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Learning in graphical congestion games with applications to content replication and caching

György Dán
KTH Royal Institute of
Technology

Monday 21 October
10 am

Rm 418, Macleod Bldg
2356 Main Mall
UBC

Content caching and replication are widely used in networked systems to improve performance. Examples include content distribution networks, cache hierarchies, proxy caches, and the emerging paradigm of content centric networking. In this talk, we consider the problem of caching and replication of contents by autonomous, interacting agents. We model the replication problem as a player-specific congestion game played on a graph that determines the influence of the players on each other. We show that while pure Nash equilibria do exist for arbitrary graph topologies, the graph topology and the congestion function play a fundamental role in the convergence of learning rules to equilibrium. We show how the results can be used to design efficient algorithms for distributed replication, and we discuss how they can be applied to networks of caches. We conclude with results on the stability of equilibrium cache allocations under noisy estimates of content popularity.

Speaker: György Dán is an Associate Professor at KTH Royal Institute of Technology, Stockholm, Sweden. He received the M.Sc. degree in computer engineering from the Budapest University of Technology and Economics, Hungary in 1999, the M.Sc. degree in business administration from the Corvinus University of Budapest, Hungary in 2003, and the Ph.D. in Telecommunications from KTH in 2006. He worked as a consultant in the field of access networks, streaming media and videoconferencing 1999-2001. He was a visiting researcher at the Swedish Institute of Computer Science in 2008, and a Fulbright research scholar at the Information Trust Institute at University of Illinois Urbana-Champaign in 2012-2013. He received the best paper award at IFIP/TC6 Networking 2008 and at IEEE P2P 2010, and the best student paper award at ITC 23 in 2011. His research interests include the design and analysis of content management systems, game theoretical models of networked systems, and cyber-physical system security in power systems.

IEEE COMMUNICATIONS SOCIETY · IEEE Information Theory Society · photonics SOCIETY · BTS IEEE Broadcast Technology Society · VTS · ITSS

Jt. Chapter BT-02/COM-19/IT-12/ITS-38/PHO-36/VT-06

Deploying advanced technology for better system reliability

Damir Novosel
Quanta Technology

Distinguished Lecturer

Tuesday 08 October
4:00 PM to 5:00 PM

BC Hydro: Edmonds A01
Skytrain Auditorium
6911 Southpoint Drive,
Burnaby

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

Sense of urgency has been brought to energy issues around the world, including addressing the power grid infrastructure and environmental concerns. Reliable and efficient electrical grid operation is critical to society. Electrical utility industry is making the transition to new infrastructure with benefits of improving the performance of electric utility systems and addressing the energy needs of society, such as improved efficiency and utilization, renewable energy integration, demand response, power quality and reduced maintenance cost. This approach requires system and equipment reinforcement, improved integrated system planning and operation, and increased automation.

Advanced monitoring, protection, and control technologies enable implementation of "smarter" electrical grids to realize the needs of the electricity users for sustainable energy delivery and enhanced power system performance. Following grid phenomena are managed for reliable grid operation:

- Equipment tripping due to faults or overloads

- Power system islanding (frequency instability)

- Angular or out-of-step instability and small signal instability

- Voltage instability/collapse issues

Addressing the above using advanced technologies (such as synchronized measurements) has a significant potential to improve system reliability. However, system solutions need to be introduced and deployed carefully to ensure good value to the user, effective deployment of technology, and reduced risk of stranded assets. This presentation addresses methodologies and key success factors for successful deployment of production-grade systems designed to improve reliability.

Solutions for managing voltage stability phenomena will be addressed in more detail. Different methods have different advantages and users should select methods optimal for their system. As real-time, model-free methods are faster but generally less accurate, combination of selected methods provides comprehensive solution for voltage stability issues. Advantages and disadvantages of various methodologies are compared for optimal system design.

Speaker: Bio Damir Novosel (SM 1994, F2003) served as chair of the PES Technical Council, vice president of technology, and a member of the PES Governing Board from 2010 to 2012. He is presently Technical Council Education Chair and Chair of the Long Range Planning Subcommittee for Technical Activities, Meetings, and Publications, as well as IEEE PES candidate for President, Damir is also member of the CIGRE US National Committee Governing Board and vice-chair of Technology.

