Connections 2009
ECE Graduate Symposium, U of T
May 14, 2009
Welcome to the fifth annual University of Toronto Electrical and Computer Engineering (ECE) Graduate Symposium, Connections 2009. The objectives of this event are to promote interaction between members of industry and our graduate students and faculty, to learn about current research, to encourage cross-discipline research and to identify future directions and collaboration opportunities. This year we have presenters from 7 ECE groups: biomedical, communications, computer, control systems, electromagnetics, energy systems, photonics, and system control. We have prepared for an eventful program with:

- 35 short graduate student presentations
- A keynote speech by Dr. Tom Chau
- A panel session with U of T professors and company representatives
- A plenary session with presentations from Xilinx and The Innovations Group (TIG)

You will find more details about these events in the following pages. We hope that you will enjoy meeting our researchers and hopefully we will see you again next year.
## Schedule

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<td>10:30 – 11:00</td>
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<td>12:00 – 13:00</td>
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<td>ECTI Lab Tour</td>
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<td>15:30 – 17:00</td>
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<td>Awards Presentation for Top Speakers</td>
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<td>17:00 – 19:00</td>
<td>Showcase Dinner (GB202)</td>
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Keynote Speech
9:10 am – 9:30 am

Speaker: Dr. Tom Chau

BA 1180

Tom Chau is the principal investigator in the PRISM lab. He is a Senior Scientist and Theme Leader, Innovation & Development, in the Bloorview Research Institute, and an Associate Professor and Graduate Coordinator of the Clinical Engineering Program, Institute of Biomaterials & Biomedical Engineering at the University of Toronto.

Dr. Chau holds a Canada Research Chair in Pediatric Rehabilitation Engineering (Canadian Institutes of Health Research). He also holds a doctorate in systems design engineering, with a specialization in pattern analysis and machine intelligence (Waterloo), a Masters in electrical & computer engineering (Toronto) and a Bachelors in engineering science (Toronto).

Dr. Chau's research interests lie in the exploitation of intelligent systems to maximize possibilities for children and youth with disabilities. A central focus of his activities is on enabling access for those who otherwise would have no means of communication or interaction with the environment.

Dr. Chau was recently honored with an Early Researcher Award (Ministry of Research & Innovation). Other notable accolades include: Canada's Top 40 Under 40 (Caldwell Partners), For Kids Sake Award (Rogers Communications), Maclean's Honour Roll (Maclean's Magazine) and Young Engineer Medal (Professional Engineers Ontario).
Session 1: **Performance I**
9:30 am – 10:30 am

BA 1180

1-1 **Peter Yiannacouras**, yiannac@eecg.utoronto.ca
FPGA-Based Vector Chaining

1-2 **Eric LaForest**, laforest@eecg.utoronto.ca
Efficient Implementation of Multi-ported Register Files on FPGA

1-3 **Steven Birk**, sbirk@cs.toronto.edu
Parallelizing FPGA Placement Using Transactional Memory

1-4 **Daniel L. Ly**, daniel.ly@utoronto.ca
A Distributed FPGA Architecture for Restricted Boltzmann Machines

1-5 **Jin Jin**, jinjin@eecg.toronto.edu
Multimedia Multicasting in Next Generation Wireless Communication Networks

1-6 **Ali Khanafar**, ali.khanafar@utoronto.ca
Transceiver Design for Broadband Wireless Communications
Session 2: **Reliability and Productivity**  
9:30 am – 10:30 am

BA 1190

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**2-1 Yunfeng Lin,** ylin@eecg.toronto.edu  
Data Persistence in Large-scale Sensor Networks with Decentralized Fountain Codes

**2-2 Hong Xu,** henryxu@eecg.toronto.edu  
XOR-Assisted Cooperative Diversity in OFDMA Wireless Networks: Optimization Framework and Approximation Algorithms

**2-3 Vincent Mirian,**  
Scalable Macro-Pipelined Accelerator (SMPA for Matrix Multiplication)

**2-4 David Han,** han@eecg.toronto.edu  
Directive-based GPU Programming

**2-5 Chuck Zhao,** czhao@eecg.toronto.edu  
Efficient Software-only Check-pointing Support for Debugging

**2-6 Navid Toosizadeh,** navid@eecg.utoronto.ca  
PVT-aware Self-tuning Design
Session 3: **Performance II**
11:00 am – 12:00 am

BA 1180

3-1 **Yang-Yang Li**, yy.li@utoronto.ca
Cognitive Channel Reuse for User-deployed Femtocells

3-2 **Bijan Golkar**, bijan@comm.utoronto.ca
Resource Management in Autonomous Infrastructure-based Cellular Networks

3-3 **Martin Labrecque**, martinl@eeeg.utoronto.ca
Maximizing the Returns of Parallelism in FPGA-based Processors

3-4 **Dharmendra Gupta**, danny.gupta@utoronto.ca
Acceleration of CDO pricing on FPGA

3-5 **Alireza Heidar-Barghi**, arhdr@eeeg.toronto.edu
Matching Algorithms to Computing Architectures

3-6 **Etienne Veilleux**, etienne.veilleux@utoronto.ca
Interconnection of Wind Turbines Using DC Grid
Session 4: **Functionality I**
11:00 am – 12:00 am

