IEEE VANCOUVER CONTACT

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## IEEE Vancouver 2015 Volunteer Nominations

Dear IEEE Vancouver members,

I hope everyone had a great summer so far. The weather mostly cooperated this year in BC so no complaints there. As the season changes we also have some annual duties in regard to the IEEE volunteering positions. We are planing to hold elections this year in order to hear from the membership and open the door for new volunteers to participate. I strongly suggest for those who have never volunteered with IEEE Vancouver before to gather information by talking to the section vice chair or any other current officer to understand the duties and responsibilities.

There are a lot of benefits but it does require some of your time and may not be suitable to everyone. There are also some restrictions in the IEEE MGA bylaws and IEEE Vancouver bylaws which were put in place carefully to protect the organization. I would like to remind you that IEEE Vancouver and some of our chapters have won best Section and Chapter awards multiple times and we are well known for the quality of our people. Yes, IEEE Vancouver is made of people. We do not have a lot of assets besides our strong professional membership. So I call on you to consider volunteering with the organization and take part in the upcoming elections. I would like to see more of you vote as well. We plan an electronic vote which will take only few minutes of your time and we're hoping to see greater participation. It is a difficult request these days of information overload but necessary to maintain a professional democratic operation. Feel free to reach me or any other current executive with your questions and comments.

Alon Newton SMIEEE P. Eng
IEEE Vancouver Section Past Chair
2014 IEEE Vancouver Nomination Committee Chair

# Warm Dense Matter:
# The transition state between solid and Plasma

Andrew Ng
UBC

**Distinguished Lecturer**

Monday 15 September
4:00 PM.

TRIUMF Auditorium
4004 Wesbrook Mall
Vancouver, BC

Warm Dense Matter refers to states in which the electron temperature is comparable to the Fermi energy and the ion-ion interaction potential exceeds the ion kinetic energy. Physical properties of such states are dominated by degeneracy, excited electronic states, and strong ion-ion correlation. Warm Dense Matter occupies an important region of the phase diagram as the transition state between solid and plasma. Yet, it cannot be described adequately by either condensed matter or plasma physics.

Since its introduction in 1999, Warm Dense Matter has emerged as a new frontier in condensed matter and plasma physics. It is also attracting growing interest in broad disciplines including matter under extreme conditions, high power laser ablation, inertial confinement fusion, shock wave, planetary physics and astrophysics. A daunting challenge in the study of Warm Dense Matter is the measurement of physical properties of a well-defined, uniform state.

In this lecture, I will highlight some of our discoveries made in femtosecond laser pump-probe experiments. These have revealed unique behaviours in lattice stability, electron-ion coupling and electron kinetics in Warm Dense Matter states far from equilibrium, underscoring respectively the condense matter, plasma, and atomic nature of Warm Dense Matter.

**Speaker:** Dr. Andrew Ng received his B.Sc. degree from the University of Hong Kong and his M.Sc. and Ph.D. degrees from The University of Western Ontario. Prior to joining the Department of Physics at the University of British Columbia in 1980, he was a National Research Council of Canada Postdoctoral Fellow in the Department of Electrical Engineering at the University of Alberta. In 2003, he joined the Lawrence Livermore National Laboratory as Scientific Director of the Jupiter Laser Facility. With the successful establishment of JLF, he returned to UBC in 2008 to continue research as an Emeritus Professor.

As a young student, he was attracted to the field of plasma physics by the excitement of fusion research as a means to produce a virtually inexhaustible source of energy. As a researcher, he has been fascinated by the multidisciplinary nature of plasma science. He is particularly interested in the link between condensed matter physics and plasma physics. He strives to understand the transition from a condensed matter to a plasma state in the regime for which he has coined the description “Warm Dense Matter”. This regime is also key to research in high pressure science, planetary science and inertial confinement fusion.

In 2000 Prof. Ng initiated the International Workshop on Warm Dense Matter to bring together scientists from a wide range of disciplines. The meeting has since been held in Canada (2000, 2005), Germany (2002), France (2007), Japan (2009), U.S.A. (2011). Prof. Ng is a recipient of the C.A. McDowell Medal and the Izaak Walton Killam Research Prize at UBC, the Lawrence Livermore National Laboratory Science & Technology Award, the Merit award and the PSAC award of IEEE Nuclear and Plasma Sciences Society. He is a Fellow of the American Physical Society and an IEEE Fellow.

