

Joint Communications

UBC IEEE Student Branch

**Mobile robotic research at UBC
-Thunderbird Robotics -
the future is autonomous**

John A. Meech
Keevil Institute of Mining Engineering
Monday 01 February 700 - 900pm
BCIT Burnaby campus SW3 - 1750

Research into autonomous ground vehicles has been on-going at the University of British Columbia by an undergraduate student group called Thunderbird Robotics since 2004. The work began with development of an entry into the 2005 DARPA Grand Challenge in which a 1991 Jeep Cherokee was converted into a telerobotic system by creating a removable robotic driver. Later this vehicle was adapted to be driven fully-autonomously to enter the 2007 DARPA Urban Challenge. Since then, the group has been involved in five independent, yet interlinked projects:

1. 1/10 Scale Autonomous Robot Racing
2. Robotic Soccer Team
3. The NASA Regolith Excavator Centennial Challenge
4. The Zero-Emissions Race Around the World
5. Development of a Fully-Autonomous Mine-Haulage Truck System

The approach taken in these projects involved three main sub-systems - hardware, software, and instrumentation conducted in a collaborative fashion by about 400 students over the years.

The presentation will describe these projects - how each was conceived, coordinated, and completed. The various successes and failures will be discussed and projected into what the future may hold for robots in society.

Speaker: John Meech is Professor in the Norman B. Keevil Institute of Mining Engineering at the University of British Columbia. He is Director of CERM3 (Centre for Environmental Research in Minerals, Metals, and Materials), a multidisciplinary team of over 30 researchers who conduct studies on Mining and the Environment.

Mobile..

**Game Theory:
What a Dilemma!**

Adam Noel
ECE MASc Student
Thursday 28 January at noon
McLeod 418, UBC Campus
(Lunch and Learn Series)

The UBC IEEE student branch has kick-started a new "Lunch and Learn" series on Thursdays at noon each week.



One or two speakers will make presentations in a casual atmosphere on anything interesting, inspirational, or educational.

For example the pilot session held on Thursday 21 January at noon featured:

- Angshul Majumdar, ECE PhD Student
Energy Efficient Wireless Sensor Networks
- Roee Diamant, ECE PhD Student
Spatial Reuse Protocols for Ad-Hoc Underwater Acoustic Communication Network

The series will continue every Thursday throughout the school term. Details on the location and the speakers for each session are being posted at

<http://www.ieeeubc.org/blog/category/lunch-learn/>, and in the online Contact at <http://clients.teksavvy.com/~specific/>

While the presentations are geared towards undergraduates, all are welcome to attend. The student branch is hoping to attract presenters from inside and outside the UBC community in order to offer a diverse set of sessions. Anyone who would be interested in participating or learning more is invited to email lunch.and.learn@ieeeubc.org.

ICICS/IEEE

11FEB

Workshop on future communication systems

Open to the public

Friday 05 March 2010 - 800am to 400pm
Kaiser 2020/2030 - 2332 Main Mall, UBC
Registration through website is required and free of charge
<http://icics.ubc.ca/comm-workshop/>

KEYNOTE SPEAKER ONE

A COMPUTER SCIENTIST LOOKS AT THE ENERGY PROBLEM

Randy H. Katz
Berkeley
900am 940am

In this talk, we describe LoCal, a research project at Berkeley that applies the lessons of the Internet, for building distributed and robust communications infrastructures, to a radical new architecture for energy generation, distribution and sharing. We introduce the concept of packetized energy, stored and forwarded to where it is locally needed, exploiting technology for more efficient energy storage. Like the Internet, quality is achieved end-to-end via protocols over a best-effort, resilient and scalable infrastructure. Distributed management and storage enables dramatic reductions in peak-to-average energy consumption, influencing infrastructure provisioning and investment, and enabling a virtuous cycle of power-limited design. Our architectural building block, intelligent power switching, permits use of diverse, even non-traditional energy storage. Rather than replacing the grid, we overlay it, providing independence from existing generation and transmission systems. Our approach is suited to environments where it is desirable to add incremental generation and distribution, where a centralized infrastructure is prohibitively expensive to deploy as in third world or remote regions (e.g., military or humanitarian operations), or where continued operation in the face of natural disasters is highly desirable (e.g., post-Katrina or post-earthquake disruption of the wide-area energy grid). Management of local demand is also important to dynamically reduce load to remain independent of the grid for as long as possible.

