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IEEE Annual Social Event

IEEE Annual Social Event

Save the Date

Date: Saturday Nov 21

Time: 2-4 PM (arrive 15 minutes early)

Location: Zone Bowling, 228 Schoolhouse Street, Coquitlam BC, next to Silver City Theatre

Once in awhile we on the IEEE Vancouver Section executive stop thinking about technology for a few moments and arrange something just for fun.

Join us for a fun-filled afternoon with your fellow techies (or even non-techies) or bring the family. Price details to follow, but this will be a very affordable event. Prizes!



Modern methods for microwave filter synthesis



Richard Cameron
ComDev Europe

Up until the early 1970s, nearly all filter synthesis techniques were based upon the extraction of electrical elements (lumped capacitors and inductors, transmission line lengths) from the polynomials that represented the filter's electrical performance in mathematical terms. This was perfectly adequate for the technologies and applications that were current at the time, and many important contributions were made to the art of advanced filter transfer and reflection polynomial generation, and then their conversion to electrical component values corresponding to the filter technologies that were then available.

In the early 1970s a revolution in telecommunication systems and available technology was taking place. The first satellite telecommunication systems were in operation and demand for their services was growing enormously. The crowding of the available spectrum meant that the specifications on channel filters in terms of in-band linearity (group delay, insertion loss) and out-of-band selectivity (high close-to-band rejection, and for transmit filters lowest possible insertion loss), were getting ever more demanding.

During this period some important advances were made in the art of filter network synthesis. Central to these was the coupling matrix representation of the microwave filter electrical network. The coupling matrix synthesis method offers some important advantages over the classical synthesis methods - one of these is the one-to-one correspondence between the elements of the coupling matrix and the individual physical components of the filter. Another advantage is the ability to reconfigure the coupling matrix through similarity transforms to arrive at a different coupling topology, corresponding to the available coupling elements of the particular microwave structure that has been selected for the application. The coupling matrix will naturally accommodate asymmetric characteristics, and those incorporating special features such as transmission zeros or group delay equalization, or both. All these features are critical for meeting the stringent specifications of today's microwave systems.

The lecture for the DML tour will focus on the coupling matrix and the many opportunities for advanced microwave filter design that it opens up. Although there are a number of commercial software tools available for the design of such filters, they are often applied without proper understanding of the fundamentals involved or awareness of alternative designs better suited to the specifications in hand, resulting in a device which is sub-optimal in terms of electrical and mechanical performance. The younger upcoming designers tend to rely on these packages, largely due to a scarcity of reference works and journal articles on the subject of modern filter network synthesis methods.

The DML lecture will aim at bringing these state-of-the-art filter synthesis methods to microwave equipment designers, presenting the possibilities that have now become available for meeting the very stringent specifications that are demanded by modern telecommunication, broadcast, radar and scientific/earth observation satellite systems. The lectures will be presented in a style that minimizes mathematics and jargon as far as possible in order to appeal to multi-discipline audiences.

Speaker: Richard Cameron gained his BSc in Electronics with Telecommunications at the University of Loughborough in 1969. He subsequently joined the Marconi Space and Defence Company to begin a career devoted to the design and R&D of microwave equipment and systems for spacecraft and associated ground stations.

In 1975 Professor Cameron joined The European Space Research and Technology Establishment (ESTEC), the technical branch of the European Space Agency (ESA) based in the Netherlands. Here he was involved in the development of software for the design of advanced microwave equipment for space application, particularly microwave filters. He was also responsible for the monitoring of contracts for microwave equipment for telecommunications, radar (earth observation), scientific, TV broadcast and inter-orbit relay spacecraft. In addition he delivered several lecture series on the computer-aided design of microwave filters to national space agencies.

In 1984 Prof. Cameron joined the ComDev company of Canada to assist in the establishment of the European branch of ComDev - ComDev Europe - based near London, England. This involved laying down the design foundations for the production of passive microwave devices and sub-systems for space application, and later for cellular communication systems. As the company grew, activities tended towards technical management and improving CAD methods for both ComDev in Europe and in Canada.