**Information**
Joint Applied Physics
Chair
Ahmed Hussein
Ahmed.Hussein@unbc.ca

Francesco Ferro
PAL Robotics

**Distinguished Lecturer**

Tuesday 26 August

11am-noon
Kaiser 2020/2030
UBC

Sponsored by the joint chapters of IEEE Control Systems, Robotics and Automation, and Systems, Man and Cybernetics socities

**Information**
CS/RA/SMC
Joint chapter vice chair
Neda Eskandari
neda.eskandari@gmail.com

# PAL Robotics: history, research activities and collaboration opportunities

PAL Robotics is a robotics R & D company with a multi-national team from across the world, working specially in the humanoid robotics field. PAL Robotics has developed several humanoid robots: the biped REEM-A, REEM-B and the last creation REEM-C, and other with a mobile base, REEM-H1 and REEM. Its diverse team consists of people from various countries, mostly mechanic, electronic and software engineers with many years of experience in the robotics industry. The presentation consists of three main topics that will be explained in the following lines. Firstly, the history of the company and the several robots already developed will be introduced. The goals of the company, the strong relationship with the investors and the different humanoid robotics platforms and their characteristics will be also presented. Secondly, a selection of research lines will be showed. Navigation, walking, grasping, human robot interaction as well as hardware features will be presented. Finally, the different ways of collaboration with the company will be dealt: internships, co-advising master/PhD thesis, PhD programs, FP7 projects, etc. At the end some performance about REEMs events will be shown.

**Speaker**: Francesco Ferro obtained a BSc degree in Telecommunications Engineering in 2002 at the Politecnico di Torino. He began a PhD in Computer Vision but left it in 2004 to attend a robotics humanoid project, where he still works on. He started the development of stereo vision algorithms and later he joined the autonomous robot navigation team to implement various SLAM algorithms. In 2008 he became the manager of the software department of PAL. He obtained an MBA at the UB University in Barcelona in the 2011. From the beginning of the 2011 he is the CEO of PAL Robotics, in charge of REEM's humanoids robots development.

Robotics & Automation Society

CSS IEEE Control Systems Society

Systems, Man, & Cybernetics Society

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New Senior Members named at the July meeting of the A&A committee:

Okanagan subsection
**Ramon Lawrence**

IEEE Vancouver
**Allen Macphail**
**Ryozo Nagamune**

# Wi-Fi and Other ISM band unlicensed system: Their origins and future trends

Michael J. Marcus
Marcus Spectrum Solutions

Wednesday 27 August
3:30 pm

UBC ECE - MCLD 418
2356 Main Mall
Vancouver, BC

Please RSVP to
Prof. Dave Michelson,
davem@ece.ubc.ca
604 822-3544

**Information**
Joint Aerospace and Electromagnetics Chairs
Dave Michelson
davem@ece.ubc.ca
Steven McClain
StevenMcClain@ieee.org

In 1985 FCC created the unlicensed ISM bands that ultimately became the home of Wi-Fi, Bluetooth, ZigBee and a myriad of other useful products. What were they thinking at the time? While unlicensed had existed before, these new rules, quickly implemented also by IC in Canada, spurred an unprecedented spurt of wireless innovation that affected the general population with ubiquitous Wi-Fi hotspots as well as Bluetooth headsets.

This presentation will review the history of these bands including the role of serendipity. It will also discuss what the long term trends are and whether present trends can continue.

**Speaker:** Michael Marcus is a native of Boston and received S.B. and Sc.D. degrees in electrical engineering from MIT. Prior to joining the FCC in 1979, he worked at Bell Labs on the theory of telephone switching, served in the U.S. Air Force where he was involved in underground nuclear test detection research, and analyzed electronic warfare issues at the Institute for Defense Analyses. At FCC his work focused on proposing and developing policies for cutting edge radio technologies such as spread spectrum/CDMA and millimeterwaves.

Wi-Fi is one outcome of his early leadership. The total amount of spectrum he proposed for unlicensed use and directed the drafting of implementing rules was 8.234 GHz. He also participated in complex spectrum sharing policy formulation involving rulemakings such as ultrawideband and MVDDS. Awarded a Mike Mansfield Fellowship in 1997, he studied the Japanese language and spent at year at the FCC's Japanese counterpart. He retired from FCC in March 2004 after servicing a senior technical advisor to the Spectrum Policy Task Force and codirecting the preparation of the FCC's cognitive radio rulemaking.

Immediately after retirement he lived in Paris France for 3 years, consulting for US and European clients. In 2006 he was appointed Special Advisor to Mrs. Viviane Reding, European Commissioner for Information Society & Media. He is now Director of Marcus Spectrum Solutions LLC, an independent consulting firm based in the Washington DC area and focusing on wireless technology and policy. He is also Adjunct Professor of Electrical and Computer Engineering at Virginia Tech and the 2011-2013 chair of the IEEE-USA Committee on Communications Policy.

