Applied research plays a key role at CityU, but graduate students may not be fully aware of its value both in terms of their own development and the wide ranging benefits to society. Through the sharing of real-life success stories and experiences and discussing relevant issues, this forum on 30 March 2007 aimed to provide an important opportunity to gain insights into the world of applied research, including how to develop research outcomes to build a successful career.

In his opening address, Prof Roderick Wong, Vice-President (Research) and Dean of Graduate Studies, said “the line between basic and applied research is very blurred”. He recounted a time earlier in his academic career when a large US company became aware of the basic research he was doing in Canada, and invited him to undertake applied research for them as a consultant to solve a particular problem they were facing in their industrial setting.

“I’m really glad to see so many students interested in applied research,” Dr Andy Chun said as he welcomed the audience in his role as facilitator of the forum. He went on to introduce fellow panel members Prof Jian Ma, Prof Benjamin T’ou, and Mr Kelvin Lam, all of whom, like Dr Chun, have a wealth of experience in applied research. Each gave a short presentation to share their experience and initiate discussion.

Contributing to Society
Prof Ma identified applied research as having “high usability and high impact”. He was inspired in the 1990s by a retiring professor in China who encouraged him to do something useful. “I also thought if you can contribute to society, then this really is a reward as well.”

Prof Ma received a grant from the Innovation and Technology Fund in 1996 for his work on research administration through the Internet, at a time when widespread Internet use was just emerging. He stressed that his work has not been solely implementation, rather the underlying research and experimentation has enabled his team to maintain a leading role in this area. He has witnessed the impact of the work, such as his software being used by around 100,000 people a year, income being generated through spin-off companies, and PhD students involved in the projects successfully completing their studies and finding good positions.

Demonstrating Relevance
In his presentation, Prof Benjamin T’ou outlined how a body of work could have both basic and applied research functions. Over the past 10 years or so, he and his team have been working on a project on dynamically monitoring the characteristic use of the Chinese language in different Chinese communities. He demonstrated how this body of knowledge has been utilised to address real-world tasks, such as for Chinese character input on mobile phones, search engine development, textual retrieval and classification, and analysis of language use. Beneficiaries include Nokia, Ericsson, Microsoft, Google, Yahoo!, the Hong Kong Judiciary, the Department of Health of the HKSAR, and the Ministry of Education in China.

“If academic research is seen as the open search for truth and for relevance, applied research may be seen as having the goal of immediate relevance,” Prof T’ou concluded.

Developing a Career
Mr Kelvin Lam has been involved in applied research since his undergraduate days, when his final-year project developed a flexible operating system for a smart card. “I learnt so much about smart cards and gained know-how in related areas.” He went on to work on a large project on a smart card design centre, complete his MSc, and join a CityU subsidiary company to develop smart card control systems. Such products are now in use for example in more than 100 doors at Tseung Kwan O Hospital, 40 lifts at Taikoo Place, and 300 lanes in the immigration e-channels for entry to and exit from Hong Kong.

Mr Lam said customer need is an important concern, as is the creative development of new products. Presenting the product to customers is a challenge to be addressed. Communicating with customers is important to enhance your products and improve your market share.
Solving Real-world Problems
Dr Chun gave some examples of how he has applied his expertise in artificial intelligence (AI) to address enterprise resource optimisation problems for large organisations. For example, he developed software for the Hong Kong International Airport to allocate aircraft parking based on a complex set of requirements. For the Hospital Authority, Dr Chun developed software to automatically schedule rosters for nurses and healthcare assistants working in our public hospitals. For MTR, his software schedules all engineering and maintenance works during the night so that trains can run smoothly the next day. Recently, he has been developing software for the Immigration Department to automatically decide whether applications (such as those for visas, ID cards, and passports) should be approved or not based on relevant legislation, using data mining and learning from human experts.

Defining Applied Research
The presentations prompted a series of questions. One hot topic was how applied research is defined and the link between basic and applied research. Prof Tsou used an illustrative example:

“Delivering a language learning system could be applied research, but it can have basic research behind it, such as on which aspect of the language should be learned first or the particular type of learners. Basic and applied need to go hand-in-hand, but the ultimate delivery for the system would be applied.” He later added that the clear distinction is between good and bad research, rather than basic and applied. Mr Lam also highlighted the interrelation between the two: “In our company we need to repackage the outcomes from our basic research on operating systems to a product that we can sell to the customer, and we use the revenue from sales to do basic research to support new product development.”

In response to a question on how to get started, such as identifying potential projects or external partners, Prof Ma suggested “approaching researchers in your field, for example in your department, who may already be doing related work or have industry connections.” Like any form of research, one of the key motivating factors is a passion for the subject. “The most important thing is to identify what you are interested in,” Dr Chun said. “I always knew that artificial intelligence was the only thing I wanted for my career.”

— Vicki Geall

Dr Andy Chun (Associate Professor of the Department of Computer Science) is an international expert in the fields of artificial intelligence (AI) and advanced web technologies. His research interests include AI, knowledge management, business intelligence, software engineering, web technologies, software architectures, and middleware technologies. He has won numerous local, regional, and international awards for applied research work, including the Project of the Year Award from ZDNet Asia in 2006, and the Innovative Applications of AI Award in 2005 from the American Association for Artificial Intelligence.

Prof Jian Ma is a Professor in the Department of Information Systems. His research is in the areas of business intelligence, decision models and decision support systems, research information management and systems, and telecom fraud management systems. He is an author/co-author of 2 books and over 100 refereed journal articles and conference papers. Prof Ma has been the principal investigator of more than 10 research projects with total funding of over $15 million. He is the founding director of two spin-off companies established to commercialise the R&D results obtained at CityU.

Prof Benjamin Tsou is Professor (Chair) of Linguistics and Asian Languages, and Director of CityU’s Language Information Sciences Research Centre. His expertise and research interests include computational linguistics and natural language processing, language variation in space and time, and bilingualism, language policy and planning. Since 1995 he has cultivated and dynamically maintained LIVAC (Linguistic Variations in Chinese Speech Communities), a very large and unique synchronous corpus of Chinese (www.livac.org), drawing data from six distinct Chinese speech communities.

Mr Kelvin Lam obtained his BSc and MSc degrees from CityU in 1999 and 2004 respectively. In his BSc final-year project, he developed a Flexible Operation System for Contact Smart Card, winning him two awards. In 2000, he worked with Dr L M Cheng to secure a $12 million ITF project in Smart Card Design Centre. The project was completed in 2002 and he joined MaCaPS International Ltd, an associate company of CityU Enterprises Ltd, as Technical Manager to continue exploring the potential use of smart cards, and later in 2004 was elected Executive Director of the Board.