

**13th INTERNATIONAL
CONFERENCE ON
DISTRIBUTED COMPUTING
AND NETWORKING
(ICDCN 2012)
Hong Kong, China, January 3-6,
2012**

Sponsors:



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學



王寬誠教育基金會
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Technical Program

Tuesday, January 3, 2012

Registration (8:00 am – 5:00 pm) Chiang Chen Studio Theatre, The Hong Kong Polytechnic University

	Tutorials		Workshop
9:00 am – 10:30 am	Tutorial 1: (PQ604B) “Distributed Algorithms for Wireless Multihop Networks” Prof. Roger Wattenhofer Computer Engineering and Networks Laboratory, ETH Zurich, Switzerland	Tutorial 2: (PQ604C) “Dynamic Spectrum Management in Cognitive Radio Networks” Prof. Mainak Chatterjee Department of Electrical Engineering and Computer Science, University of Central Florida, USA	The First International Workshop on Computing and Networking for Internet of Things Chiang Chen Studio Theatre
Tea/Coffee Break: 10:30-11:00am			
11:00 am – 12:30 pm	Tutorial 1: (PQ604B) “Distributed Algorithms for Wireless Multihop Networks” Prof. Roger Wattenhofer Computer Engineering and Networks Laboratory, ETH Zurich, Switzerland	Tutorial 2: (PQ604C) “Dynamic Spectrum Management in Cognitive Radio Networks” Prof. Mainak Chatterjee Department of Electrical Engineering and Computer Science, University of Central Florida, USA	The First International Workshop on Computing and Networking for Internet of Things Chiang Chen Studio Theatre
Lunch: 12:30-1:30pm (Staff Restaurant, 4/F Communal Building)			
1:30 pm – 3:00 pm	Tutorial 3: (PQ604B) “Computing with Directional Antennae in Wireless Sensor Networks” Prof. Evangelos Kranakis School of Computer Science, Carleton University, Ottawa, Canada	Tutorial 4: (PQ604C) “Scalable Data Management and Storage on the Cloud: State of the Art and Emerging Trends” Dr. Anwitaman Datta School of Computer Engineering, NTU, Singapore Dr. Frederique Elise Oggier School of Physical and Mathematical Sciences, NTU, Singapore	The First International Workshop on Computing and Networking for Internet of Things Chiang Chen Studio Theatre
Tea/Coffee Break: 3-3:30pm			
3:30 pm – 5:00 pm	Tutorial 3: (PQ604B) “Computing with Directional Antennae in Wireless Sensor Networks” Prof. Evangelos Kranakis School of Computer Science, Carleton University, Ottawa, Canada	Tutorial 4: (PQ604C) “Scalable Data Management and Storage on the Cloud: State of the Art and Emerging Trends” Dr. Anwitaman Datta School of Computer Engineering, NTU, Singapore Dr. Frederique Elise Oggier School of Physical and Mathematical Sciences, NTU, Singapore	The First International Workshop on Computing and Networking for Internet of Things Chiang Chen Studio Theatre
6:00 pm – 8:00 pm	Reception (PolyU Staff Club, 5/F Communal Building)		

Wednesday, January 4, 2012

Regal Kowloon Hotel

Conference Inauguration:
(9:00-9:30am) Versailles Ballroom
General Chairs and TPC Chairs

Keynote1 (9:30-10:30am) Versailles Ballroom
"Participatory Sensing: Opportunities and Challenges"
Prof. Deborah Estrin, UCLA

Tea/Coffee Break: 10:30-11:00am

Parallel Sessions

DC1: Fault-Tolerance 1

(11-12:30pm) Versailles Ballroom
Chair: Stefan Schmid, TU Berlin and Deutsche Telekom Lab

Interplay between (Im)perfectness, Synchrony and Connectivity: The Case of Reliable Message Transmission

Abhinav Mehta (IIIT-Hyderabad), Shashank Agrawal (IIIT-Hyderabad) and Kannan Srinathan (IIIT-Hyderabad)

Snap-Stabilizing Message Forwarding Algorithm on Tree Topologies

Alain Cournier (MIS, Université de Picardie), Swan Dubois (Univ. Pierre & Marie Curie - Paris 6), Anissa Lamani (Univ. Pierre & Marie Curie - Paris 6), Franck Petit (Univ. Pierre & Marie Curie - Paris 6) and Vincent Villain (MIS, Université de Picardie)

Solving the At-Most-Once Problem with Nearly Optimal Effectiveness

Sotirios Kentros (University of Connecticut) and Aggelos Kiayias (University of Connecticut)

N1: Transport Protocols & Optimization

(11-12:30pm) Luxembourg Room
Chair: Prof. Anwitaman Datta, NTU

Postorder Based Routing & Transport Protocol for WSNs

Rk Ghosh (IIT Kanpur), Shashank Shekhar (IIT Kanpur) and Rk Shyamasundar (IIT Kanpur)

DTLS Mobility

Robin Seggelmann (Münster University of Applied Sciences), Michael Tüxen (Münster University of Applied Sciences) and Erwin Rathgeb (University Duisburg-Essen)

A simple and efficient input selection function for Networks-on-Chip

Xinyu Wang (Tsinghua University) and Zhigang Yu (Xidian University)

Lunch: 12:30-1:30pm

DC2: Transactional Memory Systems

(1:30-3:00pm) Versailles Ballroom
Chair: Hugues Fauconnier, LIAFA, Université de Paris-Diderot