KEYNOTE SPEAKER TWO

**THE CHALLENGES IN ACHIEVING A SMART GRID:
THE BC HYDRO JOURNEY**

Ralph Zucker
BC Hydro
940am 1010am

The world now agrees: smart grids are good for customers, for the economy, and for the environment. Indeed, smart grids are being seen as a critical component of advanced power delivery systems including the rapid integration of a variety of distributed energy resources. BC Hydro has been on this journey for several years. While many challenges have been overcome, many more remain. The complexities of deploying new technologies and achieving effective systems integration, combined with the challenges of managing interdependent business needs and stakeholder expectations, is resulting in one of the most exciting industry transformations of all time. In this session you will learn about the specific challenges that BC Hydro faces on this journey, and the opportunities waiting to be fulfilled.

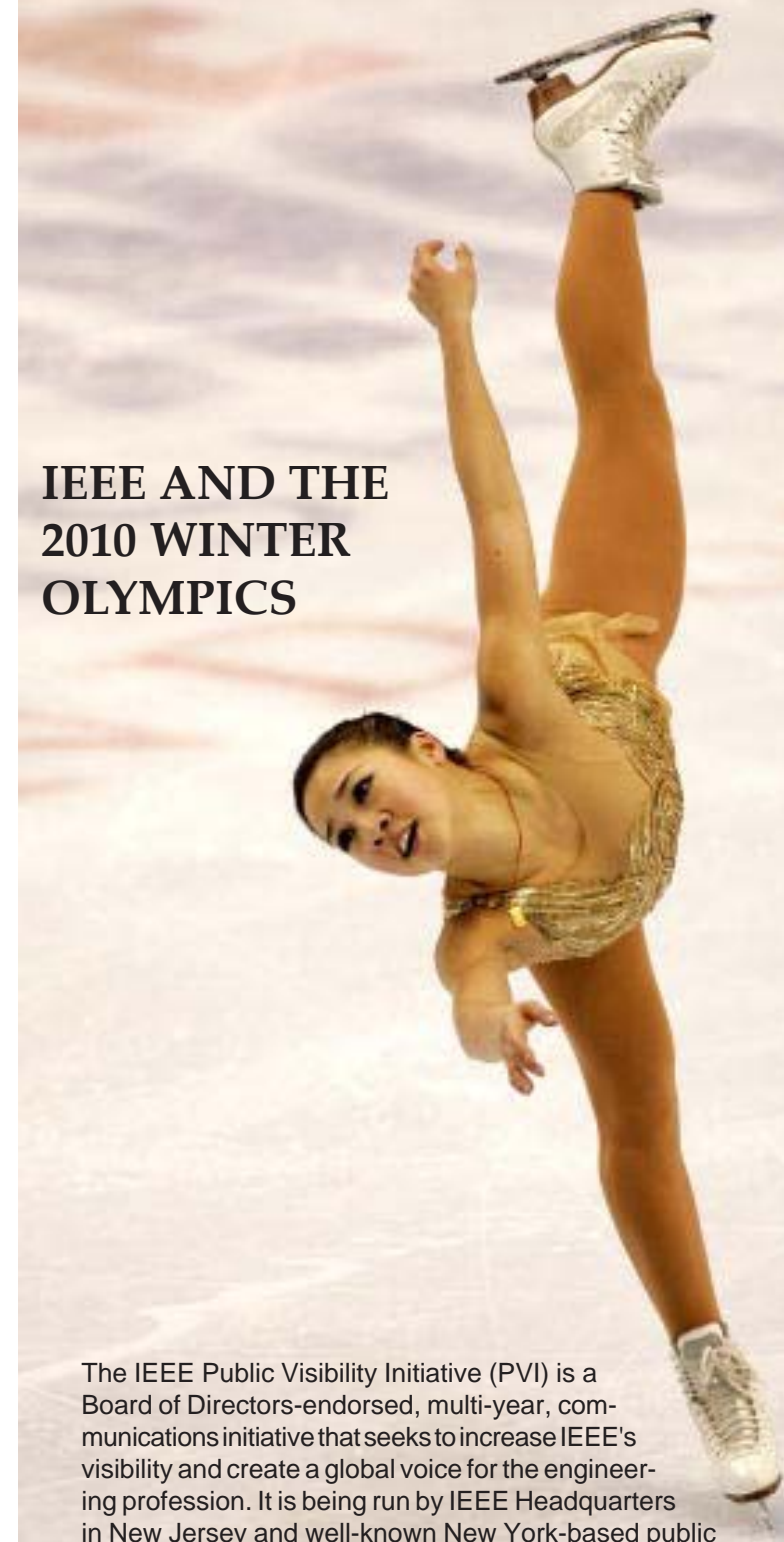
**Following the keynotes will be five regular sessions
with a total of 12 presentations from
industry collaborators, faculty, and students.**

