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Dan Fleetwood
Vanderbilt University

Distinguished Lecturer

Tuesday August 9, 2016.
Time: 4:00 PM.

TRIUMF Auditorium
4004 WesBrook Mall
Vancouver BC

Moore's Law and radiation effects on microelectronics

In 1965 Gordon Moore postulated that the number of components in an integrated circuit would double every 1-2 years. This trend still holds, making it one of the longest, sustained geometric progressions in the history of the industrialized world, enabling revolutions in computing and in virtually every aspect of technology that is enabled or enhanced by computing. Transistor dimensions have decreased from tens of microns ~ 10 nanometers over this time period.

In this presentation, we will examine the effects of Moore's Law size and voltage scaling of transistors and integrated circuits on the vulnerability of microelectronics to ionizing radiation effects in near-Earth space and terrestrial applications. We will also discuss limitations that these vulnerabilities place on future highly-scaled integrated circuit technologies

Speaker: Dan Fleetwood received his Ph.D. from Purdue University in 1984. He joined Sandia National Laboratories in 1984 as a Member of the Technical Staff. In 1990, he was named a Distinguished Member of the Technical Staff. Dan accepted a position as Professor of Electrical Engineering at Vanderbilt University in 1999, and holds a secondary appointment as Professor of Physics.

In 2001-2003 he served as Associate Dean for Research in the School of Engineering. In 2003 he was named Chairman of Vanderbilt's Electrical Engineering and Computer Science Department, and in 2009 he was named Olin H. Landreth Chair in Engineering.

Dan is author or co-author of more than 400 publications on radiation effects and low frequency noise, which have been cited more than 13,000 times (Google Scholar). He received the 2009 IEEE Nuclear and Plasma Sciences Merit Award, the society's highest technical honor, and is a Fellow of IEEE and the American Physical Society.

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

Ulrich Speidel
University of Auckland

Thursday 04 August
1:00 pm to 2:00 pm

Engineering Office Wing
(EÔW) 430
University of Victoria
Victoria BC

Light refreshments
Open to public
Please register so we more accurately estimate room size & refreshments

Information
Circuits and Systems
Chair Ljiljana Trajkovic
ljilja@cs.sfu.ca

Can network coding bridge the digital divide in Pacific Island countries?

Many Pacific Island nations rely on expensive satellite Internet links with low bandwidth and high latency. Small populations, low per-capita GDP, huge distances and a mostly very deep ocean make submarine fibre cables prohibitive for many. To add insult to injury, many ISPs in the islands struggle to utilise the full capacity of their satellite links. The culprit is TCP queue oscillation, an effect discovered decades ago - and widely considered solved through the evolution of TCP/IP stacks. However, we show that it does still occur across satellite links where a large number of TCP senders share the same bandwidth into the island. We also demonstrate that coding packets allows TCP flows to recoup some of the capacity lost to queue oscillation, and report about ongoing work to simulate whole-of-island network coding of traffic.

Speaker: Ulrich Speidel is a senior lecturer in Computer Science at the University of Auckland, New Zealand. He trained as a physicist in Germany and New Zealand, morphed into a CS person as part of his PhD, and served as an associate professor at the University of Tokyo in 2010. His research covers aspects of information theory, signal processing, network measurement, Internet protocols, applications and security.

CAS
IEEE CIRCUITS AND SYSTEMS SOCIETY
EEE VANCOUVER/VICTORIA JOINT CHAPTER

IEEE SFU Student Branch Summer Barbecue Social

WEDNESDAY 03 AUGUST — 5:30pm

SFU Burnaby Campus — Applied Sciences Building

AN OPEN INVITATION TO ALL IEEE VANCOUVER MEMBERS

Come out for an opportunity to meet a diverse group of IEEE members, ranging from students to professors and industry professionals and their family members! We will be serving burgers and hotdogs, as well as refreshments. If you have any dietary restrictions, please fill out the Dietary Restriction section in the RSVP form.