An Efficient Scheduler for Closed Nested Transactions that satisfies All-Reads-Consistency and Non-Interference

Sathya Peri (Indian Institute of Technology Patna) and Krishnamurthy Vidyasankar (Memorial University)

Towards a universal construction for transaction-based multiprocess programs

Tyler Crain (IRISA, Université de Rennes), Damien Imbs (IRISA, Université de Rennes) and

N2: Experimental Networks & Systems

(1:30-3:00pm) Luxembourg Room
Chair: Prof. Bin Xiao, Hong Kong Polytechnic University

Amine Abidi (CRISTAL LAB), Sonia Mettali Gammar (CRISTAL LAB), Farouk Kamoun (CRISTAL LAB), Walid Dabbous (INRIA), Thierry Turletti (INRIA) and Arnaud Legout (INRIA)

Hybrid approach for experimental networking research

wnPUT Testbed Experimentation Framework

Adam Nowak (Poznan University of Technology), Przemysław Walkowiak (Poznan University of Technology), Andrzej Szwabe (Poznan University of

<p>Michel Raynal (IRISA, Université de Rennes).</p> <p><i>Lifting the Barriers -- Reducing Latencies with Transparent Transactional Memory</i></p> <p>Annette Bieniusa (Universität Freiburg) and Thomas Fuhrmann (TU Munich).</p>	<p>Technology) and Pawel Misiorek (Poznan University of Technology)</p> <p><i>Multi-path OLSR Performance Analysis in a Large Testbed Environment</i></p> <p>Andrzej Szwabe (Poznan University of Technology), Pawel Misiorek (Poznan University of Technology), Maciej Urbanski (Poznan University of Technology), Felix Juraschek (Freie Universitat Berlin) and Mesut Gunes (Freie Universitat Berlin)</p>
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Tea/Coffee Break: 3-3:30pm

<p>DC3: Models and protocols for large-scale networks (3:30-5pm) Versailles Ballroom Chair: Prof. Michel Raynal, IRISA, Université de Rennes</p> <p><i>Economic Models for Cloud Service Markets</i> Ranjan Pal (University of Southern California) and Pan Hui (Deutsche Telekom)</p> <p><i>A Protocol for the Atomic Capture of Multiple Molecules on Large Scale Platforms</i> Marin Bertier (IRISA), Marko Obrovac (IRISA) and Cedric Tedeschi (INRIA/IRISA)</p> <p><i>Competitive and Deterministic Embeddings of Virtual Networks</i> Guy Even (Tel Aviv University), Moti Medina (Tel Aviv University), Stefan Schmid (TU Berlin / Deutsche Telekom Lab) and Gregor Schaffrath (TU Berlin / Deutsche Telekom Lab)</p>	<p>N3: Networking Theory (3:30-5pm) Luxembourg Room Chair: Prof. Ratan Ghosh, IIT Kanpur</p> <p><i>A Localized Link Removal and Addition based Planarization Algorithm</i> Emi Mathews (University of Paderborn) and Hannes Frey (University of Paderborn)</p> <p><i>Buffer Dimensioning of Delay-Tolerant Network Nodes - A Large Deviations Approach</i> Mahendran Veeramani (IIT Madras), Praveen Thammana (IIT Madras) and Siva Ram Murthy C (IIT Madras)</p> <p><i>Towards Optimal Event Detection and Localization in Acyclic Flow Networks</i> Mahima Agumbe Suresh (Texas A&M University), Radu Stoleru (Texas A&M University), Ron Denton (Texas A&M University), Emily Zechman (Texas A&M University) and Basem Shihada (King Abdullah University of Science and Technology)</p>
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Thursday, January 5, 2012

Regal Kowloon Hotel

Keynote2 (9:00-10:00am)

"Secure and Efficient Networking in the TV Band White Spaces"
Thomas Moscibroda,, Microsoft Research Asia

Versailles Ballroom

Tea/Coffee Break: 10:00-10:30am

Parallel Sessions

DC4: Fault-Tolerance 2

(10:30-12:15pm) Versailles Ballroom

Chair: Prof. Anish Arora, Ohio State Univ

Nuno Santos (EPFL) and Andre Schiper (EPFL)
Tuning Paxos for high-throughput with batching and pipelining

Carole Delporte-Gallet (LIAFA-Universite Paris-Diderot), Hugues Fauconnier (LIAFA-Universite Paris-Diderot) and Hung Thran The (LIAFA-Universite Paris-Diderot)
Byzantine agreement with homonyms in synchronous systems

Ali Ebneenasir (Michigan Technological University), Reza Hajisheykhi (Michigan State University) and Sandeep Kulkarni (Michigan State University).
Facilitating the Design of Fault Tolerance in Transaction Level SystemC Programs

Jingshu Chen (Michigan State University) and Sandeep Kulkarni (Michigan State University)
Application of Automated Revision for UML models: A Case Study

N4: Security & Privacy

(10:30-12:15pm) Luxembourg Room

Chair: Prof. Dan Wang, Hong Kong Polytechnic University

Emiliano De Cristofaro (University of California Irvine) and Roberto Di Pietro (Università di Roma Tre)
Preserving Query Privacy in Urban Sensing Systems

Uttam Ghosh (IIT Kharagpur) and Raja Datta (IIT Kharagpur)
An ID based Secure Distributed Dynamic IP Configuration Scheme for Mobile Ad Hoc Networks