Dr. Novosel is the president of Quanta Technology, a subsidiary of Quanta Services, an S&P 500 company. Previously, he was vice president of ABB Automation Products and president of KEMA T&D US. In his leadership role, he supported engineers' participation in IEEE and other professional organizations, and promoted value of PES membership to employers.

Damir holds 16 US and international patents and published over 100 articles in Transactions, Journals and Proceedings, receiving PES 2011 and 2013 Prize Paper Awards. He has led or participated in numerous IEEE standards, publications and other initiatives, such as keynotes and panels.

Damir has been continuing contributor to education, including an adjunct professorship of Electrical Engineering at North Carolina State University, sponsorship of college scholarship programs, and support to industry courses and tutorials.

He holds PhD, MSc, and BS degrees in electrical engineering from Mississippi State University, where he was a Fulbright scholar, the University of Zagreb, Croatia, and University of Tuzla, Bosnia and Herzegovina.

6TiSCH: IPv6 over IEEE802.15.4e

Qin Wang
University of Beijing

Firday 08 November
11:00 am to 12:30 pm

ASB 10900 (IRMACS
Presentation Studio),
Simon Fraser University,
Burnaby

Light refreshments
served.
Open to public.

Please register (aids our
estimating attendance)

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

Low-power and Lossy Networks (LLNs) interconnect a possibly large number of resource-constrained nodes to form a wireless mesh network. The 6LoWPAN, ROLL and CoRE IETF Working Groups have defined protocols at various layers of the protocol stack, including an IPv6 adaptation layer, a routing protocol and a web transfer protocol. This protocol stack has been used with IEEE802.15.4 low-power radios.

The IEEE802.15.4e Timeslotted Channel Hopping (TSCH) is a recent amendment to the Medium Access Control (MAC) portion of the IEEE802.15.4 standard. TSCH is the emerging standard for industrial automation and process control LLNs, with a direct inheritance from WirelessHART and ISA100.11a.

Defining IPv6 over TSCH, 6TiSCH is a key to enable the further adoption of IPv6 in industrial standards and the convergence of Operational Technology (OT) with Information Technology (IT). The talk will give an overview about the on-going work 6TiSCH in IETF.

Speaker: Qin Wang is a professor of University of Science & Technology Beijing (USTB), China, and a visiting scholar in University of California at Berkeley, US. She received BS, MS, and Ph.D degree in Computer Science and Engineering from USTB in 1982, Peking University in 1985, and USTB in 1998, respectively.

She joined USTB in 1985, became full professor in 2000. She has been director of Micro-Architecture &

IC Laboratory in USTB since 2000. As visiting scientist (2005-2006) in EECS department of Cornell University, NY, and visiting researcher (2006-2007) in EECS department of Harvard University, Cambridge, MA, her research and contributions were on wireless sensor network technology and related power consumption modeling from both device and network system perspective.

Recent years, she has focused on low power wireless sensor networks and MPSoC (multiprocessor System-on-Chip) technology in communications and networking systems. She and her research team designed and deployed low power Large-Scale Wireless Sensor Networks applied to heavy industry including Anshan Iron and Steel Corp., a major iron and steel manufacturer in China. She has been involved in international wireless network standard development since 2007, including ISA100.11a, IEEE 802.15.4e, and industrial wireless standard WIA-PA proposed to IEC by China.

An introduction to software defined radio
with NI LabVIEW and NI USRP

National Instruments

Tuesday 02 October

09:00 a.m. - 12:00 p.m.

MCLD 418
University of British
Columbia

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

Join us for a National Instruments campus workshop: and discover how to use NI LabVIEW system design software to easily acquire, analyze, and record wireless signals from the NI USRP (Universal Software Radio Peripheral) software defined radio. Learn how to prototype a wireless communication receiving algorithm using this flexible, scalable radio.

This seminar will educate researchers and graduate students in the fields of science and engineering on the practical implementation of a software defined radio system.

