



Illinois Center for Wireless Systems

ICWS Seminar Series



Multi-Hop Wireless Networks: An Engineering Perspective

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Abstract: Wireless mesh networks (WMNs) are seen as a promising alternative to other (wired) broadband access technologies. In order to offer high throughput, they will have to be correctly configured by the operator in terms of routing, scheduling, power control, and rate adaptation. We present here a number of significant engineering insights on what makes a good configuration for medium- to large-size WMNs. We confirm that power control is useful but that the number of power levels might be less important than the actual values that are used. We also quantify the advantage of multi-hop over single-hop, show that multi-path optimal routing is not much more efficient than single-path optimal routing and that not all min-hop routing are equally efficient. We also find that the relationship between spatial reuse and network performance is not that straightforward. We then examine the importance of the interference model and show how simplistic models yield results that are qualitatively very different from the results obtained using a SINR-based model. Finally, we address the issue of lifetime and energy consumption. The engineering insights were obtained thanks to the development of very powerful computational tools.

Bio: Catherine Rosenberg is a Professor and a University Research Chair in Electrical and Computer Engineering at the University of Waterloo. She started her career in ALCATEL, France and then at AT&T Bell Labs., USA. From 1988-1996, she was a faculty member at the Department of Electrical and Computer Engineering, Ecole Polytechnique, Montréal, Canada. In 1996, she joined Nortel Networks in the UK where she created and headed the R&D Department in Broadband Satellite Networking. She was also a Visiting Professor in the Department of Electrical and Electronics Engineering at Imperial College. Dr. Rosenberg joined the faculty of the School of Electrical and Computer Engineering at Purdue University in August 1999 where she co-founded in May 2002 the Center for Wireless Systems and Applications (CWSA). She joined University of Waterloo on Sept 1st, 2004 as the Chair of the Department of Electrical and Computer Engineering. Catherine Rosenberg is on the Scientific Advisory Board of France-Telecom and was on the Board of Governors of the IEEE Communications Society from January 2007 to December 2008. She was an Associate Editor for IEEE Communications Magazine, Telecommunications Systems, and IEEE Transactions on Mobile Computing, and served as IEEE Communications Surveys and Series co-Editor for the Series on Adhoc and Sensor Networks for IEEE Communications Magazine. She has been and is involved in many conferences including IEEE Infocom, IEEE Globecom, International Teletraffic Congress (ITC) and IFIP Broadband Communication. She has authored over 150 papers on broadband and wireless networking and traffic engineering and has been awarded eight US patents.

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