Na Li (University of Texas at Arlington), Mayank Raj (University of Texas at Arlington), Donggang Liu (University of Texas at Arlington), Matthew Wright (University of Texas at Arlington) and Sajal Das (University of Texas at Arlington)
Using Data Mules to Preserve Source Location Privacy in Wireless Sensor Networks

Lei Zhang (East China Normal University)
Cryptanalysis of a Certificateless Multi-Proxy Signature Scheme (Short Paper)

Lunch: 12:15-1:30pm

**AK Choudhury Memorial Lecture
(1:30-2:30pm)**

Prof. Raymond Yeung, The Chinese University of Hong Kong

Versailles Ballroom

PhD Forum (2:30pm-3:30 pm)

Versailles Ballroom

Tea/Coffee Break: 3:00-3:45pm

Poster Session (3:45-4:30pm)

Versailles Ballroom

Logical Topology Design for WDM Networks using Tabu Search

Quazi Rahman (University of Windsor), Asutosh Sood (University of Windsor), Yash Aneja ((University of

Windsor), Subir Bandyopadhyay ((University of Windsor) and Arunita Jaekel (University of Windsor)

Finding the Quality of Line Coverage of a Sensor Network

Dinesh Dash (IIT Kharagpur), Arijit Bishnu (Indian Statistical Institute, Kolkata), Arobinda Gupta ((IIT Kharagpur) and Subhas Nandy ((IIT Kharagpur)

Virtual Tree: a Robust Overlay Network for Ensuring Interval Valid Queries in Dynamic Distributed Systems

Roberto Baldoni (Università di Roma La Sapienza), Silvia Bonomi (Università di Roma La Sapienza), Adriano Cerocchi (Università di Roma La Sapienza) and Leonardo Querzoni (Università di Roma La Sapienza)

Raymond Wong (San Jose State University), Teng-Sheng Moh (San Jose State University) and Melody Moh (San Jose State University)

Efficient Semi-Supervised Learning BitTorrent Traffic Detection with Deep Packet and Deep Flow Inspections

Conference Banquet – Hung Kee Restaurant (6:00 pm – 10:00 pm)

Friday, January 6, 2012

Keynote 3 (9:00-10:00am)
" Rethinking Security for A World of Networked Devices"
Prof. Anish Arora, Ohio State University

Versailles Ballroom

Tea/Coffee Break: 10:00-10:30am

Industry Forum: "Cloud Computing's Industry and Market Trend"
(10:30-12:30pm)

Versailles Ballroom

Lunch: 12:30-2:00pm

Parallel Sessions

N5: P2P Overlays and Applications
(2:00-3:00pm) Versailles Ballroom
Chair: Prof. Cho-Li Wang, University of Hong Kong

Riccardo Reale (Peerialism Inc.), Roberto Roverso (Royal Institute of Technology (KTH)), Sameh El-Ansary (Peerialism Inc.) and Seif Haridi (Royal Institute of Technology (KTH))
DTL: Dynamic Transport Library for Peer-To-Peer Applications

S M Saif Shams (Simula Research Laboratory), Paal E. Engelstad (Telenor group) and Amund Kvalbein (Simula Research Laboratory)
PreeN: Improving steady-state performance of ISP-friendly P2P applications

N6: Broadband Wireless
(2:00-3:00pm) Luxembourg Room
Chair: Prof. Subir Bandyopadhyay, University of Windsor

Saravana Manickam (IIT Madras), Lalit Dhingra (IIT Madras) and Siva Ram Murthy (IIT Madras)
Performance of MIMO over SUI Channels for IEEE 802.16 Networks

Phani Krishna Penumarthi (IIT Madras), Saravana Manickam R (IIT Madras) and Siva Ram Murthy C (IIT Madras)
MIMO Enabled Efficient Mapping of Data in WiMAX Networks

Tea/Coffee Break: 3:00-3:30pm

N7: Information Routing and Dissemination
(3:30-5:00pm) Versailles Ballroom
Chair: Prof. Alvin Chan, Hong Kong Polytechnic University

Rajesh Sharma (NTU Singapore) and Anwitaman Datta (NTU Singapore)
Decentralized information dissemination in multidimensional semantic social overlays

Peter Michael Melliar-Smith (University of California, Santa Barbara), Louise E. Moser (University of California, Santa Barbara), Isai Michel Lombera (University of California, Santa Barbara) and Yung-Ting Chuang (University of California, Santa Barbara)
iTrust : Trustworthy Information Publication, Search and Retrieval

Christian Esposito (Università degli studi di Napoli "Federico II"), Stefano Russo (Università degli studi di Napoli "Federico II"), Roberto Beraldi (Università degli studi di Roma "La Sapienza"), Marco Platania (Università degli

N8: Tracking and Coverage in Sensor Networks
(3:30-5:00pm) Luxembourg Room
Chair: Prof. Anish Arora, Ohio State Univ.