This is an interactive hands-on session. Eight 8 laptops/8 USRP stations will be available.

Benefits of attending this seminar:
• introduce LabVIEW fundamentals necessary for wireless communication applications
• learn basic LabVIEW design patterns for wireless communications

• develop confidence that NI can meet the requirements of their application

Space is limited so please reserve your seat today.

Speaker: Gurshan Sidhu graduated with a mechanical engineering degree from the University of Victoria and with a diploma from Columbia Institute of Technology. Prior to joining NI, he was a senior systems engineer at Honeywell-Measurex. He joined NI in August of 1998 as an applications engineer and worked with different virtual instrumentation applications across various industries, platforms, and vendors. Since May of 1999, he has been based in the British Columbia area as a field engineer working to help local companies evaluate, design, and implement solutions for their measurement and control applications.

Preregistration is required. Please contact Dave Michelson at davem@ece.ubc.ca."

World wireless research forum workshop
on wireless standards and commercialization

Wednesday 23 October
9:00 - 12:00
UBC Robson Square

During this free event, which is being held in conjunction with the World Wireless Research Forum's Meeting 3, four presentations on Wireless Standards and Communications will be given.

9:00- 9:05	Welcome		10:35-11:15	Standardization and European Research Framework Programs. Werner Mohr (Nokia Solutions and Networks, Munich)
9:05-9:45	Future wireless business and entrepreneurship Mischa Dohler (Kings College London)		11:15-11:55	Network Evolution and Innovation Opportunities for SMES and Startups - TBD (Rogers Wireless)
9:45-10:15	Wireless Commercial Resources in Canada Brad Lowe (Wavefront, Vancouver)		11:55-12:00	Wrap-up
10:15-10:35	Break			

PREREGISTRATION IS REQUIRED.
For more information, please contact Dave Michelson, davem@ece.ubc.ca.

Organized by IEEE Joint Aerospace & Electromagnetics Chapter, IEEE Canada Industry Relations Committee, and Wavefront.

IEEE Joint Aerospace and Electromagnetics Chapter

Optimization is the keyword in NanoCMOS

Ricardo Reis
UFRGS

Tuesday 12 November
2:00 pm to 3:30 pm

Rm 2020 Kaiser Bldg
2332 Main Mall
UBC

AND

Wednesday 13 November
2:00 pm to 3:30 pm

ASB 10900 (IRMACS
Presentation Studio),
Simon Fraser University,
Burnaby

Light refreshments
served.
Open to public.

Please register (aids our
estimating attendance)

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

Power optimization in NanoCMOS must be observed in all levels of abstraction of the design flow and demands an important effort in optimization. As in NanoCMOS static power consumption is related to the amount of transistors, it is fundamental to change the design approach at physical level. It must be used an approach target to reduce the amount of transistors.

The traditional standard cell flow doesn't really take care of power minimization at physical level, because there is a limited number of logical functions in a cell library, as well a limited number of sizing versions. To really obtain an optimization at physical level, it is needed to allow the use of any possible logical function, by also using complex cells (Static CMOS complex gates . SCCG) that are not available in a cell library. To have a "freedom" in the logic design step, it is needed the use of an EDA set of tools to let the automatic design of any transistor network (even with a different number of P and N transistors). This approach can reduce the amount of transistors needed to implement a circuit, reducing the power consumption, mainly the leakage power.

The talk presents some examples and comparisons between the standard cell approach and the network of transistors approach. The flexibility of the approach can also let the designers to define layout parameters to cope with problems like tolerance to transient effects, yield improvement, printability and DFM. The designer can also manage the sizing of transistors to reduce power consumption, without compromising the clock frequency. High temperatures can reduce the reliability, so it is also important to reduce power consumption to improve reliability. The talk shows a new approach to reduce the amount of transistors by using complex gates and a new set of EDA tools to generate any transistor network. Some results show an important reduction on power consumption, improving also circuit reliability.