Prof. Cameron retired from CDE in 2005, but retained a consultancy role with the Company on an ad hoc basis. Since retirement he has conducted several short lecture series for undergraduate and post-graduate students in Hong Kong and the UK. He has also been appointed a Visiting Professor at the University of Leeds.

During his career Prof. Cameron has filed 8 patents and has authored or co-authored many papers for technical journals and conferences. He is also the co-author of a technical book, *Microwave Filters for Communication Systems - Fundamentals, Design and Applications*

IEEE MTT-S
Distinguished Lecturer



Friday 02 October
4:00 - 5:00 pm

Room 418
MacLeod Building
2356 Main Mall
UBC

Preregister by contacting
Prof. Dave Michelson,
davem@ece.ubc.ca



Information
Joint Aerospace and
Electromagnetics Chair
Dave Michelson
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Ari Sihvola
Aalto University

Metamaterials in electromagnetics: A bird's-eye view

In the analysis of electromagnetic fields interacting with material structures, the response of medium is condensed in dielectric and magnetic material parameters, like permittivity, conductivity, and permeability. In complicated and anisotropic media, these material parameters may need to be generalized from scalar quantities into matrices, or equivalently dyadics. The complicated response of materials is very often of structural origin, in other words the manner in which a heterogeneous mixture is formed determines its macroscopic electromagnetic material parameters. Periodical arrangements lead to electromagnetic band gap (EBG) structures with fascinating responses.

This lecture deals with the variety of ways how one is able to characterize and effectively describe the macroscopic dielectric and magnetic behavior of composite materials with given properties of the constituents and the geometrical microstructure. Homogenization principles will be applied to analyze and understand mixtures that display very interesting properties that differ strongly from these of the constituent materials. This is the domain of metamaterials, and the talk will shed light into this new paradigm in electromagnetics.

Speaker: Ari Sihvola was born in 1957, in Valkeala (Finland). He received the degrees of Diploma Engineer in 1981, Licentiate of Technology in 1984, and Doctor of Technology in 1987, all in Electrical Engineering, from the Helsinki University of Technology (TKK), Finland. Besides working for TKK and the Academy of Finland, he was visiting engineer in the Research Laboratory of Electronics of the Massachusetts Institute of Technology, Cambridge, in 1985–1986, and in 1990–1991, he worked as a visiting scientist at the Pennsylvania State University,

State College. In 1996, he was visiting scientist at the Lund University, Sweden, and for the academic year 2000–2001 he was visiting professor at the Electromagnetics and Acoustics Laboratory of the Swiss Federal Institute of Technology, Lausanne. In the Summer of 2008, he was visiting professor at the University of Paris XI, France.

Ari Sihvola is professor of electromagnetics in Aalto University School of Electrical Engineering (Aalto University was created in 2010 as a merger of three universities: Helsinki University of Technology, Helsinki School of Economics, and the University of Art and Design). His scientific interests range from electromagnetic theory, complex media, materials modeling, remote sensing, and radar applications, into engineering education research and history engineering and technology. Ari Sihvola is Chairman of the Finnish National Committee of URSI (International Union of Radio Science), Chairman of the Commission B (Fields and Waves) of the international URSI, and Fellow of IEEE. In 1990's, he has served as Chairman of the IEEE AP–MTT Chapter for several years.

He was awarded the five-year Finnish Academy Professor position in 2005–2010. He served also as director of the Finnish Graduate School of Electronics, Telecommunications, and Automation (GETA) 2008–13. Author of several books and hundreds of publications, Ari has been active in organizing conferences and workshops, convening and chairing sessions, and serving in advisory, technical, and organizing committees for numerous national and international scientific symposia as member, secretary, or chairman. In TKK and Aalto University, Ari Sihvola has received several teaching awards, like the “Teacher of the Year” Prize in 1995 from the Student Union of TKK.