Sarang Deshpande (IIT Madras) and Krishna M. Sivalingam (IIT Madras)
Adaptive Velocity Based Guided Navigation in Wireless Sensor Networks

Yen-Ting Chen (Chung Hua University), Yin-Chung Hsu (Chung Hua University) and Chiu-Kuo Liang (Chung Hua University)
Distributed Coverage-Enhancing Algorithms in Directional Sensor Networks with Rotatable Sensors

Roberto Di Pietro (Università di Roma Tre), Mauro Conti (Vrije Universiteit) and Angelo Spognardi (Sapienza Università di Roma)
Wireless Sensor Replica Detection in Mobile Environments

studi di Roma "La Sapienza") and Roberto Baldoni (Università degli studi di Roma "La Sapienza")
Achieving Reliable and Timely Event Dissemination over WAN

Mahendran Veeramani (IIT Madras), Praveen Thammana (IIT Madras) and Siva Ram Murthy C (IIT Madras)
Impact of Persistent Storage on the DTN Routing Performance

End of Conference

AK Choudhury Memorial Lecture

(5 January 2012, 1:30-2:30pm, Versailles Ballroom)

Title: Network Coding: Theory and Applications

Speaker: Professor Raymond Yeung

Co-Director, Institute of Network Coding

The Chinese University of Hong Kong

Abstract:

In recent years, network coding has generated much interest in information theory, coding theory, networking, wireless communications, cryptography, and computer science. Consider a point-to-point communication network on which a number of information sources are to be multicast to certain sets of destination nodes. The problem is to characterize the maximum possible throughput. Contrary to one's intuition, network coding theory reveals that it is in general not optimal to regard the information to be transmitted as a "fluid" which can simply be routed or replicated. Rather, by employing coding at the nodes, bandwidth can in general be saved. In this talk, we will give an overview of network coding theory and its extensions for error correction and information security. We will also discuss applications of network coding in computer networks, wireless communications, and cloud storage.

Biography:

Raymond W. Yeung (S'85-M'88-SM'92-F'03) was born in Hong Kong on June 3, 1962. He received the B.S., M.Eng., and Ph.D. degrees in electrical engineering from Cornell

University, Ithaca, NY, in 1984, 1985, and 1988, respectively.

He was on leave at Ecole Nationale Eriure des Telecommunications, Paris, France, during fall 1986. He was a Member of Technical Staff of AT&T Bell Laboratories from 1988 to 1991. Since 1991, he has been with The Chinese University of Hong Kong, where he is now a chair professor of Department of Information Engineering and Co-Director of Institute of Network Coding. He is also a Changjiang Chair Professor at Xidian University (2009-12) and an Advisory Professor at Beijing University of Post and Telecommunications (2008-11). He has held visiting positions at Cornell University, Nankai University, the University of Bielefeld, the University of Copenhagen, Tokyo Institute of Technology, and Munich University of Technology. He was a Consultant in a project of Jet Propulsion Laboratory, Pasadena, CA, for salvaging the malfunctioning Galileo Spacecraft and a Consultant for NEC, USA.

His research interests include information theory and network coding. He is the author of the textbooks *A First Course in Information Theory* (Kluwer Academic Plenum 2002) and its revision *Information Theory and Network Coding* (Springer 2008), which have been adopted by over 60 institutions around the world. His

second book has also been published in Chinese (Higher Education Press 2011, translation by Ning Cai et al.). Dr. Yeung was a member of the Board of Governors of the IEEE Information Theory Society from 1999 to 2001.

He has served on the committees of a number of information theory symposiums and workshops. He was General Chair of the First and the Fourth Workshop on Network, Coding, and Applications (NetCod 2005 and 2008), a Technical Co-Chair for the 2006 IEEE International Symposium on Information Theory, and a Technical Co-Chair for the 2006 IEEE Information Theory Workshop, Chengdu, China. He currently serves as an Editor-at-Large of Communications in Information and Systems}, an Editor of Foundation and Trends in Communications and Information Theory} and of Foundation and Trends in Networking}, and was an Associate Editor for Shannon Theory of this Transactions from 2003 to 2005.

In 2011-12, he serves as a Distinguished Lecturer of the IEEE Information Theory Society. He was a recipient of the Croucher Foundation Senior Research Fellowship for 2000/2001, the Best Paper Award (Communication Theory) of the 2004 International Conference on Communications, Circuits and System (with C.K.Ngai), the 2005 IEEE Information Theory Society Paper Award (for his paper "Linear network coding" co-authored with S.Y.R.Li and N.Cai), and the Friedrich Wilhelm Bessel Research Award of the Alexander von Humboldt Foundation in 2007. He is a Fellow of the IEEE and the Hong Kong Institution of Engineers.

KEYNOTES SPEAKERS

Keynote Speaker 1: [Prof. Deborah Estrin](#)



Computer Science Department, UCLA
Director, Center for Embedded Networked Sensing
Co-Founder, openmhealth.org

Participatory Sensing: Opportunities and Challenges

Abstract: Many critical issues facing science, government, business and the public call for high fidelity and relevant time understanding of physical phenomena. Participatory Sensing in which individuals and communities leverage always on and carried mobile devices to systematically capture and analyze data, complements the Internet of information and things by supporting increased visibility into the determinants and impacts of our daily actions and choices. Innovative data practices (from measurement, to analysis and sharing) can reveal the previously unobservable about us and our environments, and in so doing help us understand and manage our interactions with the physical world, with ourselves, and with one another. One of the most active application areas for Participatory Sensing (PS) is health and wellness. Participatory mobile health (mHealth) incorporates a variety of techniques, including automated actigraphy and mobility traces, smart context based reminders, phone-mediated exercises, and prompted experience sampling inputs. mHealth can assist individuals with adherence to their treatment regimen during the course of their everyday activities, while providing to clinicians and researchers information about daily patterns that were not previously practical but that are critical to personalized diagnosis and treatment. This talk will discuss the broad opportunities for social innovation and the many challenges for technical development. I will draw upon our experience to date with PS and mHealth pilots and prototypes and will address technical areas in need of significant R&D: open modular tools for data analysis and visualization across diverse data types and data consumers, engagement such as adaptive goal setting and game mechanics, and privacy mechanisms such as Personal Data Vaults and selective sharing.