Speaker: Full Professor at Instituto de Informatica of the Universidade Federal do Rio Grande do Sul - UFRGS (professor since 1979). Electrical Engineering from the UFRGS, Porto Alegre, Brazil, in 1978. Ph.D. degree from the Polytechnic Institute of Grenoble (INPG), France, January 1983. Member of the Microelectronics Committee of National Council for Scientific and Technological Development (CNPq). Former member of the Computer Science Committee of National Council for Scientific and Technological Development (CNPq), for two terms.

His primary research interests include Physical Design Automation and Methodologies, CAD tools, Circuits Tolerant to Radiation, VLSI Design Methodologies and Microelectronics Education. More than 350 hundred papers in journals and conferences proceedings. He is also author or co-author of several books. Invited speaker in several international conferences. Award as research of the year by the Science Foundation of Rio Grande do Sul, 2002. Silver Core award from IFIP. Research level 1A of the CNPq (Brazilian National Science Foundation). Head of several research projects. Past head of the Graduate Program in Microelectronics (2 terms) and of Computer Science Graduate Program at UFRGS (two terms). Professor and advisor at the Microelectronics and Computer Science Graduate Programs at UFRGS.

General Chair or Program Chair of several conferences like the IFIP/IEEE VLSI-SoC, IEEE ISVLSI, IEEE LASCAS, Symposium on Integrated Circuits and Systems Design (SBCCI) and Congress of the Brazilian Microelectronics Society (SBMIcro). Past President of the Brazilian Computer Society and Past Vice-President of the Brazilian Microelectronics Society. IEEE CASS Chapter Rio Grande do Sul Chair (since 2007). Vice-president of IEEE Circuits and Systems representing R9, for two terms, from 2008 to 2011. Member of the Editorial Board of IEEE Design&Test. Member of the Steering Committee of the following conferences: IFIP/IEEE VLSI-SoC, ICECS, LASCAS, NEWCAS, IEEE CASS Summer School, IEEE ISVLSI, SBCCI, IBERCHIP. Senior member of IEEE.

Measuring the arrival quality of real-time packet trains - a global perspective

Ulrich Speidel
University of Auckland

Monday 02 December
2:00 pm to 3:30 pm

ASB 10900 (IRMACS)
Simon Fraser U, Burnaby

Light refreshments
served.
Open to public.

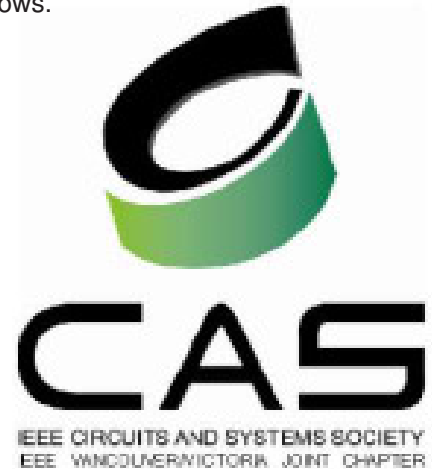Please register (aids our
estimating attendance)

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

Real-time applications on the Internet include everyday applications such as Voice over IP telephony, but also more advanced technologies such as remote manipulation, e.g., for remote surgery. These applications work best if their packet trains arrive with minimum latency, low packet loss, constant inter-arrival times and all packets in the order in which they were transmitted. Latency is largely unavoidable due to the physical distance, but not meeting the remaining requirements perfectly requires applications to buffer packets until sufficient data for meaningful processing (e.g., audio playback) has accumulated at the receiver.

Conventional "improvements" to Internet infrastructure, such as the addition of new links and load balancing can be a double-edged sword: While they create extra bandwidth and reduce congestion and sometimes latency, they also create additional router queues and alternative paths, potentially affecting inter-arrival times and in-order delivery. This is in particular a problem if the destination is served by long thin networks. Our project is a longitudinal study that attempts to track the long-term global trend in the arrival quality of real-time long distance packet streams.

Speaker: Ulrich Speidel is a senior lecturer in the Department of Computer Science. He holds a PhD in Computer Science and an MSc in Physics from Auckland, and held a visiting associate professorship at the University of Tokyo in 2010. He works in information theory, variable-length coding, information measurement and web technologies and applications of all these fields.