He was recognized as a Fellow of the IEEE "for leadership in the development of spectrum management policies", received in 1994 IEEE-USA's first Electrotechnology Transfer Award , and received in 2013 the IEEE ComSoc Award for Public Service in the Field of Telecommunications "For pioneering spectrum policy initiatives that created modern unlicensed spectrum bands for applications that have changed our world."

IEEE Joint Aerospace and Electromagnetics Chapter

Martin Huang
BC Hydro

Thursday 25 September
12:00 Noon - 1:00 PM

BC Hydro: Edmonds A01
Skytrain Room Auditorium

**Information**
Joint Power & Energy Chair
Rama Vinnakota
Rama.Vinnakota@bchydro.com

## Challenges in maintaining bulk electric system reliability in the changing industry

The power industry in North America is undergoing fundamental changes. Environmental regulations, development of intermittent resources, fuel prices and new technologies change not only how the bulk electric system is planned, but how equipment and resources are operated, controlled and dispatched. The presentation will highlight some of these changes and discuss the challenges ahead of us in maintaining the level of reliability for the bulk electric system.

**Speaker:** Martin Huang, Executive Director for Inter-Utility Operations, is responsible for inter-utility affairs, the operations of the wholesale transmission market under BC Hydro's Open Access Transmission Tariff, and reliability compliance for BC Hydro.

Martin has more than 25 years of experience in power system operations and planning with positions such as System Transmission Planning Engineer, Manager of System Control Center, Manager of Real Time Operations and Vice President, Grid Operations.

Martin represents BC Hydro at various external industry forums such as the Western Electricity Coordinating Council and the North American Electric Reliability Corporation.

Martin received his M. Eng degree and BASc degree in electrical engineering from the University of British Columbia and is a licensed engineer in the Province of British Columbia.

IEEE PES Power & Energy Society®

DEIS

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Michele Vincent
Alvana Business Consulting

Tuesday 23 September
doors 630 - talk 700
networking 800 - 830

1009 Expo Blvd
2nd Floor meeting room
Vancouver BC

**Information:**
Consultants Network Chair
Jim McKay
jbmckay@telus.net

## Writing proposals and establishing fees

**Speaker:** Michele Vincenti PhD, MBA, M.A., CMC, C.Mgr (Canada), CIM, C.I.M., FCSI, STI, CMgr (UK) F.CMI (UK) Michele Vincenti has over 25 years of experience in the financial sector, both as a consultant and as an executive in financial institutions. He highly skilled in strategic business planning with a focus on international development.

Michele is particularly adept in managing relationships and working as an agent of change management. Michele is a trusted consultant and is an Associate Faculty member at different Universities.

He is a member of the Canadian Association of Management Consultants (CAMC), Canadian Institute of Management (C.I.M.), Chartered Institute of Management London (UK)(CMgr and F.CMI). Member of the Institute of Management Consultants (IMC USA) IMC-USA and of the International Council of Management Consulting Institutes (ICMCI) www.icmci.org

CMC (Certified Management Consultant) is the certification mark awarded by the Institute of certified management consultants in USA. The CMC designation represents evidence of the highest standards of consulting and adherence to the ethical canons of the profession.

# INTELEC 2014 - *Resilient communications energy for our connected world*

The 36th annual conference to be held, from September 28 - October 2, at the Vancouver Convention Center in Vancouver. This year's keynote address entitled "Time for Reflection: Telecommunications and Electric Power Resilience" will be given by Alex Tang, a leading consultant on earthquake engineering of lifelines, such as telecommunications and electric power. In addition, daily plenary sessions from industry leaders Victor Goncalves, P.Eng, FEC (Chief Technology Officer Alpha Technologies LTD), Dr. Ewart Blackmore (Senior Research Scientist, TRIUMF), and Power Electronics legend Bruce Carsten (President, Bruce Carsten Associates) will provide their insights and industry perspectives on hot topics for the entire audience The technical program using oral presentations, poster sessions, workshops and daily plenary presentations will cover all of today's compelling topics such as:


- Resilient Power Systems
- Architectures for energy storage
- High efficiency and high density power supplies
- Remote line power
- Renewable energy generation
- DC/DC topology
- Islanded and grid-connected autonomous power systems
- Cooling techniques
- Power systems for commercial offices and data centersBattery technologies
- AC/DC converters
- 400V DC architecture
- Techniques and strategies for energy management
- Physical and thermal design
- Fuel cell technology
- Line powering of telecommunications systems Energy Storage

This Conference, which serves the broad community of researchers, suppliers and operators, explores new technologies presents the latest developments in communications energy systems and related power-processing devices and circuits. of power conversion, energy storage and systems design for telecom applications. To register for the conference, please go to www.intelec2014.org/registration. For more information including Conference Venue, Technical Program, Exhibition and Social Program, please visit www.intelec2014.org.