Speaker's Bio: Deborah Estrin is a Professor of Computer Science, holds the Jon Postel Chair in Computer Networks, and is Founding Director of the NSF-funded Center for Embedded Networked Sensing (CENS). She received her Ph.D. (1985) in Computer Science from M.I.T., and her B.S. (1980) from U.C. Berkeley. Estrin's

early research focused on the design of network protocols, including multicast and inter-domain routing. In 2002 Estrin founded the NSF-funded Center for Embedded Networked Sensing (<http://cens.ucla.edu>) to develop and explore environmental monitoring technologies and applications. Most recently Estrin and collaborators are developing and deploying participatory sensing systems, leveraging the location, image, and user-contributed data streams increasingly available globally from mobile phones. Ongoing projects include self-monitoring applications in support of health and wellness (<http://openmhealth.org>), citizen science (<http://whatsinvasive.com>), and STEM education (<http://mobilizingcs.org>). Professor Estrin is an elected member of the American Academy of Arts and Sciences (2007) and the National Academy of Engineering (2009). She is a fellow of the IEEE, ACM, and AAAS. She was selected as the first ACM-W Athena Lecturer in 2006, awarded the Anita Borg Institute's Women of Vision Award for Innovation in 2007, inducted into the WITI hall of fame in 2008, and awarded Doctor Honoris Causa from EPFL (2008) and from Uppsala University (2011).

[Keynote Speaker 2: Dr. Thomas Moscibroda](#)



Lead Researcher
Microsoft Research Asia, Microsoft Corporation

Secure and Efficient Networking in the TV Band White Spaces
Highlights from the Microsoft Research White Space Project

Abstract: The FCC's recent decision to open up the "White Spaces" in UHF TV band spectrum for unlicensed use is historic and has created tremendous interest in industry and research. It signifies a fundamental paradigm shift, as for the first time, wireless devices are allowed to opportunistically use licensed spectrum as long as they do not cause interference with any incumbent. In this talk, I will give an overview of the Microsoft Research White Space project. In this project, we have developed a series of technologies that ultimately allowed us to deploy the world's first wireless network operating over white spaces. The network provides Internet access by efficiently and opportunistically "reusing" unoccupied parts of the TV band spectrum. It enables new application scenarios, and has been instrumental in the FCC's regulatory decisions. The main technical focus of my talk will be on new solutions to a key challenge in white space networks: How to securely protect primary users from harmful interference, while still giving white space devices as much access to the spectrum as possible. I will discuss two new techniques that collectively yield an efficient solution to this coexistence problem, as well as their implications on the underlying network protocols.

Speaker's Bio: Thomas Moscibroda is a Lead Researcher at Microsoft Research Asia in Beijing. He also holds the position of an Adjunct Associate Professor at the Institute of Theoretical Computer Science (ITCS) at Tsinghua University. Before moving to China in 2011, he was a member of the Distributed Systems Research group at Microsoft Research in Redmond for 5 years, as well as an affiliate member of the Networking Research Group and the Computer Architecture Research group at MSR Redmond, respectively. Thomas obtained his MS in 2004, and his PhD in 2006 both from ETH Zurich, and was awarded the ETH Medal for his doctoral thesis. His research interests are in distributed algorithms, (wireless) networking, and computer architecture, with ongoing projects in each of these areas. He has a particular focus on algorithmic and mathematical approaches to practical system problems. Thomas' research is documented in more than 50 research papers, and he has received Best Paper Awards at several highly-prestigious conferences, including PODC 2004, IPSN 2007, SIGCOMM 2009, NSDI 2009, and ASPLOS 2010. In addition, he is the recipient of Best Presentation Awards from MOBICOM 2004 and PODC 2008, and his articles on DRAM scheduling and on-chip networking in multi-core systems were selected as IEEE Micro Top-Pick Computer Architecture papers in 2008 and 2010, respectively. Thomas is also the inventor of more than 35 patents, several of which have been filed internationally.

Among other projects, Thomas has been co-leading Microsoft's initiative on White Space networking, building the world's first operational White Space network. Spectrum regulators from India, China, Brazil, Singapore, and the US (including the FCC Chairman) have visited the Microsoft Campus in Redmond to see a live demonstration of his research. This work has been instrumental in the recent historic spectrum policy decisions taken by various governments (USA, UK, ...) to open up TV band spectrum for unlicensed use.

[Keynote Speaker 3: Prof. Anish Arora](#)



Department of Computer Science and Engineering
Ohio State University, USA
Co-founder, Institute for Sensing Systems
Co-founder and CTO, The Samraksh Company

Rethinking Security for A World of Networked Devices

Abstract: As the numbers of devices per person and per organization grow dramatically, the challenges associated with the manageability of the associated security material become daunting. The conventional approach of using public or symmetric keys, which are updated from time to time or from session to session, is therefore ripe for being reconsidered. In this talk, we will present extremal alternatives wherein keys are either eschewed, based on exploitation of the physical layer, or keys are used without the need for updates. We will explore the use of such keys in providing diverse sorts of end-to-end security properties in device networks and discuss the consequences of device compromise in the model. Our discussion will include a survey of the state-of-the-art and the feasibility of our methods, including current experimental results. **Speaker's Bio:** Anish Arora is a Professor of Computer Science and Engineering and co-founder of the Institute of Sensing Systems, both at The Ohio State University, as well as co-founder/CTO of The Samraksh Company. Anish has led research and development of diverse wireless sensor network applications: a large-scale persistent perimeter surveillance ExScal Project (for extreme scale); a multi-platform, multi-environment, KanseiGenie fabric for application development, testing, and deployment, which has now been integrated into and variously cloned in the NSF GENI next generation internet prototype; a "mote"-augmented-cellphone and building array fabric for hosting people-centric and smart grid applications called PeopleNet; and the BumbleBee/GuardBee micropower radar systems for people activity sensing. Recent system platforms work includes a state-of-the-art wireless sensor mote, the eMote, which runs the .NET micro framework in an energy efficient manner. More broadly, his research focuses on the end-to-end fault-tolerance, security, and timeliness of distributed systems and networks and has yielded a number of innovations in scalable dependability. He is a Fellow of the IEEE.