*There will also be a student poster session during lunch time.
We will provide lunch, and there will be two coffee breaks.*

Visit online CONTACT

<http://clients.teksavvy.com/~specific/>
for complete details as they become available
Details and free registration also available at
<http://icics.ubc.ca/comm-workshop/>

**IEEE AND THE
2010 WINTER
OLYMPICS**



Can you or a colleague speak to any of the following issues concerning preparation for the 2010 Winter Olympics?

- City development and infrastructure in preparation for the Olympics
- Handling communications during the Olympics
- Cell phone usage during the Olympics and how wireless companies prepare
- Prosthetics as they relate to the Paralympics
- Product development and engineering for Olympians gear
- Development and coordination of simulation centers at the Olympics

If so, the IEEE Public Visibility Initiative would like to hear from you.

Please contact Section Chair Dave Michelson, dmichelson@ieee.org so that he can add your name to the list to be forwarded to IEEE Headquarters

The IEEE Public Visibility Initiative (PVI) is a Board of Directors-endorsed, multi-year, communications initiative that seeks to increase IEEE's visibility and create a global voice for the engineering profession. It is being run by IEEE Headquarters in New Jersey and well-known New York-based public relations firm Ruder Finn, Inc. Details can be found at https://www.ieee.org/web/volunteers/secure/public_visibility/index.html.

The critically acclaimed "IEEE - One Voice" video is their creation: <http://www.ieee.org/web/aboutus/toolkit/brand/videos.html>.

The IEEE PVI is putting together a media kit that will direct media to IEEE members who can help reporters and the media understand and report accurately on technology issues surrounding the 2010 Winter Olympics. IEEE HQ and Ruder Finn, Inc. will make the process as simple and straightforward as possible.

This is a rare opportunity to engage the media and raise the profile of the profession. IEEE greatly appreciates your participation.

Message from the Chair

One of IEEE Canada's most important roles is to recognize the achievements of its members through its extensive program of awards. Sections play an important role by ensuring that deserving and qualified members are nominated before IEEE Canada's 30 November deadline. A listing of the IEEE Canada Achievement Awards is given below. More information is available at <http://www.ieee.ca/awards/nominate.htm>

During the next few months, IEEE Vancouver Section will establish a Major Awards Committee consisting of leaders from both industry and academia. The Committee will be responsible for identifying potential candidates from Vancouver Section and ensuring that they are nominated for these awards. Of particular concern is ensuring adequate recognition of the achievements of IEEE members from industry.



In the mean time, we ask members of Vancouver Section to begin thinking about possible candidates for IEEE Canada Major Awards who we might nominate next fall. Any thoughts, suggestions or concerns? Please contact Dave Michelson, Section Chair, dmichelson@ieee.org.

IEEE Canada Achievement Awards

A.G.L. McNaughton Award

IEEE Canada remembers, through the A.G.L. McNaughton Gold Medal, General McNaughton's contributions to the engineering profession in Canada. Recipients of this medal are outstanding Canadian engineers recognized for their exemplary contributions to the engineering profession. Established in 1969, the award consists of a gold medal, a plaque, and a travel allowance to the awards ceremony (if required). Sponsored by IEEE Canada.