**Engineers, engineering managers and strategic development and planning managers**: Attend all IEEE VTC 2014 Fall and WiVeC plenaries, panels, workshops and technical sessions over 14-17 Sep 2014 for a Special Delegate registration rate of $100 USD! To register, please click http://www.cvent.com/d/44qxz0/4W

# VTC2014-Fall VANCOUVER

Connecting the Mobile World

**IEEE-Vehicular Technology Conference – Vancouver, Canada**

**Sept. 14-17, 2014 at the Westin Bayshore Hotel**

## Event Highlights

### Industry Tracks

**Major Industry & Technology Segments:**

- *5G Technology Evolution*
- *Propagation & Channel Modeling*
- *Wireless Network Design*
- *Wireless Freight Security and Efficiency*
- *mmWave Access Networks*
- *Autonomous Vehicles*
- *Connected Vehicles*
- *Electric Vehicles and Vehicular Electronics*
- *Developments in EV Recharging Infrastructure*
- *Automotive EMC Workshop*

***Sessions:***

There are hundreds of advanced wireless-technology presentations based on very recent research and development results by presenters representing organizations around the world.

An elite panel of speakers with expertise ranging from public policy, research and strategic development of products and services provide insight into this nexus of transportation's future. These leaders ask and answer the tough questions and invite you to open your mind and join the discussion and Q&A

**Ibrahim Gedeon**
VTC Conf. Co-Chair
CTO - TELUS

**Prof. David G Michelson**
VTC Conf. Co-Chair
University of BC

**Dave Atnikov**
CEO
Novax Industries

**Wen Tong**
Wireless CTO
Huawei Technologies

**Barrie Kirk**
Executive Director
CAVCOE

**Barry Einsig**
Global Transp. Exec.
Cisco Systems

**Todd Hubing**
Director- CVEL
Clemson Univ.

**Andrew Poliak**
Global Director
QNX

*IEEE VTC 2014 Fall features an Industry Program consisting of invited presentations by industry and university experts that will run in parallel to the regular Technical Program of peer reviewed papers. See highlights of the Industry Program at right!*

**For Exhibition/Sponsorship Opportunities Contact:**
**VTC@ICTSGroup.com**

## Day 1: Sun Sep 14, 2014 8am to 6pm
## Wireless Vehicular Electronic Communication Conference (WiVeC)

- Multiple In-Depth Tutorials.
- Wireless Vehicular Communications Workshop

## Day 2: Mon Sep 15, 2014 8am to 6pm - Welcome to 5G

Keynote Addresses - 5G Wireless Technologies
- Ibrahim Gedeon – CTO, TELUS
- Dr. Wen Tong – Wireless CTO, Huawei

Industry Session: Future Challenges – Mobile Radio Network Design and Optimization
- Dr. Yann Le Helloco – SVP & CTO, InfoVista, Canada,
- Dr. Pascal Chambreuil – Head Software Team, Orange Labs, France,
- Faris Alfarhan – Wireless Systems Eng., InfoVista, Canada

Industry Session: Millimetre Wave Access Technologies for 5G
- Yves Lostanlen – Siradel North America, Canada
- David Wessel – RF Designer, Huawei Technologies, Canada
- Rapeepat Ratasuk – Wireless Research Engineer, Nokia Solutions and Networks, USA

Industry Session: The Challenge of Defining 5G
- Dean Brenner – Senior Vice President, Government Affairs, Qualacomm, USA
- David Keegstra – CTO, Ericsson Canada
- Dr. Anthony Soong – Huawei Standards, USA
- Juan Ranuarez – TELUS, Canada

Special Industry Session: Wireless Technologies for Freight and Asset Tracking
- Dean Brickerd – Vice-President, Orbcomm, USA
- Dalibor Pokrajac – Guard RFID Solutions, Canada

## Day 3: Tue Sep 16, 2014 8am to 6pm – Automated & Connected Vehicles

Keynote Addresses – Automated and Connected Vehicles
- Barrie Kirk - Exec. Dir. Canadian Automated Vehicles Center of Excellence (CAVCOE)
- Barry Einsig - Global Transportation Executive, Cisco Systems, USA

Industry Session: Autonomous Vehicles (AV):
- Paul Godsmark- CTO CAVCOE
- Corey Clothier- President & COO, Induct Technologies
- Mohammad Ali- Sr. Researcher, Volvo, Sweden.
- Andrew Poliak- Global Director, QNX

Industry Session: Connected Vehicles (CV):
- Dave Atnikov – CEO, Novax Industries, Canada
- Geoff Cross – Senior Manager, Policy and Analytics, Translink, Canada
- Prof. Garland Chow – UBC Sauder School of Business