TUTORIAL SPEAKERS

Tutorial 1: [Prof. Roger Wattenhofer](#)



Computer Engineering and Networks Laboratory,
ETH Zurich, Switzerland

Distributed Algorithms for Wireless Multihop Networks

Abstract: In the first part of the tutorial we learn the fundamentals of distributed algorithms, also known as message passing algorithms, or the "local" model. A distributed system is represented by a graph. We would like to solve classic combinatorial optimization problems by having the nodes of the graph just talk to their neighbors in the graph. As a running example throughout the first part of the tutorial we will use the so-called Maximal Independent Set (MIS) problem. Together, we figure out and discuss simple deterministic and randomized algorithms to solve the MIS problem in a distributed context. We will discuss applications of the MIS problem, such as coloring. Then we look at some of the state of the art results of the MIS problem and discuss the lower bound technique by Linial, the upper bound technique by Cole and Vishkin, and finally the lower bound by Kuhn et al. In the remainder of the first part of the tutorial we will also look at related problems, and the most important open questions in this area. In the second part of the tutorial we will look at how to apply the lessons learned from the first part in the context of wireless multihop networks, i.e. ad hoc, sensor, or mesh networks. In particular we discuss in what sense the physical reality is different from the pure local model learned in the first part. Towards this end we will discuss models for connectivity in wireless multihop networks, various interference models, and finally communication models. Again, we will discuss some of the most important open problems. **Speaker's Bio:** Roger Wattenhofer is a full professor at the Information Technology and Electrical Engineering Department, ETH Zurich, Switzerland. He received his doctorate in Computer Science in 1998 from ETH Zurich. From 1999 to 2001 he was in the USA, first at Brown University in Providence, RI, then at Microsoft Research in Redmond, WA. He then returned to ETH Zurich, originally as an assistant professor at the Computer Science Department. Roger Wattenhofer's research interests are a variety of algorithmic and systems aspects in computer science and information technology, currently in particular wireless networks, multi-core systems, peer-to-peer computing, and social networking. He publishes in different communities: distributed computing (e.g., PODC, SPAA, DISC), networking (e.g., MobiCom, MobiHoc, SenSys, IPSN, HotNets), or theory (e.g., STOC, FOCS, SODA, ICALP).

Tutorial 2: [Prof. Mainak Chatterjee](#)



Department of Electrical Engineering and Computer Science,
University of Central Florida, USA

Dynamic Spectrum Management in Cognitive Radio Networks

Abstract: Radio spectrum has traditionally been allocated in a static manner. However, recent studies have shown that parts of the radio spectrum are over-utilized while some parts are under-utilized. In order to break away from the inflexibilities and inefficiencies of long-term static allocations, the concept of dynamic spectrum access and management using cognitive radios is being investigated and is expected to be a significant component in next generation wireless systems. It is currently of big interest to radio engineers, policy makers and economists involved in the design, analysis, and optimization of next generation wireless access systems and networks.

In this tutorial, we will first motivate the concept and use of dynamic spectrum access. We will then see how this new paradigm can be made viable through the use of cognitive radios. Our main focus will be Spectrum Management i.e., dynamic spectrum allocation and sharing among primary and secondary users. We will discuss issues related to MAC and distributed/centralized channel access. After a brief introduction to game theory, we will show how game theory can be used as an effective tool to model the competition and cooperation among various cognitive networks. We will also show how different auction models can be used to find the equilibrium price for spectrum trading. We will conclude with IEEE 802.22 which is a cognitive radio based wireless regional area network technology. **Speaker's Bio:** Mainak Chatterjee is an Associate Professor in the department of Electrical Engineering and Computer Science, University of Central Florida, Orlando. He received the BSc degree in physics (Hons.) from the University of Calcutta, the ME degree in electrical communication engineering from the Indian Institute of Science, Bangalore, and the PhD degree from the Department of Computer Science and Engineering from the University of Texas at Arlington. His research interests include economic issues in wireless networks, applied game theory, cognitive radio networks, and mobile video delivery. He has published over 100 conferences and journal papers. He got the Best Paper Award in IEEE Globecom 2008. He is the recipient of the AFOSR sponsored Young Investigator Program (YIP) Award. He co-founded the IEEE Workshop on Mobile Video Delivery (MoViD). He serves on the editorial board of Elsevier's Computer Communications and Pervasive and Mobile Computing Journals. He has served as the TPC Co-Chair of several conferences including IEEE WoWMoM 2011, WONS 2010, IEEE MoViD 2009, Cognitive Radio Networks Track of IEEE Globecom 2009 and ICCCN 2008. He also serves on the executive and technical program committee of several international conferences.