IEEE AP-S

Distinguished Lecturer



Friday 23 October

4:00-5:00 pm

Room 418
MacLeod Building
2356 Main Mall
UBC

Preregister by contacting
Prof. Dave Michelson,
davem@ece.ubc.ca

Information

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



IEEE Joint Aerospace and
Electromagnetics Chapter



Maysam Ghovanloo
Georgia Institute of Technology

Implantable and wearable microelectronic devices to improve quality of life for people with disabilities

Implantable microelectronic devices (IMD) and neuroprostheses are finding applications in new therapies thanks to advancements in microelectronics, microsensors, RF communications, and medicine, which have resulted in embedding more functions in IMDs that occupy smaller space and consume less power, while offering therapies for more complex diseases and disabilities. I will address the latest developments in key building blocks for state-of-the-art IMDs, particularly on the analog front-end, RF back-end, and power management.

IMDs have been quite successful in neuroprosthetic devices, such as cochlear implants and deep brain stimulators. They have been recently approved for vision and are being considered for brain-computer interfacing (BCI) to enable individuals with severe physical disabilities to control their environments, particularly by accessing computers. Implantable BCIs, however, are highly invasive and should be used when there are no less invasive alternatives that would offer similar benefits. They can also be utilized as advanced tools for neuroscience research on freely behaving animal subjects.

I will talk about the example of a smart cage, which can wirelessly power, communicate with, and track sensors implanted in or attached to small freely behaving animals. At the same time, novel minimally-invasive methods are being explored for individuals with severe paralysis to make the best use of their remaining abilities to control their environments. An example of such technologies is a wireless and wearable brain-tongue-computer interface (BTCl), also known as the Tongue Drive System (TDS), which enables individuals with tetraplegia to control their environments using their voluntary tongue motion.

Speaker: Maysam Ghovanloo received the B.S. degree in electrical engineering from the University of

Tehran, and the M.S. degree in biomedical engineering from the Amirkabir University of Technology, Tehran, Iran in 1997. He also received the M.S. and Ph.D. degrees in electrical engineering from the University of Michigan, Ann Arbor, in 2003 and 2004. Dr. Ghovanloo developed the first modular Patient Care Monitoring System in Iran where he also founded a startup to manufacture physiology and pharmacology research laboratory instruments.

From 2004 to 2007 he was an Assistant Professor in the Department of ECE at the North Carolina State University, Raleigh, NC. Since 2007 he has been with the Georgia Institute of Technology, School of Electrical and Computer Engineering, where he is an Associate Professor and the founding director of the GT-Bionics Lab. He has 5 issued patents and authored or coauthored more than 150 peer-reviewed conference and journal publications on implantable microelectronic devices, integrated circuits and micro-systems for IMD applications, and modern assistive technologies.

Dr. Ghovanloo is the general chair of the IEEE Biomedical Circuits and Systems (BioCAS 2015) in Atlanta, GA (Oct. 22-24, 2015). He is an Associate Editor of the IEEE Transactions on Biomedical Engineering and IEEE Transactions on Biomedical Circuits and Systems. He served as an Associate Editor of IEEE Transactions on Circuits and Systems, Part II (2008-2011), as well as a Guest Editor for the IEEE Journal of Solid-State Circuits and IEEE Transactions on Neural Systems and Rehabilitation Engineering. He has also served on the Imagers, MEMS, Medical and Displays subcommittee of the International Solid-State Circuits Conference (ISSCC) from 2009-2014. He has received the National Science Foundation CAREER Award, the Tommy Nobis Barrier Breaker Award for Innovation, and Distinguished Young Scholar Award from the Association of Professors and Scholars of Iranian Heritage.

