



# IEEE

## Ottawa Section



**The IEEE Ottawa Signal Processing, Oceanic Engineering, and Geoscience and Remote Sensing Joint Chapter (SP/OE/GRS) is cordially inviting all interested researchers, engineers, technologists, and students to the following seminar.**

**TITLE:** Soft-TDMAC: A Software-based 802.11 Overlay TDMA MAC Protocol with Microsecond Synchronization

**SPEAKER:** Dr. Petar Djukic, Huawei Canada Research Centre

**DATE:** Friday, July 27, 2012

**TIME:** 12:00PM to 1:00PM (pizza and soft drinks will be served at 11:45 AM)

**PLACE:** Room 5084, SITE Building/University of Ottawa, 800 King Edward Avenue, Ottawa, K1N 6N5

**Admission:** Free. Registration preferred by contacting:

Dr. Yifeng Zhou ([yifeng.zhou@crc.gc.ca](mailto:yifeng.zhou@crc.gc.ca)), or

Mr. Jungang Liu ([jliu115@uottawa.ca](mailto:jliu115@uottawa.ca)), or

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### Abstract

We implement a new software-based multi-hop TDMA MAC protocol (Soft-TDMAC) with microsecond synchronization using a novel system interface for development of 802.11 overlay TDMA MAC protocols (SySI-MAC). SySI-MAC provides a simple, kernel independent, message based interface for overlay MAC protocol implementations to schedule transmissions, send packets, and receive packets. The key feature of SySI-MAC is that it provides near deterministic timers and transmission times, which allows for implementation of highly synchronized TDMA MAC protocols. Building on SySI-MAC's predictable transmission times, we implement Soft-TDMAC, a software based 802.11 overlay multi-hop TDMA MAC protocol. Soft-TDMAC has a synchronization mechanism which synchronizes all pairs of network clocks to within microseconds of each other. Building on pairwise synchronization, Soft-TDMAC achieves tight network-wide synchronization. With network wide synchronization independent of data transmissions, Soft-TDMAC can schedule arbitrary TDMA transmission patterns. For example, Soft-TDMAC enables schedules that decrease end-to-end delay and take end-to-end rate demands into account. We summarize hundreds of hours of testing Soft-TDMAC on a multi-hop test-bed, showing the synchronization capabilities of the protocol and the benefits of flexible scheduling.

This work was done while Petar was a post-doctoral researcher at the University of California, Davis. It was published at INFOCOM 2008 and in IEEE Transactions on Mobile Computing in 2012.

### Speaker's Bio

Petar Djukic (S '01, M '08) received B.A.Sc., M.A.Sc. and Ph.D. degrees from the University of Toronto in 1999, 2002 and 2008, respectively. He is currently with Huawei Canada Research Centre. From 2010 to 2011 he was a research scientist with the Communications Research Centre, Ottawa, Canada. From 2008 to 2010 he was a postdoctoral researcher at the Department of Systems and Computer Engineering, Carleton University, Ottawa, Canada. From 2007 to 2008 he was a postdoctoral researcher at the Department of Computer Science, University of California, Davis. His research interests are in wireless multi-hop scheduling and resource allocation and test-bed implementations of new wireless MAC protocols. From 1999 to 2001 he worked as a software designer in Ottawa, Canada.