His main project in the last two years has been to establish of an international network of computers for active network measurement to investigate long-term trends in the smoothness of long-distance real-time data flows.

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IEEE CIRCUITS AND SYSTEMS SOCIETY
IEEE VANCOUVER/VICTORIA JOINT CHAPTER

INCOSE workshop broadcast

Systems Engineering is an engineering discipline that deals with a complex system as a whole, covering its entire lifecycle and all its functional and operational aspects. INCOSE, the International Council on Systems Engineering, has organized a workshop in Ottawa with multiple talks about Systems Engineering. The event from Ottawa will be broadcast and we will view and hear the talks here in Vancouver. Here in Vancouver, we are also planning to have at least one speaker. IEEE Vancouver GOLD will be hosting that event jointly with INCOSE Canada.

Saturday 28 September

10:00 am - 1:00 pm
SFU Segal Building
Policy Room 4600
500 Granville Street

The event in Vancouver is still being organized. An update will be updated here and posted on the IEEE Vancouver website as soon as the venue and event plan are confirmed. For event registration and any additional information or to participate as a volunteer, please contact Ophir Kendler at ophir2k@ieee.org

For additional information and to (please) register, see the event page at:
https://meetings.vtools.ieee.org/meeting_view/list_meeting/20581

GOLD
Graduates Of the Last Decade

Information
GOLD chair
Ophir Kendler
ophir2k@ieee.org

10th International Workshop on Complex Systems and Networks

**SFU Harbour Centre
December 11-13, 2013**

http://iwcsn2013.eie.polyu.edu.hk/Home.html

The International Workshop on Complex Systems and Networks (IWCSN) is a strongly interdisciplinary workshop intended to bring together mathematicians, physicists, biologists, social scientists, and engineers working on different aspects of network dynamics. The focus of IWCSN 2013 will continue to be devoted to the impact of network structure on systems dynamics. This area continues to be a hot research topic in all branches of science and technology.

The objectives are to provide opportunities for participants to learn about state-of-the-art research in various related yet disparate fields. We plan to have both tutorial talks and in-depth technical talks describing the latest research results and ongoing projects. Furthermore, these workshops provide opportunities for researchers and students from diverse disciplines to interact, find common ground, share results and insights, and foster collaboration.

Some of the questions that we have and would like to address in this workshop are: What are the universality properties of complex networks? For a particular application, what is the best complex network to deploy? How does the topology of the network influence various aspects of the underlying system? What can we learn from biological and social networks that may be useful in engineering networked systems and vice versa? What network models can be analyzed mathematically yet capture the salient features of the underlying ensemble systems? Can we build a taxonomy of complex network models that facilitates the identification of phenomena in ensemble systems?

The 2013 IWCSN will be divided into two main sections: theoretical works with a special focus on mathematical modeling and careful analytical studies a wide range of problems emanating from various applications in physics, chemistry, life sciences, engineering, and communications. There will be an opportunity for junior researchers and students to present their work including a session where researchers may pose interesting open questions.

Local organizer: The IRMACS Centre, Simon Fraser University

Sponsors: IEEE Circuits and Systems Society Centre for Chaos and Complex Networks, City University of Hong Kong, Hong Kong; IEEE Vancouver Section and IEEE Circuits and Systems Society joint Chapter of the Vancouver/Victoria Sections; Faculty of Applied Science and School of Engineering Science, Simon Fraser University

Inquiry: Ljiljana Trajkovic (Email: ljilja@sfu.ca)

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EEE VANCOUVER/VICTORIA JOINT CHAPTER

amazon

IEEE WIE Vancouver is organizing a networking night with guests from Amazon and is inviting students and IEEE WIE members to join us for an evening of good company.

The start of the new academic year is a great opportunity to meet new members and expand your network.

Wednesday 09 October
7:00 - 8:30 PM
Room 2020 - Fred Kaiser Building 2332
Main Mall, UBC Campus, Vancouver

6:45 PM Registration
7:00 PM Welcome
7:15 PM Introduction
7:30 - 8:30 PM Networking and Reception
(Sandwiches and soft drinks are served
This event is free of charge)

Please register online at
https://meetings.vtools.ieee.org/meeting_view/list_meeting/20855

Information: Women In Engineering Affinity Chair Tanaya Guha tanaya@ece.ubc.ca

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What role does quantum mechanics play in biology?