R.A. Fessenden Award

IEEE Canada remembers, through the R.A. Fessenden silver medal, his pioneering transmission of intelligible speech by electromagnetic waves. Recipients of this medal are outstanding Canadian engineers recognized for their important contributions to the field of telecommunications engineering. Established in 2000, the award consists of a

silver medal, a plaque, and a travel allowance to the awards ceremony (if required). Sponsored by TELUS.

Electric Power Award

Recipients of this medal are outstanding Canadian engineers recognized for their important contributions to the field of electric power engineering. Established in 2007, the award consists of a silver medal, a plaque, and a travel allowance to the awards ceremony (if required).

Computer Award

Recipients of this medal are outstanding Canadian engineers recognized for their important contributions to the field of computer engineering and science. Established in 2007, the award consists of a silver medal, a plaque, and a travel allowance to the awards ceremony (if required).

Outstanding Engineer Award

Recipients of this medal are outstanding Canadian engineers recognized for their important contributions to Electrical and Electronics Engineering. Normally not available to candidates in telecommunications engineering, power engineering, or computer engineering or science. Established in 1994, the award consists of a silver medal, a plaque, and a travel allowance to the awards ceremony (if required).

Outstanding Engineering Educator Award

Recipients of this medal are outstanding Canadian engineers recognized for sharing their technical and professional abilities through teaching (in industry, government or an institution of higher learning) and in doing so have made an outstanding contribution to engineering education. Established in 1994, the award consists of a silver medal, a plaque, and a travel allowance to the awards ceremony (if required). Sponsored by the Canadian Heads of Electrical and Computer Engineering Departments.

Industry Leadership Award

Recipients of this medal are outstanding Canadian professionals recognized for their important leadership contributions in Canadian industry where there is significant activity in areas of interest to IEEE. Established in 2009, the award consists of a silver medal, a plaque, and a travel allowance to the awards ceremony (if required).

Call for Presentations

IEEE Mini-Symposium on Biomedical Engineering

IEEE Vancouver Section is hosting an IEEE Mini-Symposium on Biomedical Engineering to be held one afternoon about mid-April 2010 (to be finalized) at McKesson Imaging Group in Richmond, BC. Attendance will be free-of-charge and open to all. Space is limited, however, so pre-registration will be required.

The event will be a joint effort of the Section, our Technical Society Chapters, our Academic Collaborators and our Industrial Sponsors.



Proposals for 20-minute presentations on topics related to biomedical engineering, including communications, computing, signal processing, safety and reliability, and electromagnetic compatibility are solicited. For more information, please contact Prof. Dave Michelson, Section Chair, dmichelson@ieee.org.



..Mobile

He teaches Industrial Automation and Robotics, Introduction to Mineral Processing, and Artificial Intelligence in the Mining Industry. His research activities include Safety Issues at High-Impact Velocities, Autonomous Open Pit Haulage Vehicles, Geothermal Activities in British Columbia (both low- and high-temperature applications, and Mercury Use in Gold Mining.

In 2004 he founded a student-run group called IBC Thunderbird Robotics that conduct applications of mobile robotics in a variety of competitive environments that included the BARPA Grand and Urban Challenges, the NASA Regolith Excavator Challenge, the University of Waterloo Robot Racing Competition, Robo-Cup Robotic Soccer, and the Zero-Emissions Electric Car Race. More than 400 students from across the Faculty of Applied Science have participated in this club over the past 5 years.

Info: Email Joint Communications Chair Alon Newton, anewton@ieee.org

Chapter News

The following changes to our Technical Chapter organization have been approved by IEEE Member and Geographic Activities:

- A new IEEE Joint Aerospace and Electromagnetics Chapter (Steve McClain and Prof. Dave Michelson, co-chairs) has been formed. It will merge our former IEEE Joint Geoscience and Remote Sensing Chapter and our former Joint Product Safety and Reliability Chapter. It now includes the IEEE Electromagnetic Compatibility Society and the IEEE Microwave Theory and Techniques Society, as well. The official re-organization date is 11 November 2009. The society codes for the joint chapter are AES10/EMC27/GRS29/MTT17/PSE43/RL07. It will inherit the geo-code CH07116 from its predecessor.