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BA 1190

### 4-1 Jason Luu, jason.luu@utoronto.ca
Packing for Heterogeneous FPGAs

### 4-2 Yibin Chen, yibin@eecg.utoronto.ca
Error Trace Compaction Using Satisfiability Solving

### 4-3 Zimu Liu, zimu@eecg.toronto.edu
Why Are Peers Less Stable in Unpopular P2P Streaming Channels?

### 4-4 James Huang and Lionel Litty, z.huang@utoronto.ca
Ocasta: Separating Wheat from Chaff for System Configuration Management

### 4-5 Daniel Fingas, d.fingas@utoronto.ca
Autonomous Operation of A Parallel-Converter Motor Drive

### 4-6 Jurgen Aliço, jurgen.alico@utoronto.ca
Multimode Digital Current Program Mode Controller
Session 5: **Modeling**
2:00 pm – 3:00 pm

BA 1180

5-1 **Mohamed Zakaria Kamh**, m.zakariakamh@utoronto.ca
   A Hybrid HNN-QP Based Approach for Dynamic Economic Dispatch Problem Solution

5-2 **Elham Safi**, elham@eecg.utoronto.ca
   Modeling and Optimization of Delay and Power for Processor Components

5-3 **Guang Ji**, gji@comm.utoronto.ca
   Stochastic Rate Control of VBR Scalable Video Streaming over Wireless Network

5-4 **Henry Wong** and **Danyao Wang**, danyao.wang@utoronto.ca
   Packet Network Simulator-on-Chip

5-5 **Jimmy Qiu**, jimmy.qiu@utoronto.ca
   Cough Detection and Forecasting for Radiation Therapy
Session 6: **Functionality II**
2:00 pm – 3:00 pm

BA 1170

6-1 **Samuel Tien-Chieh Huang**, s.huang@utoronto.ca
   Hardware Realization of Discrete Event System Diagnosers

6-2 **Hien K. Goi**, hien.goi@utoronto.ca
   Vision-Based Vehicle Trajectory Following with Constant Time Delay

6-3 **Brian Keng**, brian.keng@gmail.com
   A Succinct Memory Model for Automated Design Debugging

6-4 **Levent Kayili**, levent.kayili@utoronto.ca
   Superluminal Group Delay and “Detection Latency” in the Presence of Noise for Communication Systems

6-5 **Sinisa Colic and Josh Dian**, sinisa.colic@utoronto.ca
   Biologically Inspired Stimulation for Epilepsy Control

6-6 **Jason R. Grenier**, j.grenier@utoronto.ca
   Using Light to Make Light Devices
Lab Tours

The Emerging Communications Technology Institute (ECTI) is an interdisciplinary, inter-faculty research institute based at the University of Toronto. ECTI provides global university-based leadership through access to state-of-the-art research facilities, promotion of collaborative research with strategic partners, and by facilitating advanced educational opportunities and information exchange events.

Session 1: ECTI Bahen Prototyping Cleanroom
Location: BA 7180

Lab description: The Bahen Cleanroom provides two large areas in which to fabricate devices in silicon, compound semiconductors, ceramic, glass, and polymer. Resources include a Class 1000 photolithography/wet chemistry space, including two fully exhausted acid wet benches, and a Class 10,000 space housing deposition and etching machines.

Session 2: ECTI Electron Beam nanolithography Facility
Location: Wallberg Room 38 (basement)

Lab description: ECTI's recently opened Electron Beam Nanolithography Facility is in the basement of the Wallberg Building. The Class 100 cleanroom space houses an Electron Beam Lithography tool, and is the only one of its kind in Ontario or Western Canada. With the capability to define features as small as 7 nanometres, this technology offers a broad-base fabrication platform for research in areas ranging from electronic devices and integrated optics to the emerging fields of nanobiotechnology, nanoelectromechanical systems (NEMS), nanophotonics and nanomagnetics.
Panel Session
3:30 pm – 5:00 pm

BA 1180

Topic: “The future of research in Canada”

Panel members:

• **Jennifer MacInnis**
  Director of Intellectual Property and Contracts, University of Toronto
  VP Research.

• **Jonathan Rose**
  Professor and Chair of the Edward S. Rogers Sr. Department of
  Electrical and Computer Engineering, University of Toronto.

• **Av Utukuri**
  President and CTO of Nytric Ltd., a leading Innovation Consulting
  Firm that creates cutting edge technologies to turn innovative ideas into
  successful products.

• **Cameron Serles**
  Founder, President and CEO of Xiris Automation Inc., a manufacturer
  of “machines that can see” defects in manufactured goods, primarily for
  the global optical disc (CDs, DVDs) and metal fabrication industries.
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Symposium Chairs

Ali Khanafer
Guang Ji
Bogdan Simion
Brian Keng
David Han
Dharmendra (Danny) Gupta
Mohammad Shahin Mahanta
Tao Xu

Advisers

Prof. Jonathan Rose, Department Chair
Jason Luu, Connections 2008 Symposium Chair
Xavier Pena, TIG
Symposium Map
Bahen Centre for Information Technology
40 St. George Street
Toronto, Ontario
Sponsors

Platinum:

Gold:

Faculty of Applied Science and Engineering University of Toronto

Graduate Student Society

Silver:

Graduate Students’ Union

XILINX

CMC Microsystems

IEEE Graduates of the Last Decade

IEEE Toronto Section

The Toronto Section of the Institute of Electrical and Electronics Engineers