K. Birgitta Whaley
UCal Berkeley

Wednesday 09 October
7:30 pm

Fairmount Lounge
St. John's College
2111 Lower Mall
UBC Campus

This is a non-IEEE sponsored event but may be of interest to many in IEEE Vancouver and is published here courtesy Alon Newton, IEEE Vancouver Chair

ED 06OCT13

 The discovery of quantum mechanics immediately transformed both physics and chemistry, and questions were soon asked about its implications for biology. The first era of quantum biology focused on the structure and stability of biological entities like molecules. A second era began in the 1960s, with lasers allowing experiments on the very short time scales relevant to atomic and molecular motions. Today, we have novel nanoprobes of real living cells,
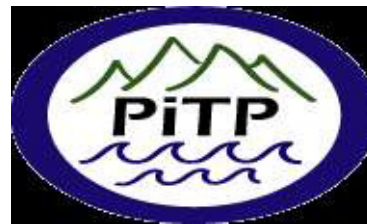
and evidence for biological phenomena that may involve highly non-trivial quantum effects such as long-range coherence and entanglement. I shall review some of this history, and then describe studies of dynamical quantum effects in biological systems, discussing the diverse questions that these studies raise for our understanding of the biological world we inhabit

This event is sponsored by the Pacific Institute of Theoretical Physcis, PITP. The PITP/St.Johns public lectures are BACK, and the new season begins NEXT WEEK at the same old time and place - St Johns college on the UBC campus, on the 2nd Wednesday of the month, at 7.30 pm. We will have some very interesting lectures this year, and we encourage everyone and anyone to attend.   The opening lecture of the season will be about a topic that has been creating some sensational news in the last couple of years - the possibility that living processes at quite high levels may be quantum-mechanical.

For many decades it has been a central belief in biology that quantum mechanics could only play a role at the atomic level, so this idea is really

revolutionary. And yet it has now received dramatic experimental support in recent studies of photosynthesis and light-harvesting (where quantum coherence is found to persist over hundreds of Angstroms), and of bird navigation (where the essential mechanism may involve correlations between entangled Einstein-Podolsky-Rosen electron pairs).   One of the figures at the centre of this storm has been Prof Birgitta Whaley, from Berkeley (where the long-range coherence in light-harvesting molecules was discovered). A very well-known chemist, she has also written extensively on quantum information and other topics in physics. She will be giving a lecture designed specifically for a broad public audience, which will also review some of the background history - this will be a very nice opportunity to hear it 'from the source'.

For more info and weblinks: http://pitp.physics.ubc.ca/quant_lect/2013/Whaley.htm

An afternoon at the RIO Cinema

Saturday 09 November
Noon to 04:00pm

1660 E Broadway
Vancouver

Information:
StevenMcClain@IEEE.ORG

Come one, come all to the
2013 IEEE Vancouver's Social Event

We have booked the historic RIO theater for our own private party! We will meet at the RIO, and have (non-alcoholic) drinks and snacks while socializing and renewing friendships. Then we settle in for a movie that should appeal to us engineering types.

The movie is called "The Dish" and is based on a true story about a Australian radio telescope that was used to carry the television signal from the Apollo 11 moon walk. It is funny and entertaining and can be appreciated by young and old.

This event is open to all members and their families (children welcome) although the movie is rated PG13 for some mild language.

Ticket price is $5 per person and will include a small popcorn and drink. Concession will be open if you want to buy more snacks. We would prefer that you register and pay beforehand but it will be possible to pay (cash) when you get there. Please register anyway so that we can plan accordingly.
Registration closes Nov 8.

Registration: https://meetings.vtools.ieee.org/meeting_registration/register/20687

12:00pm - doors open
Guests arrive and socialize
1:00pm - 3:30 film shows
4:00pm theater closes

ED 06OCT13