Please let us know if you will be attending at the RSVP survey link following:

https://docs.google.com/forms/d/e/1FAIpQLScoTbsC7Kpn8eVS6GdFz0NAeL71As627jNBPhIXFQDLWEo66g/viewform

Those without a Google account may use the V-Tools registration system following:
https://meetings.vtools.ieee.org/m/40565

The first round of food will be free for all IEEE members and their families
Nearest parking lot is Parking Lot B — behind the Cornerstone building
Michael Fujiwara, Chair — SFU IEEE Student Branch

IEEE Student Scholarships and Grants

The Students in the Vancouver Section did very well this year winning two of the five available major scholarship awards from the IEEE Canada Foundation. Congratulations are in order to both Colin Warkentin and Zuhair Shaheed Naseem on their awards. If you know a student who has a high academic standing and is active in their IEEE student chapter encourage them to apply for these scholarships. Information is available at the IEEE Canada Foundation web site at http://www.ieeecanadianfoundation.org/EN/mcn_sch.php. There are other grants available at the IEEE Canada Foundation including the McNaughton Learning Centre grants, of which SFU was a recipient plus other grants and prizes.

Jonathan Holzman, UBC Okanagan IEEE Student Councillor, and Youry Khmelevsky, UBC Okanagan Sub-Section Chair with Colin Warkentin celebrating Colin's $5,000.

UBC Student Zuhair Shaheed Naseem receiving his $5,000 IEEE Canada Foundation Scholarship certificate at the Region 7 Board Meeting with Lee Vishloff and David Kemp of IEEE Canada Foundation.

The Vancouver Section has a scholarship endowment that is managed by the IEEE Canada Foundation. For many years it has remained at approximately $20,000 growing slowly with contributions made at the annual AGM. Last Fall we embarked on a plan to increase this fund significantly as the awards were becoming small compared to today's education costs and with an increasing number of student branches (now six and still growing) we need more student scholarships. At the June Vancouver Section Executive meeting a decision was made to contribute an additional $15,000 to the ICF endowment. This increase came largely from our recent conference surpluses with some coming from many years of surplus funds which came from pervious conference and educational activities. It is the current plan to keep staying actively involved with IEEE conferences in order to increase this endowment fund.

For those of you able to make a personal contribution to help worthy students we will be more than happy to provide assistance or information you may need. The ICF donation information page is at http://www.ieeecanadianfoundation.org/EN/donations.php.

IEEE Vancouver

Section Communication

If you are reading this it is on our long term reliable communication vehicle, Contact. Contact has been edited for many years (decades) by Nick Keenan. In recent years the section has also been moving forward on Twitter, Facebook and Web. The Vancouver section has also had a desire for sometime to capture some of the technical presentations, particularly those from Distinguished Lecturers or longer workshops so that they can shared with members who are unable to attend the event due to time or location issues.

There are many things for us to consider as we go forward in this multi-facetted media world, such as continuity, consistency and coherence. We have had a challenge keeping our web page up to date as the tools associated with it are not as user friendly as they could be. There are many things we need to consider and so we are arranging a special meeting to discuss these on Saturday 10 September. (Place TBD, but likely BCIT).

There are several things we need to think about.

1. This is a volunteer organization. Nick and Pieter have been our go-to people on this file forever, but we cannot expect all areas to have such long-serving and dedicated volunteers (or can we?). With this in mind we need to be realistic about what we can and cannot do.
2. Social media - Facebook, Twitter, Instagram, etc. each require extra effort. Maybe we need to pay for some social media tools (Hootsuite for example) to get some effort leverage. How do we encourage conversations?
3. The Multi-Media Team is still not very far along on output - not from lack of effort, but because it take so much effort to accomplish things. I note that the MIT courseware for example is pretty basic. If we are to capture and rebroadcast some of our talks we need make this activity routine and easy so volunteers can complete these with reasonable effort.
4. Web page. For the last few years the section has lacked a long term support mechanism for our Drupal web site. Obvious options are to port the site to other tools that less skilled people can use or hire tech support on a semi-regular basis.
5. Contact - the emailed PDF works and we will continue to want a regularly paced information source. A question is whether we should have an HTML email version, as this form is becoming preferred by most newsletters.
6. Should we become active on IEEE Collabratec? What can we use this tool for?
7. Resources for chapter chairs. We have lots on line in the Online Community but it is hard to find after many years of use. Do we restart with Google drive or similar tools or ?