Industry Panel: Exploring the AV/CV - issues raised by previous speakers
- Moderator: John Niles – President, Global Telematics, USA
- Steve Marshall – Exec. Dir., Center. for Adv. Transportation and Energy Solutions
- Charlie Howard – Director, Integrated Planning, Puget Sound Regional Council, USA
- Plus Previous Session Speakers – Corey Clothier, Mohammad Ali, Geoff Cross

## Day 4: Wed Sep 17, 2014 8am to 6pm Electric Vehicles and Electronics

Keynote Addresses – Electric Vehicles and Vehicular Electronics
- Teaque Lenahan – Executive Director, Innovation Strategy, frog, USA
- Lee Stogner – President, Vincula Group & Chair, IEEE TEI

Industry Session: Electric Vehicle Charging Infrastructure
- Teaque Lenahan – Executive Director, Innovation Strategy, frog, USA
- Alec Tsang – Senior Technology Strategist BC Hydro, Canada
- Ian Neville – Project Manager, City of Vancouver, Canada
- Moutie Wali – Director, Technology Strategy and Operations, TELUS, Canada

Industry Workshop: Automotive EMC
- Todd Hubing – Director - Clemson University Vehicular Electronic Systems Lab., USA
- Joungho Kim – Prof. KAIST and Dir., Smart Automotive Electronics Research Ctr., S Korea
- Garth D'Abreu – Director of RF Engineering, ETS-Lindgren, USA
- Karim Boutraas - Manager, Energy Efficient Electronics, Hughes Research Labs, USA

# IEEE WORKSHOP ON AUTOMOTIVE EMC

## Wed, 17 Sep 2014 1:00 – 5:00 pm

***in conjunction with***

***Electric Vehicles & Vehicular Electronics Day at***
**IEEE Vehicular Technology Conference - Vancouver, Canada**
**Sept. 14-17, 2014 at the Westin Bayshore Hotel**


**Organizing Committee**:

- Todd Hubing, *Clemson University, USA*
- David Michelson, *University of British Columbia, Canada*
- Janet O'Neil, *ETS-Lindgren, USA*
- Parminder Singh, *QAI Labs, Canada* – Registration Chair

**Feature Topics:**

- Design and Test for Automotive EMC
- EMC Vendor – Tabletop Expo

**Invited Speakers:**

- Todd Hubing, *Clemson University, USA*
- Joungho Kim, *KAIST, South Korea*
- Karim Boutras, *Hughes Research Labs, USA*
- Garth D'Abreu, *ETS-Lindgren, USA*

**Engineers, engineering managers and strategic development and planning managers**: Join professionals from a global pool of industry, government and academia to exchange "state of the art" results from new R&D in the fields of vehicular wireless and electronic technology. Attend *all* IEEE VTC 2014 Fall and WiVeC plenaries, panels, workshops and technical sessions over 14-17 Sep 2014 for a Special Delegate registration rate of $100 USD! For details, please click http://www.cvent.com/d/44qxz0/4W

# INDUSTRY SESSIONS (INVITED PRESENTATIONS)

### New!

In addition to the regular technical program, we will host special industry sessions that will feature invited presentations by noted experts. These sessions will align along three major theme days:

- 5G Wireless,
- Autonomous and Connected Vehicles, and
- Electric Vehicles and Vehicular Electronics.


### New!

IEEE VTC 2014 Fall will feature a mobile app called **CrowdCompass** that will help you navigate the conference and find the papers, sessions and activities of greatest interest to you.

**Mon, 15 Sep 2014 – 5G Wireless Day**
*Program Chairs*: Peiying Zhu, *Huawei*
Ibrahim J. Gedeon, *TELUS*

AM Sessions: Keynote Presentations * Wireless System Planning Tools
PM Sessions: Millimetre Wave Access * 5G Wireless Technology

**Tue, 16 Sep 2014 – Autonomous and Connected Vehicles Day**
*Program Chairs*: Barrie Kirk, *CAVCOE*, and
David Atnikov, *Novax Industries*

AM Sessions: Keynote Presentations * Autonomous Vehicles
PM Sessions: Connected Vehicles * Panel Session on AV/CVs

**Wed, 17 Sep 2014 – Electric Vehicles and Vehicular Electronics Day**
*Program Chairs*: Lee Stogner, *IEEE TEI*, and
David G. Michelson, *UBC*

AM Sessions: Keynote Presentations * Electric Vehicle Charging in BC
PM - Workshop on Automotive EMC: Design for EMC * Test for EMC

# 6th International Symposium on Wireless Vehicular Communications: WIVEC2014

## 14–15 September 2014, Vancouver, Canada

***in conjunction with***

## IEEE Vehicular Technology Conference- Vancouver, Canada, Sept. 14-17, 2014 at the Westin Bayshore Hotel

http://www.ieeevtc.org/wivec2014/


**General Chairs:**

- Azzedine Boukerche,
  -- University of Ottawa, Canada
- Soumaya Cherkaoui,
  -- Université de Sherbrooke, Canada
- Victor C.M. Leung,
  -- University of British Columbia, Canada


Wireless vehicular communications has been identified as a key technology for increasing road safety and transport efficiency, and providing Internet access on the move to ensure wireless ubiquitous connectivity. The potential of this technology has been acknowledged with the establishment of ambitious research programs worldwide in Europe, US and Asia.

