PhD Scholarship in The Hong Kong Polytechnic University
(http://www.polyu.edu.hk/ro/hkphd-fellowship/)

(1) Large-scale Internet Performance Monitoring
(2) Big Network Data Analysis
(3) Quality-of-Experience Measurement

Brief Description

(1) Large-scale Internet Performance Monitoring
Due to the inherent design of the Internet, it is very difficult to measure the end-to-end performance of network paths in a scalable manner. Partly because of that, it is extremely difficult to diagnose the root problem of observed performance degradation. This project aims to develop novel measurement methods (and tools) for monitoring many network paths at the same time. The possible applications include fault localization, detection of DDoS attacks, better informed load balancing mechanisms, choosing the right rate for multimedia stream, and many others.

(2) Big Network Data Analysis
There are many challenges to analyzing massive network data. Currently, network data are often collected in a routine manner without considering the utility of the data. Big network data analysis can help optimize the measurement process on the fly. Another challenge is related to the temporal and spatial aspects of the network data. Very often, an analysis of time-series network data collected from different vantage points can obtain new insights than an isolated analysis of the data. A classic problem is network tomography which measures link-level performance based on a set of end-to-end measurements.

(3) Quality-of-Experience Measurement
The quality of a network service/application will ultimately be measured by the user's (perceived) quality of experience (QoE). Unlike network performance measurement, QoE measurement is complicated by other non-network factors, such as the end system's performance, the user's expectation, user's interest in the content, and so on. Therefore, the well developed methodologies from social science and psychology, together with network performance measurement, could further advance the field of QoE measurement. Possible services that could benefit from QoE measurement include online video, IPTV, VoIP, network games, and so on.

Links:
1. Dr. Rocky K. C. Chang's homepage
2. OneProbe project website