Please send me your thoughts on how you think our communications should move ahead.

Thank you and best regards,

Lee Vishloff
IEEE Vancouver
Section Chair
lee@vishloff.ca

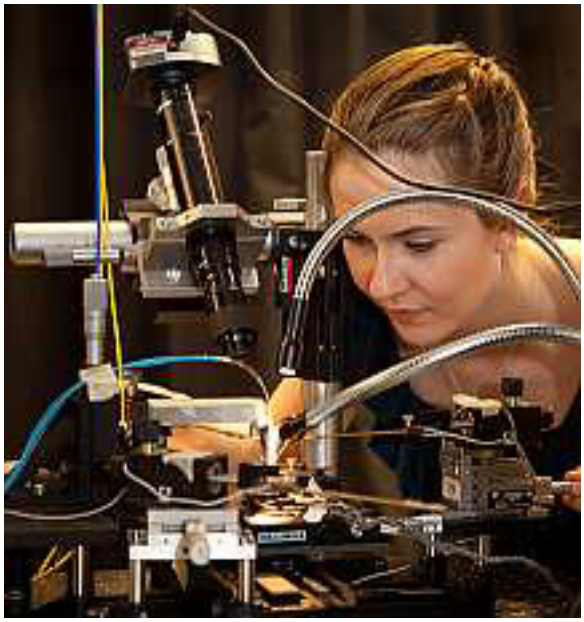
A microfluidic platform to study real-time tumour cell and tumour spheroid response to chronic and transient hypoxia

Wednesday 24 August

2:00 pm

Room ASB9705

Simon Fraser University
Burnaby Campus



Samantha Grist
University of BC

Cell-based screening of cancer treatments is used early in the drug development process to test the efficacy and toxicity of treatment candidates prior to animal and human testing. Current cell-based screening methods offer limited predictive capacity, contributing to the high percentage of drugs that fail during the clinical trial stage (80-95% for cancer treatments). One shortcoming of traditional cell-based screening platforms is their inability to recreate many aspects of the natural environment of tumour cells, which can affect treatment response. One important aspect of the microenvironment that can affect cell behaviour and treatment response is oxygenation. Irregular blood vessel formation can cause tumour oxygenation to be much lower than that of surrounding tissue, and spatial and temporal variations in oxygen can be present. Temporal variations can occur at timescales up to several cycles/hour: changes that are too fast to recreate using standard technologies like well plates due to their long diffusion distances.

We have deveoped a novel microfluidic platform to expose cells to both chronic and time-varying oxygen profiles and study their response. Microfluidics technology is combined with 3-D cell culture in tumour spheroids, which can better recreate other aspects of the tumour microenvironment (such as cell-cell and cell-matrix interactions) than traditional 2-D culture. The functionality of the oxygen control device is verified using both finite-element modelling and integrated optical oxygen sensors. Two novel methods for oxygen sensor microfabrication are presented, and the functionality of sensors during long-term experiments is studied. Precise oxygen control is demonstrated using the microfluidic system, with oxygen switching times of <10 minutes. Furthermore, we demonstrate the utility of the platform with preliminary biological experiments and drug screening assays. We show long-term culture of breast tumour cells, and analyze the response of the cells to oxygen changes. We show how the microfluidic platform allowed us to observe for the first time that tumour spheroids can reversibly swell and shrink under changing oxygen conditions.

Speaker: Samantha is a microfluidics/BioMEMS researcher in Prof. Karen Cheung and Prof. Lukas Chrostowski's research groups in Electrical and Computer Engineering at the University of British Columbia. She completed her B.A.Sc. in Engineering Physics (2010) at Simon Fraser University in the group of Prof. Bonnie Gray, and she will receive her Ph.D. from UBC in November 2016. Her thesis research focuses on using microfluidics to recreate the microenvironment of cells within tumours during in vitro experiments such as drug screening, and she is passionate about learning, solving problems, and working on interdisciplinary research. In addition to her thesis work, Samantha has designed and tested optical biosensors using silicon nanophotonics technology combined with microfluidics.

IEEE Electron Devices Society

Information
Electron Devices Chair
Bonnie Gray
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