The IEEE Vehicular Technology Society (VTS) currently covers through its areas of interest (mobile radio, transportation systems and automotive electronics) all technical aspects needed to make wireless vehicular communications a reality. As a result, IEEE VTS decided to co-locate a technical symposium on wireless vehicular communications with some of the flagship IEEE Vehicular Technology Conferences (VTC).

The IEEE International Symposium on Wireless Vehicular Communications (WiVeC) covers all aspects of vehicular wireless communications such as Vehicle-to-Vehicle (V2V), Vehicle-to-Infrastructure (V2I) and Vehicle-to-Person (V2P) communications, including implications on transport efficiency and safety, implications on automotive electronics, liability issues, standardizations efforts and spectrum assignment.

After the successful 2007 (Baltimore), 2008 (Calgary), 2010 (Taipei), 2011 (San Francisco) and 2013 (Dresden) editions, the sixth IEEE WiVEC symposium will be co-located with the 80th IEEE VTC 2014 Fall conference. Combined registration packages are available for WiVeC and VTC.

In addition to the regular technical paper presentations, WIVEC2014 will feature a **Keynote Presentation**, a **Panel Session**, and a **Demonstrations** session for researchers and practitioners to showcase their latest industrial applications, prototypes with media, models or live demonstrations.

**Sponsors:**

## IEEE BCIT 2014 Summer Part Kit Assembly – BCIT Burnaby Campus


Every summer, the students of the ECET (Electrical & Computer Engineering Technology) program at BCIT Burnaby work together to assemble part kits for the coming school year. Students from many programs at BCIT benefit from these kits, including ECET and Mechatronics & Robotics students. Students volunteer through the summer, mostly on weekends to complete over 400 part kits.

Students are rewarded with valuable volunteer hours that go towards the BCIT Volunteer Passport program. Students also have a great time networking with students in different levels of the ECET program.

These kits range in price from $10 to $66 and provide students with a significant amount of savings. The convenience of buying everything they need, all at once and at a reduced cost is very beneficial.

The Level 1 ECET part kit includes a large variety of parts. For only $66, students receive a breadboard, basic tools, LEDs, IC chips (Integrated Circuit), and many more electronic parts and components. Some of the ICs include the most basic digital system logic. For example, NAND, NOR, and XOR chips, which are the foundation to all digital electronic devices.

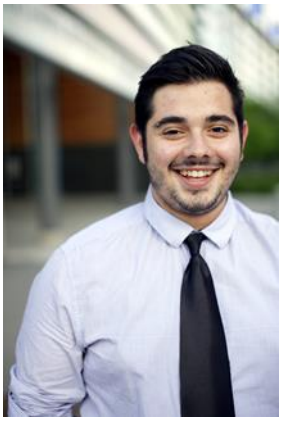
Below are the IEEE executives involved with organising the assembly and distribution of the parts.

## The 2014 BCIT IEEE Student Branch and Power & Energy Society Executives

**Chair**
Matteo Leemet

**Vice Chair**
Cody Vieira

**Treasurer**
Peter Zhang



**Secretary**
David Eidelshtein

**P&E Society Chair**
Prehlad Heer

# IEEE Board of Directors votes to recognize pioneering MDA achievement

The IEEE Board of Directors has voted to recognize

**"First Digitally Processed Image from a Spaceborne Synthetic Aperture Radar, 1978"**

as an IEEE Milestone in Electrical Engineering and Computing.

The Milestone citation reads:

In November 1978, a team from MacDonald, Dettwiler and Associates Ltd. (MDA) became the first to use a digital processor to reconstruct an image from Seasat-A, the first civilian spaceborne synthetic aperture radar (SAR). MDA engineers subsequently developed three of the four most important SAR digital processing algorithms that replaced the optical processing methods used previously.