- The IEEE Joint Communications Chapter (Alon Newton, Chair) has been expanded. In addition to the IEEE Communications Society, Antennas and Propagation Society and Vehicular Technology Society, it now includes the IEEE Photonics Society. The official re-organization date is 11 December 2009. The society codes for the joint chapter are AP03/VT06/COM19/PHO36. The geo-code remains CH07045.

The following changes to our Technical Chapter organization have been approved by the Vancouver Section Executive Committee:

- Prof. Ljiljana Trajkovic, Chair of our IEEE Circuits and Systems Society Chapter (joint with IEEE Victoria Section), has also taken on the role of Chair of our IEEE Systems, Man and Cybernetics Society Chapter.

SFU IEEE Student Branch striving for prominence

Many people in the Vancouver Section have wondered why the SFU student branch (SB) became dormant in the last couple of years, to a point when the student branch website disappeared, and the student executives were nowhere to be found. Not too long ago, as our branch counselor Dr. Glenn Chapman recalled, SFU SB was one of the most active branches in western Canada, and it had collected many awards. Indeed it was true. In the mid-90s, SFU SB was awarded the best Student Branch Award. During the heyday, SFU's IEEE student members even competed in various competitions, and collected many individual awards, and made the School of Engineering Science at SFU very proud.

So what happened in the last couple of years? Why was there a discontinuity between student executives and the rest of the world?



Congratulations! Robert Schober University of British Columbia on elevation to IEEE Fellow for contributions to wireless communications

None of the current executives knew because it was far before our time, but Dr. Chapman offered the following explanation. SFU is unique compared to other universities because of the tri-semester system, and students would go for a 4-month, or 8-month, or sometimes a 12-month co-op if a good opportunity arose. Therefore, an executive could be away from campus for a year without properly having a successor to take on the role. As a result, meetings were not held, and the branch became eventually dysfunctional.

And from that point on, the SB was revived. The SFU SB is now once again active. With the energy and efforts provided by our grad and undergrad students, we are now rolling out some exciting activities for our student body. We hold regular meetings, and we send representatives to attend Section meetings. We volunteer at local IEEE-sponsored events, connecting with other SBs, and most importantly, we are growing our membership base. We feel that 2010 will be a year when we become prominent again!

It was until mid-2007 when I browsed through the IEEE Vancouver Section website and noticed about IEEE Student Branches. I thought to myself, this is such a great opportunity to become a volunteer for the SB, meet other students, establish better relationship with faculty, and network with IEEE profes-

sionals. So I decided to find out more from my local SB. Unfortunately, communication broke down, until Dr. Ljiljana Trajkovic stepped in and helped us set up a meeting to get things started once again.

SFU IEEE Student Branch Chair, Duncan Chan dchana@sfu.ca

Challenges and limits for secrecy in wireless networks: an information theoretic framework

Dr. Mauro Biagi
Visiting Assistant Professor, UBC
Tuesday 09 February 500 - 600pm
SFU ASB 10900
(IRMACS Presentation Studio)

Wireless transmission requires the access to a shared medium, so the communication may be susceptible to adversarial eavesdropping. It is well known that 'secrecy' means 'cryptography' but, since the current and future technologies seem to require devices with very high performance at low costs, it appears clear the need for a help from the physical layer. This last could allow the device to save the processing power that is a not-secondary source of power consumption and battery life reduction.

The Information Theoretic approach, in this sense, may aid cryptography since the work to be done for assuring a good degree of confidentiality could be shared between power allocation and cryptography. The considered framework is that of a MIMO ad-hoc network but it can be extended also to a centralized one. By fact, in this context, Space Division Multiple Access (SDMA) techniques could be the key to gain against eavesdropping at very low cost since the well known Waterfilling solution, conventionally used to maximize information rate without paying attention to secrecy level, is re-shaped in order to account for the possible presence of eavesdroppers.

Speaker: Mauro Biagi received the laurea degree in communication engineering in 2001 and the Ph.D. in information and communication theory in January 2005 from the INFO-COM Department of the University of Rome "La Sapienza" where he covers the position of Assistant Professor since 2006.