Distinguished Lecturer

Friday 30 October

4:00 - 5:00 PM

TRIUMF Auditorium
4004 Westbrook Mall
Vancouver BC

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Circuits and Systems

Joint Solid-State Circuits

Electron Devices

Women in Engineering



Information

Joint Applied Physics
Chair

Ahmed Hussein

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Bethanie Stadler
University of Minnesota

Magnetic nanowires: Revolutionizing hard drives, RAM, and cancer treatment

Magnetic nanowires can have many names: bits, sensors, heads, artificial cilia, sensors, and nano-bots. These applications require nanometer control of dimensions, while incorporating various metals and alloys. To realize this control, our 7- to 200-nm diameter nanowires are synthesized within insulating matrices by direct electrochemistry, which negates sidewall damage such as that caused by lithographical patterning of vacuum-deposited structures. Our nanowires can easily have lengths 10,000x their diameters, and they are often layered with magnetic (Co, Fe, FeGa, FeNi, Ni) and non-magnetic (Ag, Cu, Au) metals as required by each application.

This talk will reveal synthesis secrets for nm-control of layer thicknesses, even for difficult alloys, which has enabled studies of magnetization reversal, magneto-elasticity, giant magnetoresistance (GMR), and spin transfer torque (STT) switching. In addition, this lithography-free synthesis yields 10-nm diameter nanowires that have resistivities of only 5.4mΩ/0.5cm (nearly that of bulk copper) due to negligible sidewall roughness. Therefore, these nanowires will mitigate the ITRS Roadmap's "Size Effect" Grand Challenge which identifies the high resistivities in small interconnects as a barrier to continued progress along Moore's Law (or better). Ten-nm diameter trilayers of [Co(15nm)/Cu(5nm)/Co(10nm)] have also met or surpassed all of the criterion for the world's smallest read heads with 30 Ω resistance and 19% magnetoresistance. High magnetoresistance is also possible in other multilayered nanowires that exhibit excellent properties for multilevel nonvolatile random access memory (RAM) using STT switching at very low current densities (100kA/cm²). If the insulating growth matrix is etched away, the nanowires resemble a magnetic bed of nano-sea-

weed which enables microfluidic flow sensors and vibration sensors. Finally, we have incubated various nanowires with several healthy and cancerous cell lines, and find that they are readily internalized by all cell types thus far. Careful magnetic design of these "nano-bots" enables external steering, nano-barcode identification, and several modes of therapy. In short, by the end of this talk, I hope you will be convinced that magnetic nanowires can and will revolutionize hard drives, RAM, and cancer treatment.

Speaker: Bethanie Stadler works on the integration of nanomagnetic and photonic materials with a variety of platforms to allow the development of practical devices and systems. This includes magnetic nanowires for magnetoelectronics (including hard drive heads), microfluidic flow sensors and actuators, acoustic/vibration sensor applications, and cellular biomarkers. In photonics, Stadler works on the integration of magnets, magneto-optical garnets waveguides, and nanostructures for magnetophotonic crystals with semiconductor platforms for isolator and sensor applications.

Stadler received her PhD from MIT in 1994 and her B.S. from Case Western Reserve University in 1990, both in Materials Science and Engineering. She held a National Research Council postdoctoral fellowship at the Air Force Rome Laboratory before joining Electrical and Computer Engineering at the University of Minnesota, where she is also on the Graduate Faculty of Chemical Engineering and Materials Science. Her research there has been awarded the NSF CAREER award and a McKnight Presidential Fellowship. Stadler has served both as Director and Secretary of the international Materials Research Society, and has been asked to teach "Nanomagnetics" for the IEEE Magnetic Summer School in Chennai India and in Assisi Italy.

