two to three years of use. It was found that the electrolytic capacitors used in the electronics control circuit (LED driver) contributed to most of the early failures of the LED street lighting systems because electrolytic capacitor typically has only a life time of around 15,000 hours (or 1.7 years). The cost to replace the defective LED driver in a street lamp is found to be huge and for this reason, the transition from conventional street lamp to LED street lamp is hampered. Recently CityU developed a LED driver circuit that does not require any electrolytic capacitor. The circuit only uses passive and robust electrical components which feature long lifetime, low maintenance cost, robustness against extreme temperature variations and good power factor. The technology is welcomed by the street lighting industry in the world. A company with major shareholding from Taiwan licensed the invention exclusively from CityU and is developing a new family of LED street lamp for the world market. The first product family is now at product development stage and is expected to be launched in the market within one to two years.

2. Underpinning research

This invention totally eliminates electrolytic capacitors that are commonly used in the control circuit for lamps. In general, electrolytic capacitors are used in electronic control circuit for lighting systems because they are made with large capacitance in the order of hundreds and even thousands of micro-Farads, whereas other more reliable and long-lasting capacitors such as ceramic, polypropylene and metalized plastic film capacitors have only capacitance in the order of several tens of micro-Farads. Large capacitance electrolytic capacitors are usually used to provide a stable dc link voltage such that the ballast circuit can provide stable power (with reduced power variation) for the load. The novelty of the invention is in the successful reduction of capacitance of the capacitors in the control circuit so that capacitors other than electrolytic type can be used. With electrolytic capacitors eliminated in the control circuit, the whole lighting system will become more reliable and can last longer. The invention also improves the input power factor. There is an international standard governing the input power factor. The invented circuit generates a smooth input current that reduces the current distortion factor and thus improves the input power factor.

3. Reference to the research

Several patent applications under the title of “Apparatus and Methods of Operation of Passive and Active LED Lighting Equipment” have been filed in a number of countries.

4. Corroboration, of impact or benefit

The invention developed by CityU has many advantages. Without the electrolytic capacitors, the LED street lights could have longer lifetime and can last over 10 years. While existing LED drivers can only last for around three years typically, frequent repair works are unavoidable. Consequently the maintenance cost for street lamp is high especially for highway street lamps. Other than the cost of the electronic components, there will be significant labor cost involved. Maintenance staff are required to go to the site to carry out the

repair work which is time consuming and costly. According to a market study report for LED street lights (Lightstrade.com Feb 2012), there are about 2.5 million sets of LED street light in 2009 and 4.5 million sets of LED street light in 2010 in the world. Pike Research predicted that shipment rates for LED street light will go above and beyond 17 million sets of street light, and the annual revenue of the LED street lighting market will surpass US\$2 billion by 2020. If the market forecast is correct, there will be significant maintenance cost saving in the near future if CityU's technology is adopted in the LED street light systems. Another impact to the world on this invention is that, LED street light drivers are developed with passive and robust electrical components such as inductor and diode circuits, thus they are more environmental friendly than other electronics drivers that are using active components which might contain toxic substances.

5. References to the corroboration of impact or benefit

It is observed recently that many semiconductor companies have been attempting to develop similar technologies to eliminate electrolytic capacitors in their LED drivers for extending lifetime of the LED lighting systems. Unlike CityU's invention which provides driver solution to the high power LED street lighting systems (more than 50 watts in general) with few passive components only, most of their LED driver products are developed with active components and can be used for low power LED lighting systems only. The company which licensed CityU's invention is actively applying for patent applications in many countries to ensure the IP rights are protected in more jurisdictions (e.g. USA, China, Taiwan, Europe, Australia, New Zealand, South Africa, Argentina, Venezuela, Pakistan, Malaysia, Bahrain, Kuwait, Qatar, Oman, Saudi Arabia, United Arab Emirates, etc.). The licensed products are now at product development stage. It is expected that the invention will bring significant income to the licensee in the future. Last but not the least, the inventor, who developed the technology, received the IEEE Power Electronics Transactions Prize Paper Award for his research in LED control circuits and drivers.