His research is focused on several topics of communications engineering. In particular, by

dealing with wireless communications, one of the main research field concerns Multi-antenna systems both from a physical (PHY) layer point of view (coding, signal processing and information theory) and a Multiple Access one (resource management, power allocation, and Space Division Multiple Access). Concerning Ultra Wide Band systems, the involvement in the research activities deals with timing recovery and pulse shaping algorithms both for single antenna and multiple antenna schemes.

Finally regarding wireline communications, he is in the PLC ComSoc Group to propose solution for power line communication standards since he is involved in several research projects dealing with PHY-MAC problems. He is associate editor of the International Journal of Ultra Wideband Communications and Systems (IJUWBCS) and currently visiting assistant professor at the University of British Columbia, Dept. of Elec. & Comp. Engineering.

Cosponsors: IEEE Circuits and Systems Society Joint Chapter of the Vancouver/Victoria Sections IEEE Systems, Man, and Cybernetics Society Chapter of the Vancouver Section
Info: CAS Chair Ljiljana Trajkovic, ljilja@cs.sfu.ca



INTERNET PROTOCOL DOUBLE HEADER

Introduction to IPv6

Andrew Daviel
TRIUMF

Monday 15 February 730 - 900pm
Rm 1025 Bldg SW1 BCIT

The Internet Protocol, version 4 (IPv4), with its familiar dotted-quad addresses, is 30 years old. It works fairly well, but there's a problem - there are not enough addresses, and within a couple of years they will run out. A new version of the protocol (IPv6) was introduced in 1995, which has a vastly larger address space, but it is incompatible and implementation has been slow. I will talk about the basic concepts, and business case for IPv6 deployment.

IPv6 Networking

Andrew Daviel
TRIUMF

Monday 15 March ???-???pm
????

The Internet Protocol, version 6 (IPv6), is designed as a replacement for the familiar version 4. I will talk about the basic addressing concepts, and show some common tools (ping, traceroute, Wireshark) running on an IPv6 network. While IPv6 is largely transparent to the end user, there are significant implications for network administrators, security managers, and application programmers.



Speaker: Andrew Daviel is the Network Security Manager at TRIUMF, where he also has responsibilities for videoconferencing, email, PKI and DNS. He graduated in Physics+Electronics at the University of Manchester when they still used punch cards, and worked on computer-assisted sonar in the UK before moving to Canada in 1981. He built his first home computer in 1978 and has been a Linux user since 1994.

Sponsors: Co-hosted by the Vancouver Linux Users Group [<http://www.vanlug.bc.ca>]

Info: Computer chair Sathish Gopalakrishnan
gsathish@computer.org



IEEE
EMBS-UBC Chapter

27JAN

GRAND ROUND

Tuesday, February 9th, 2010
4:00p.m. – 5:00p.m.

CHBE Room 101
2360 East Mall

Tales from a Medical Device Start-up



Kevin Chaplin

Vice President of Business Development,
Kardium Inc.

Kardium was founded in 2007, based on some great ideas and an empowering management philosophy. Kardium is currently developing 3 products to treat Atrial Fibrillation, Mitral Valve regurgitation and Sternal Closure. Kevin Chaplin will provide an overview of these three markets and the product technologies that Kardium is working on. He will share some of the challenges of product development, and also some of Kardium's management philosophy, which has been essential in building a start-up medical device company. This session will give you an overview of Kardium's exciting technology, as well as insight into the world of a medical device start up.

Kevin Chaplin has been leading the product management and business development efforts at Kardium, a Vancouver medical device start up, since the beginning of 2008. Prior to that, Kevin held business management positions for local companies such as Sierra Wireless and Kodak. He also has technical and management experience in mining, telecommunications, and management consulting. Kevin has a degree in Chemical Engineering from the University of Cape Town, and an MBA from the school of hard knocks.



IEEE Technical Seminar –
Engineering in Medicine and Biology Society – Vancouver
EMBS – UBC Student Chapter

****LIGHT REFRESHMENTS SERVED AT 3:45PM****
****SEMINAR STARTS PROMPTLY AT 4:00PM****

Biomedical Engineering Graduate Program Office
218-2360 East Mall Vancouver BC V6T 1Z3

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