Tutorial 3: [Prof. Evangelos Kranakis](#)



School of Computer Science,
Carleton University, Ottawa, Canada

Computing with Directional Antennae in Wireless Sensor Networks

Abstract: Directional and omnidirectional are the two types of antennae being used in sensor networking. The former emit greater power in one direction thus achieving increased transmission range and performance as well as reduced interference from unwanted sources. On the contrary, omnidirectional antennae radiate power uniformly in all directions. Regardless of the type of antenna being used the transmission cost of each antenna is proportional to the coverage area of the antenna. By providing a comparative analysis of directional vs omnidirectional antennae the purpose of the tutorial is to understand how the use of directional antennae can improve energy consumption, security, and topology control. In the first part of the tutorial we introduce basic concepts and ideas for 2D and 3D antennae and look at how directional antennae reduce energy consumption and improve security of a sensor network. In the second part, we look specifically at topology control issues, in particular connectivity, neighbor discovery, coverage, routing, and stretch factor, In both parts of the tutorial we discuss and analyze several recent algorithms and study trade-offs on the beam width, range and number of antennae being used per sensor. We also provide directions for future research and give several challenging recent open problems.

Speaker's Bio: Evangelos Kranakis received his B.Sc. in Mathematics from the University of Athens, Greece, and a Ph.D. in Mathematics from the University of Minnesota, USA. He has been in the Mathematics Department of Purdue University, USA, Mathematisches Institut of the University of Heidelberg, Germany, the Computer Science Department of Yale University, USA, at the Computer Science Department of the Universiteit van Amsterdam, and at the Centrum voor Wiskunde en Informatica (CWI) in Amsterdam, The Netherlands. He joined the faculty of the School of Computer Science of Carleton University in the Fall of 1991. He has published in the analysis of algorithms, bioinformatics, communication and data (ad hoc and wireless) networks, computational and combinatorial geometry, distributed computing, and network security. He was director of the School of Computer Science from 1994 to 2000 and has been in the Research Management Committee of MITACS (Mathematics of Information Technology and Complex Systems) since 1998.

Tutorial 4: [Dr. Anwitaman Datta](#)



School of Computer Engineering,
NTU, Singapore

[Dr. Frederique Elise Oggier](#)



School of Physical and Mathematical Sciences,
NTU, Singapore

Scalable Data Management and Storage on the Cloud: State of the Art and Emerging Trends

Abstract: The rapid growth of the Internet, particularly fuelled by social media and Web 2.0 applications - has necessitated new, scalable mechanisms for data management and storage. These techniques have subsequently organically become the key enabling technologies for the cloud infrastructure. In particular, distributed file systems, primarily based on distributed key-value stores have emerged as a key ingredient facilitating the core data management needs in many such systems - such as Amazon's Dynamo, Facebook's Cassandra, Yahoo's PNUTS!, Google's BigTable, etc. to name a few prominent ones, while abstractions such as map-reduce (and Hadoop framework) and NoSQL systems have emerged for manipulation and querying such stored information. The first half of the tutorial will introduce these state-of-the art data-management mechanisms, and the associated open challenges. Redundancy is essential for fault-tolerance, however the overheads of storing the huge volume of data involved - in terms of storage space, as well as bandwidth and computational needs, to create and then maintain the

redundancy over time, in presence of faults that can occur randomly and continuously, can be huge. Traditional erasure coding techniques, which were originally developed for communication centric applications, help reduce the storage overhead, but do not perform well in terms of repair traffic or necessary computational overheads. New coding techniques tailor made for storage centric applications - some based on network coding concepts (regenerating codes), as well as others (such as Pyramid and self-repairing codes) are emerging - and are posed to play a vital role in providing scalable solutions for storing huge volume of data. The second part of the tutorial will provide a summary of these emerging mechanisms.

Speakers' Bio: Anwitaman Datta did his PhD at EPFL Lausanne before moving to NTU Singapore in 2006, where he is currently an Assistant Professor in the School of Computer Engineering. He is interested in large scale networked distributed information systems and social collaboration networks, self-organization and algorithmic issues of these systems and networks and their scalability, resilience, security and performance. He won the best paper awards at IWSOS 2006, ICDCS 2007 and ICDCN 2011, and is one of the recipients of HP Labs Innovation Research Program award 2008.

Frederique Oggier received her degree Diplome in Mathematics and Computer Science in 2000 from the University of Geneva, Switzerland. She then joined the Swiss Federal Institute of Technology, Lausanne (EPFL), where she graduated from the Doctoral School in Communication Systems (2001), and completed her Ph.D. thesis in Mathematics (2005). She was a postdoctoral visitor at the California Institute of Technology (CalTech) from 2005 till 2007, and at the Research Center for Information Security (RCIS) in Tokyo, Japan, from 2007 to 2008. She is currently an Assistant Professor at the School of Physical and Mathematical Sciences, Nanyang Technological University (NTU), Singapore. She is a recipient of the Singapore NRF Fellowship. Her main research interests are in applied algebra to coding problems arising in wireless communications, distributed networked storage as well as information theoretic security.

