

KITCHENER-WATERLOO SECTION

December 2001

Meetings

Please mark these dates on your calendar

- | | | |
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| 21 November | Prof Eddie Law on TCP Niagara
UW Davis Centre room DC2577 | page 3 |
| 23 November | Dr. Wim Geens on Organic Solar Cells
UW Davis Centre room DC2577 | page 3 |
| 29 November | Hector de los Santos on MEMS
UW Davis Center room DC2577 | page 4 |

Reminder:

28 November: Annual General Meeting: election of officers for 2002-2003

Mate Prgin on Starting/running a high-tech company in Waterloo
University of Waterloo Davis Centre Room DC1302

Feature articles

- | | |
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| Conferences in Canada | page 5 |

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Stream A:)
Summer 2001)Siva

Stream B:) Sivoththaman
Fall 2001)

EDITORIAL

Don't forget to come to the AGM on
Wednesday 28th November if you can,
and bring your spouse: both of you
should find the talk by Mate Prgin on
starting a company very interesting.

I have told the Nominating Committee
that after 15 years I am stepping down as
editor of this section's newsletter. It has
been an enjoyable, though onerous task,
and it is time someone else took it on,
and gave it a fresh approach.

Seasons greetings!

Tom East

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PROFESSOR EDDIE LAW ON TCP NIAGARA

Date: Wednesday 21 November 2001
Time: 2.00 pm
Place: University of Waterloo Davis Centre, Room DC2577
Subject: TCP Niagara
Speaker: Prof. Eddie Law, University of Toronto

Abstract: A completely newly designed flow control family for the Transmission Control Protocol was developed. It is named TCP Niagara. There are four congestion control mechanisms designed, and they are the Slow-Start (SS), Congestion Avoidance (CA), Timeout Avoidance – Fast Transmit (TAF), and Timeout Recovery (TR). A brief comparison with existing de facto design, TCP Reno, will be discussed. TCP Niagara can achieve fairness between flows, and more importantly, it is able to reduce the occurrences of timeout events as they happen in TCP Reno.

Speaker: Eddie Law obtained his Ph.D. degree from the University of Toronto in 1995. He worked at Nortel Networks, Ottawa from 1995 to 1999. Since September 1999, he has rejoined the Department of Electrical and Computer Engineering at the University of Toronto as an Assistant Professor. His research interests are on active networking, TCP flow control and protocol design, optical network performance and optical switch fabric design.

WIM GEENS ON ORGANIC SOLAR CELLS

Date: Friday 23th November 2001
Time: 4.00 pm
Place: University of Waterloo Davis Centre, Room DC2577
Subject: The Challenges and Limitations of Organic Solar Cells
Speaker: Wim Geens – IMEC, Leuven, Belgium

Subject: As an introduction, a short overview will be given of the various existing types of organic solar cells. Their properties and state-of-the-art power conversions will be discussed. With this as a starting point, focus will be on the concept of the so-called bulk heterojunction, which consists of a mixture interpenetrating donor and acceptor molecules. In particular, photovoltaic devices based on spincoated blends of a conjugated polymer and a fullerene derivative have proven to be very promising regarding their performance as well as the possibility of reel-to-reel processing. At IMEC these spincoated plastic solar cells are being investigated and recent results will be presented. The charge carrier mobilities in the organic donor/acceptor network are known to be crucial parameters for optimizing the final solar cell performance. Therefore, it will be shown as to how organic field-effect transistors can be used as a tool to determine the hole and electron mobilities within these photovoltaic polymer/fullerene films.

In order to gain more insight into the working principle and at the same time get an idea of the ultimate conversion efficiency potential of the organic bulk heterojunction solar concept, we have also used the technique of vacuum evaporation to deposit organic layers in a well-controlled manner. By varying the

source and substrate temperatures one has the disposal of the tools to optimize the molecular morphology of the deposited films. The sublimed donor and acceptor materials are respectively a PPV-oligomer and C₆₀. Co-evaporated films of the PPV-oligomer and C₆₀ can serve as "model systems" for the corresponding photovoltaic conjugated polymer/fullerene blends.

Speaker: Wim Geens was born in Bonheiden, Belgium on 23 October 1973. He studied Physics at the University of Antwerp (UIA) where he obtained his Master's degree in 1997. He then joined the Interuniversity Microelectronics Center IMEC, Leuven where he started his Ph D research on organic solar cells based on donor/acceptor bulk heterojunctions . For this he received a grant from the Institute for the Promotion of Innovation by Science and Technology in Flanders (IWT).

**DR.DE LOS SANTOS ON APPLICATION OF MEMS TECHNOLOGY TO
RF/MICROWAVE SYSTEMS**

Date: Thursday 29th November 2001
Time: 5.00 pm
Place: University of Waterloo Davis Centre, Room DC2577

Subject: Microelectromechanical Systems (MEMS) applications in RF and microwave electronics are on the verge of revolutionizing wireless communications. In this talk we discuss the fundamentals of this exciting technology, potential pitfalls to be encountered, and typical applications where MEMS is expected to make the greatest impact in RF/microwave circuits and systems. In particular, the ability of MEMS' fabrication techniques to enhance the performance of passive components, e.g., capacitors, inductors, transmission lines, and switches, is addressed, and a number of potential wireless system opportunities, namely, wireless transceivers, routing networks, and tracking antennas for mobile multimedia communications, awaiting the maturation of MEMS, are discussed.

Speaker: Hector J. De Los Santos is Principal Scientist at Coventor, Inc., Irvine, CA, where he leads Coventor's RF MEMS research and development effort. He received a Ph.D. from the School of Electrical Engineering, Purdue University, West Lafayette, IN, in 1989. From March 1989 to September 2000, he was employed at Hughes Space and Communications Company, Los Angeles, CA, where he served as Scientist and Principal Investigator and Director of the Future Enabling Technologies IR&D Program. Under this program he pursued research in the areas of RF MEMS, Quantum Functional Devices and Circuits, and Photonic Bandgap Devices and Circuits. Dr. De Los Santos holds over ten patents and has over half a dozen patents pending. He is author of the bestseller textbook Introduction to Microelectromechanical (MEM) Microwave Systems, Norwood, MA: Artech House, 1999, and of the upcoming book RF MEMS Circuit Design for Wireless Communications, Norwood, MA: Artech House, June 2002. Dr. De Los Santos' achievements are recognized in Maquis' Who's Who in Science and Engineering, Millennium Edition, and Who'sWho in the World, 18th Edition, He is a Senior Member of the IEEE, and member of Tau Beta Pi, Eta Kappa Nu, and Sigma Xi. He is an IEEE Distinguished Lecturer of the Microwave Theory and Techniques Society for the 2001-2003 term.

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