Distinguished Lecturer

Friday 20 November

4:00 - 5:00 PM

TRIUMF Auditorium
4004 Westbrook Mall
Vancouver BC

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Circuits and Systems

Joint Solid-State Circuits

Electron Devices

Women in Engineering



Information

Joint Applied Physics
Chair

Ahmed Hussein

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Agile Vancouver Events

Sponsored by IEEE Vancouver Joint Computing Chapter



Much Ado About Agile X

- Date:** Monday, October 26th, for the conference and Tuesday, October 27th, for tutorials
- Time:** The conference starts at 8:30 am and tutorials start at 9 am.
- Place:** Sutton Place Hotel on Burrard
- Website:** <http://agilevancouver.ca/index.php/events-in-2015/2015-much-ado-about-agile-x>
- Registration:** <http://www.eventbrite.ca/e/much-ado-about-agile-2015-general-registration-tickets-18090489140>.

2015 marks a significant achievement for the Vancouver Agile Methods Users Group. Agile Vancouver, as the group is more widely known, has been following its mandate of “educating its members, sharing experiences, promoting Agile approaches in the local BC software industry, and fostering academic and industrial research” since its inception in 2005, and having a great time doing it. This year will be our 10th Much Ado About Agile conference.

To commemorate the anniversary, we have invited Philippe Kruchten back to deliver the keynote speech. This year’s speaker lineup has a lot of new faces in it, some local and some not, including Jennifer Fawcett, Mark Lines, Adrian Moise, James Shore, Byron Packwood, Ardita Karaj, and Jeff Morgan. As has become our custom, we will be wrapping up the conference by having a Panel Discussion with all the speakers. There are three full-day tutorials to choose from: “Lean Software Delivery” with Matt Heusser, “Bringing Fluency to your Agile teams: Coaching for Best-Fit Agile” with James Shore, and “Disciplined Agile Delivery in a Nutshell” with Mark Lines.



Follow IEEEXtreme on      reddit



24 October 2015

Starting at 00:00:00 UTC

IEEEXtreme is a 24-hour online coding competition, within which a worldwide community of college and university students enjoy an engaging set of unique programming challenges.



WHO CAN COMPETE?

- Teams of up to three collegiate students who are current IEEE student members
- A local college or university may form multiple teams



WHERE IS THE COMPETITION HELD?

- IEEEXtreme is a virtual event, but teams often organize around their local IEEE Student Branch

Not an IEEE member?

If you are not a student member, you can join both IEEE and IEEE Computer Society for US\$35 or US\$40, depending on location. Current IEEE student members can add IEEE Computer Society Student Membership for just US\$8. www.computer.org/students



WHAT COULD I WIN?

- Fame: Unlimited bragging rights and an item for your resume
- Fortune: The Grand Prize is a trip to the IEEE conference of your choice, anywhere in the world



THE 29TH ANNUAL IEEE CANADIAN CONFERENCE ON ELECTRICAL AND COMPUTER ENGINEERING

15–18 MAY, 2016 / VANCOUVER, CANADA

Advancing Society Through Electrical and Computer Engineering

Important Dates

Tutorial proposals:	November 29, 2015
Invited sessions proposals:	November 29, 2015
Regular paper submission:	November 29, 2015
Acceptance notifications:	January 31, 2016
Camera-ready papers:	February 28, 2016

— CALL FOR PAPERS —

The 29th Annual IEEE Canadian Conference on Electrical and Computer Engineering (CCECE 2016) will be held in Vancouver, British Columbia, Canada from May 15 to 18, 2016. CCECE is the flagship conference for researchers, students, and professionals in the area of Electrical and Computer Engineering from Canada and around the world to meet annually in a Canadian city to disseminate their research advancements and discoveries, to network and exchange ideas in order to strengthen existing partnerships and foster new collaborations. CCECE 2016 general theme, Advancing Society Through Electrical and Computer Engineering reflects the profound impact of ECE research on our daily lives. CCECE 2016 will address the following many themes which are listed and described to the right. CCECE 2016 will address the following themes:

- ❖ Bioengineering
- ❖ Communications and Networks
- ❖ Computer and Software Techniques
- ❖ Control and Robotics
- ❖ Devices, Circuits, and Systems
- ❖ Power and Energy Circuits and Systems
- ❖ Signal Theory and Signal Processing

Paper submission guidelines and be found on the conference website: <http://ccece2016.ieee.ca>.