ICDCN-2012

Industry Panel

11:00am – 12:30pm, January 6, 2012

Theme: Cloud Computing: Industry Technology and Market Trend

Moderator: Prof. Jiannong Cao

Panel list:

1. Jiao Wang, Huawei
2. Dr TS Lo, ASTRI
3. Edwin Cheung, Microsoft
4. Thomas Teng, Kingdee

Description:

We are talking about cloud computing to vision its potential to change IT as much as the PC and Windows did in the 80s and 90s. Cloud computing is a natural evolution of the widespread adoption of virtualization, service-oriented architecture, autonomic, and utility computing. In this panel discussion, we will invite experts from companies and enterprises to share and discuss their strategies to build and deploy cloud infrastructures, techniques to provide cloud services to enterprises, plans to meet expanding requests from end users, and understanding of the current and future cloud computing market trends. The panel discussion will provide a good opportunity to learn the current status of cloud computing in the industry sectors which can provide possible future research direction for the academy.

In the panel discussion, we will talk about the following questions (but not limited to):

1. What are the essential characteristics of Cloud Computing?
2. What are the deployment models and services models adopted in the industry?
3. What are the challenging issues today? What can be expected in the future?
4. How to move an existing web service to the cloud?
5. What are security and privacy issues in the cloud?
6. What is the new change to the business model and market?

PhD Forum

Na Li, University of Texas at Arlington. Community Detection on Online Social Networks

Stephan-Alexander Posselt, Technische Universität München, Germany. Towards a Reliable, Distributed Single System Image

Niranjan Kumar Ray, National Institute of Technology, Rourkela, India. Situation Management in Disaster Monitoring using Wireless Ad Hoc Networks

Liang Chen, Chinese University of Hong Kong. Suggestions on Routing Scalability for Future Internet

Sujoy Saha, National Institute of Technology, Durgapur, India. Secured Routing in DTNs: Threats & Countermeasures

Dinesh Dash, Indian Institute of Technology, Kharagpur, India. Localized Barrier Coverage Maintenance in Wireless Sensor Networks

Department of Computer Science, The University of Hong Kong, Hong Kong. Stochastic Model for ISP-aware VoD Streaming

Mayank Raj, University of Texas at Arlington. Energy Adaptive Computing for Mobile Devices

Workshop

ComNet-IoT 2012 Workshop Technical Program

9:00 - 9:05 Opening Remarks

Sajal K. Das, General Chair (University of Texas at Arlington, USA)

Wendong Xiao, Program Co-Chair (Institute of Infocom Research, Singapore)

9:05 - 9:50 Keynote 1: Challenges and Opportunities in the Internet of Things

Speaker: Lionel M. Ni (Hong Kong University of Science and Technology, China)

Chair: Sajal K. Das (the University of Texas at Arlington, USA)

9:50 - 10:30 Section I: IoT System Architecture

Chair: Wendong Xiao (Institute of Infocom Research, Singapore)

Exploring Ubiquitous Publish/Subscribe Services for Wireless Sensors Networks, Xiaoyu Tong and Edith Ngai (Uppsala University, Sweden)

Managing Enterprise Resource and Environment through Real-Time Tracking, Monitoring and Actuation of Enterprise Objects using Internet: a Conceptual Framework and Test-Bed Implementation, Somprakash Bandyopadhyay (Indian Institute of Management Calcutta, India) and Siuli Roy (Pervcom Consulting Pvt Ltd, Calcutta, India)

10:30-11:00am Tea/Coffee Break

11:00-12:00 Section II: IoT Resource Management

Chair: Cho-Li Wang (University of Hong Kong, China)

Multi-objective Task Allocation for Energy Harvesting Wireless Sensor Networks by Genetic Algorithm, Neda Edalat and Mehul Motani (National University of Singapore, Singapore)

An Information Entropy Approach for Sleep Scheduling in Wireless Sensor Networks, Ruiyun Yu, Xingwei Wang, Jie Li, Xingyou Xia, Xi Wang (Northeastern University, China)

CRTRA: Coloring Route-Tree based Resource Allocation Algorithm for Industrial Wireless Sensor Networks, Xiaotong Zhang, Yadong Wan, Qiong Luo, Hongling Song, and Yanhong Yang (University of Science & Technology Beijing, China)

12:00 - 12:45 Keynote 2: Technical Challenges and Business Opportunities in the area of the Internet of Things,

Speaker: Sanjoy Paul (Accenture Technology Labs India)

Chair: Lionel M. Ni (Hong Kong University of Science and Technology, China)

12:45-13:30pm Lunch

13:30-15:00 Section II: IoT Component and Platform Development

Chair: Sanjoy Paul (Accenture Technology Labs India)

Tunable Ferrite-Based Universal UHF RFID Reader Antenna, Haibin Sun, Yongjun Huang, Guangjun Wen, Jingping Zhong and Oghenemuero Gordon (University of Electronic Science and Technology of China, China),

RFID Service for Non-RFID Enabled Devices based on ZigBee and WLAN, Oscar Botero and Hakima Chaouchi (Telecom SudParis, France)

RSS Correction for Heterogeneous Devices in Fingerprinting based Localization System, Wendong Xiao (Institute for Infocomm Research, Singapore) and Boon Hee Soong (Nanyang Technological University, Singapore)

A Wireless Sensor Network for Long-term Large-scale Lake Water Quality Monitoring, Siliang Gong (Chinese Academy of Science, China), Jian Ma (Wuxi Sensingnet Industrialization Research Institute, Wuxi, China), Long Cheng (Beijing Univ. of Posts and Telecomm., China), Yingguan Wang (Chinese Academy of Science, China) and Xiong Li (Beijing Univ. of Posts and Telecomm., China)

15:00-15:30 Tea/Coffee Break

15:30 - 17:00 Panel Discussion: Internet of Things ---- Hype or Reality?

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Jiannong Cao, Hong Kong Polytechnic University, Hong Kong

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