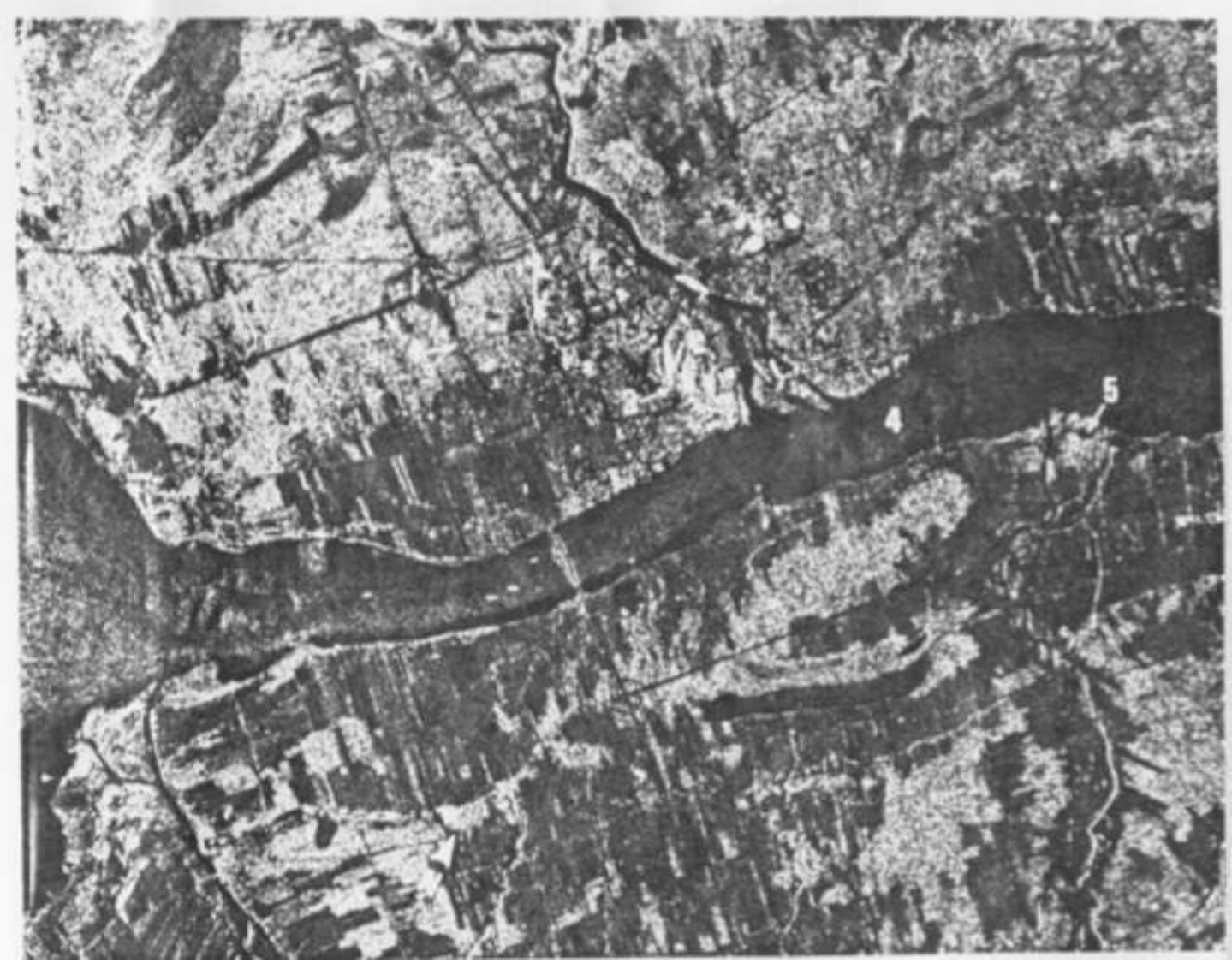
This important achievement, which revolutionized remote sensing of the Earth and played a pivotal role in MDA's rise to global prominence in space technology, now joins a list that includes the First Exchange of Messages over the Internet, the First Transatlantic Television Signal via Satellite, and the First Direct-broadcast Satellite Service.

A milestone dedication ceremony will be held at MDA Headquarters in Richmond on

Tuesday 09 September 2014

from 11 am - noon

A limited number of complimentary passes are available for IEEE Vancouver members who wish to attend. Please contact Prof. David Michelson, davem@ece,.ubc.ca, for further details.




