



# Hamilton Institute

## High Density 802.11 Mesh Networks: Management Principles

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### *Abstract*

802.11 wireless LANs for broadband wireless access constitute a growing success story. Currently, their deployment in single-cell (i.e. single AP) scenarios (homes, small business and isolated hotspots) is well-supported by current .11 technology. However, increasing node density implies the need for improved interference management. We propose a multi-cellular, multi-hop approach to WLAN network design to support the twin goals of network scalability (supporting larger number of users per unit area) while simultaneously extending coverage. This is achieved by connecting APs wirelessly to form a (static) multi-hop .11 (mesh) networks. The talk will describe the key advances needed at the associated physical and multiple access (MAC) layers for such an architecture to achieve the necessary throughput scaling. A key innovation is the use of multi interfaces (multi-radio) per node that provides significant new degrees of design flexibility. Further, the role of cross-layer interference management techniques that allow *joint adaptation* of the link and MAC parameters will be highlighted with examples; specifically, the benefits from recent *loss differentiation* (i.e. the ability to classify the cause of packet loss) based approaches will be emphasized.

### *Speaker biography*

Sumit Roy (Fellow, IEEE) received the B. Tech. degree from the Indian Institute of Technology (Kanpur) in 1983, and the M. S. and Ph. D. degrees from the University of California (Santa Barbara), all in Electrical Engineering in 1985 and 1988 respectively, as well as an M. A. in Statistics and Applied Probability in 1988. Presently he is Assoc. Chair for Research and Prof. of Electrical Engineering, Univ. of Washington where his research interests include analysis/design of wireless communication and sensor network systems. His recent research emphasis includes wireless LANs (802.11) and wireless MANs (802.16), definition of multi-standard wireless inter-networking and cognitive radios, underwater acoustic networking and sensor networking involving RFID technology. He spent 2001-03 on academic leave at Intel Wireless Technology Lab as a Senior Researcher engaged in systems architecture and standards development for ultra-wideband systems (Wireless PANs) and next generation high-speed wireless LANs. His activities for the IEEE Communications Society (ComSoc) includes membership of several technical and conference program committees (most recently, Vice Chair of Technical Program Committee for IEEE WCNC05 conference). He has served as Associate Editor for IEEE Trans. Communications and IEEE Trans. on Wireless Communications and currently serves on the Editorial Board for IEEE Trans. Mobile Computing, IEEE Intelligent Transportation Systems and Wiley J. Wireless Communications and Mobile Computing. He is currently an SFI Walton Fellow visiting UCD till July 08.

**Venue:** Seminar Room, Hamilton Institute, Rye Hall,  
NUI Maynooth

**Time:** 1.30 - 2.30pm (followed by tea/coffee)

Travel directions are available at [www.hamilton.ie](http://www.hamilton.ie)



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