— CALL FOR TUTORIALS —

CCECE 2016 tutorials will be held on Sunday, May 15, 2016. Each tutorial will be 3-hours long. The Organizing Committee invites tutorial proposals across the broad areas of electrical and computer engineering and related fields. Tutorial proposal may involve a single speaker, or a group of speakers, and should include:

1. Title
2. Name(s) and affiliation(s) of the speaker(s)
3. Tutorial summary (two pages maximum), including importance and timeliness of the topic
4. Intended audience
5. Brief description of the materials (slides, code) to be provided to the audience
6. Brief biographies of speakers (300 words maximum), highlighting prior experience in delivering conference tutorials.

Proposals from industry and combined industry-academia proposals are especially encouraged. To submit the proposal, please **send via email a PDF document containing the required information** by November 29, 2015, to the Tutorials Co-Chairs:

Ivan Bajic (ibajic@sfu.ca) and Thomas Johnson (thomas.johnson@ubc.ca)



CALL FOR PAPERS

Please read the following paper submission guidelines before submitting your papers:

- Paper submission deadline is on **January 15, 2016**.
- All papers must be submitted through the IEEE WCCI 2016 online submission system. For special session papers, please select the respective special session title under the list of research topics in the submission system. For papers submitted to the cross-disciplinary and CI applications special sessions track, please click on the IEEE CEC 2016 paper submission link, and in the "Main Research Topic", select the respective special session title under "Section 8. Cross-Disciplinary and CI Applications". Any paper submitted to the cross-disciplinary and CI applications special sessions track (if accepted and presented) will be published in one of the three conference proceedings (IJCNN, Fuzzy-IEEE or IEEE CEC) that is most fitting. Such decision will be made by the Special Session Organizers in consultation with the Special Session Chair and one of the three Conference Chairs.
- In order for your papers to be included in the congress program and the proceedings, final accepted papers must be submitted and the corresponding registration fees must be paid by April 15, 2016.
- IEEE WCCI 2016 will present the Best Overall Paper Awards and the Best Student Paper Awards to recognize outstanding papers published in each of the three conference proceedings (IJCNN 2016, FUZZ-IEEE 2016, IEEE CEC 2016). The awards will be judged by an Awards Committee and the recipient of each award will be given a certificate of the award and a cash prize to be presented during the conference banquet at IEEE WCCI 2016.

If you encounter any problems with the submission of your papers, please contact the Paper Submission Chair Dr. Ke Tang.

- Submit papers to IJCNN 2016: <http://iee-cis.org/conferences/ijcnn2016/upload.php>
- Submit papers to FUZZ-IEEE 2016: <http://iee-cis.org/conferences/fuzzieee2016/upload.php>
- Submit papers to IEEE CEC 2016*: <http://iee-cis.org/conferences/cec2016/upload.php>

* For papers submitted to the cross-disciplinary and CI applications special sessions track, please click on the IEEE CEC 2016 paper submission link.

LaTeX and Word Templates. To help ensure correct formatting, please use the style files for U.S. Letter as template for your submission. [These include LaTeX and Word](#). Violations of any of the above paper specifications may result in rejection of your paper.

Manuscript Style Information. Only papers prepared in PDF format will be accepted. Paper Length: Up to 8 pages, including figures, tables and references. At maximum, two additional pages are permitted with overlength page charge of US\$125/page, to be paid during author registration. Paper Formatting: double column, single spaced, #10 point Times Roman font. Margins: Left, Right, and Bottom: 0.75" (19mm). The top margin must be 0.75" (19 mm), except for the title page where it must be 1" (25 mm). No page numbers please. We will insert the page numbers for you.

Note: Violations of any of the above specifications may result in rejection of your paper.

<http://www.wcci2016.org>