First digitally processed Image from Seasat-A's synthetic aperture radar shows a portion of the St Lawrence River near the city of Trois Rivieres, Quebec. The satellite passed overhead at an altitude of 800 km and the L-band radar antenna had a boresight angle of 20 deg from the nadir. The data was recorded at the Shoe Cove, Newfoundland satellite receiving station and was first processed in November 1978 by MacDonald, Dettwller & Assoc , Ltd , of Richmond, British Columbia. The image covers an area 38 km along the river by 41 km

IEEE Milestone in Electrical Engineering and Computing

# First Digitally Processed Image from a Spaceborne Synthetic Aperture Radar

David G Michelson
University of British Columbia, Dept. of Electrical & Computer Engineering
and Member, IEEE History Committee

From the time that Carl A. Wiley of Goodyear Aircraft Co. introduced the synthetic aperture radar (SAR) concept in 1951, optical correlators based upon various combinations of exotic lenses and optical film had been used to reconstruct synthetic aperture radar imagery. While reconstruction could be accomplished in reasonable time using such techniques, the results suffered from various artifacts associated with slight physical imperfections in the optical system and the limited dynamic range of the optical system. While the possibility of using digital technology to process SAR data had been recognized early on, the processing requirements greatly exceeded the capabilities of the general-purpose computers available to researchers in the 1950's and 1960's. The state of the art as of 1970 is summarized in [1].

At the same time, it had been recognized that a synthetic aperture radar carried by an orbiting satellite would offer many important advantages over airborne SARs. First, orbiting Earth observation satellites can achieve worldwide coverage with an ease that airborne platforms cannot match. Second, orbiting SARs are not buffeted by the atmospheric turbulence that shakes airborne SARs; the path that they take through airless space is ultra smooth and highly predictable. These advantages are only partially offset by the reduced resolution and lower signal-to-noise ratio achievable with orbital SAR imagery due to their much greater height above the Earth's surface.

Tremendous advances in minicomputer technology during the early 1970's renewed interest in the possibility of placing synthetic aperture radar in low earth orbit and using general-purpose computers to produce high quality imagery from the downlinked data. NASA launched Seasat-A, the world's first orbital SAR, in 1978. Although it failed within 90 days of achieving orbit due to a power system defect, Seasat-A demonstrated the enormous potential of orbital SARs and ushered in three decades of innovation that saw orbital SARs of ever increasing power and capability launched by NASA, the European Space Agency and the Canadian Space Agency.

Several teams competed to be the first to reconstruct a scene by digitally processing Seasat-A SAR data. However, the general-purpose minicomputers available to engineers in the late 1970's were only barely capable of supplying the enormous processing power required. It was widely expected that a large, well-funded team from NASA's Jet Propulsion Laboratory would prevail. Instead, a small, upstart team from Canada's MacDonald Dettwiler and Associates that had begun their task two years earlier won the race in November 1978 [2].

So significant was the accomplishment that this first image was featured in the 26 February 1979 issue of Aviation Week and Space Technology [3]. Details were reported at several conferences early in 1979 [4], [5]. JPL was behind and as recently as 1980 was still reporting results that had been processed using the less capable optical techniques [6].

## Lessons Learned

MDA's accomplishment underscored a lesson that would be repeated many times as the digital revolution progressed. Other teams had access to the same SEASAT data and similar general-purpose digital computers. However, it was the MDA team's careful mastery of algorithm design and software engineering that allowed them to win the race to become the first to produce a digitally processed data from Seasat-A data.

MDA exploited their early success to become one of the most influential and prolific developers of digital SAR processing algorithms and digital SAR processors in the world. Teams at MDA developed three of

the four common SAR processing algorithms in use today: Range/Doppler, Chirp Scaling, and SPECAN. MDA also developed the digital SAR processors used by such notable NASA, ESA and CSA programs as SIR-B, SIR-C, ERS-1, J-ERS-1, RADARSAT-1, ENVISAT and, most recently, RADARSAT-2 [7].

**A Turning Point in the History of SAR**

The events of November 1978 marked a turning point in the history of synthetic aperture radar. Demonstration that data from spaceborne SARs could be digitally processed using general purpose digital computers helped to dramatically reduce the cost of SAR imagery and make it much more widely available for civilian applications. Until 1978, military applications of SAR were predominant. Since 1978, civilian applications of SAR have assumed steadily increasing importance.

The reputation that MDA earned from this accomplishment fuelled its rapid growth into the world's largest supplier of SAR processors and Canada's largest space technology company.

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**About Seasat**

Seasat was the first satellite designed for remote sensing of the Earth's oceans with synthetic aperture radar (SAR). The mission was designed to demonstrate the feasibility of global satellite monitoring of oceanographic phenomena and to help determine the requirements for an operational ocean remote sensing satellite system. Specific objectives were to collect data on sea-surface winds, sea-surface temperatures, wave heights, internal waves, atmospheric water, sea ice features, and ocean topography. The mission ended on October 10, 1978 due to a failure of the vehicle's electric power system. Although only approximately 42 hours of real time data were received, the mission demonstrated the feasibility of using microwave sensors to monitor ocean conditions and laid the groundwork for future SAR missions.