

COMPUTER SCIENCE COLLOQUIUM

Department of Computer Science
City University of Hong Kong

Reliable System Software for Function-Rich Sensor Networks

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Date :

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Time :

11:00am - 12:00noon (Refreshment will be served at 10:45am)

Venue :

CS Seminar Room, Rm Y6405, 6th Floor Yellow Zone, Academic Building,
City University of Hong Kong, Tat Chee Avenue, Kowloon Tong.

Abstract

In this talk, I will introduce my research work in large-scale surveillance sensor networks and reliable operating systems, as well as explore future research directions. The work in operating systems will be a focus in this talk.

Traditionally, privileged-execution hardware is required for implementing OS protection (preventing applications from compromising the OS), and virtual address translation hardware is required for virtual memory. Many microcontrollers used in very-low-power embedded systems, however, lack these hardware features. Hence, they had to use simple operating systems without OS protection or virtual memory, giving rise to many difficulties in programming and maintaining such systems.

To overcome these limits, we designed a new OS kernel, the t-kernel, for networked embedded systems. I will first briefly introduce my research on a surveillance sensor network sponsored by DARPA, and explain why OS protection and virtual memory are needed in a function-rich sensor network. Then I will present how the t-kernel uses pure software methods to efficiently implement OS protection and virtual memory. Moreover, the implementation and evaluation of the t-kernel on MICA2 motes show that, though computational tasks slow down, typical applications do not experience noticeable performance degradation when running the t-kernel.

Biography

Lin Gu is an Assistant Professor at the Hong Kong University of Science and Technology (HKUST). He received B.S. from Fudan University, M.S. from Peking University, and Ph.D. in Computer Science from the University of Virginia. Centering on networked embedded systems, his research interest includes operating systems, energy efficient computing, and distributed systems. He was a major contributor to a series of large-scale wireless sensor networks in DARPA's NEST project. He wrote a new OS kernel, the t-kernel, to overcome the limitations of traditional sensor network operating systems. He published a number of academic papers, including two "Best Paper Award" winners. Prior to joining HKUST, Lin Gu worked at Google on very-large-scale web systems.

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*In case of questions, please contact Dr Guoliang Xing at Tel: 2788 7525, E-mail: glxing@cs.cityu.edu.hk,
or visit the CS Departmental Seminar Web at <http://www.cs.cityu.edu.hk/>.*