Title: The Fundamental Limits of Broadcasting in Wireless MultiHop Networks

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Abstract: In this talk, we investigate the fundamental properties of broadcasting - the so-called scaling laws - in wireless multihop networks. In particular, we ask the fundamental question of whether (asymptotically) optimal broadcast capacity and latency can be simultaneously achieved, and we give a positive answer to this question (subject to a mild condition on network topology) presenting a capacity and latency optimal broadcasting scheme. This is in sharp contrast with the case of unicast communications, for which optimal capacity and latency cannot be achieved simultaneously.
We then consider the same problem in presence of node mobility, and we show that, while broadcasting is not fundamentally limited in terms of capacity and latency (subject to a very loose upper bound on node velocity), suboptimal performance is indeed obtained when the communication overhead needed to select broadcast relay nodes is taken into account.

Biography: Dr. Paolo Santi received the Laura Degree and Ph.D. degree in computer science from the University of Pisa in 1994 and 2000, respectively. He is part of the research staff at the Istituto di Informatica e Telematica del CNR in Pisa, Italy, since 2001, first as a Researcher and now as a Senior Researcher.
During his career, he visited Georgia Institute of Technology in 2001, and Carnegie Mellon University in 2003. His research interests include fault-tolerant computing in multiprocessor systems (during PhD studies), and, more recently, the investigation of fundamental properties of wireless multihop networks such as connectivity, topology control, lifetime, capacity, mobility modeling, and cooperation issues. He has contributed more than 50 papers and a book in highly reputed conferences and journals in the field of wireless ad hoc and sensor networking. Dr. Santi has been recipient of the 2004 ITG Outstanding Paper Award for the paper (co-authored with C. Bettestetter and G. Resta) "The Node Distribution of the Random Waypoint Mobility Model for Wireless Ad Hoc Networks", appeared on IEEE Trans. on Mobile Computing in 2003.
Dr. Santi has been General Co-Chair of ACM VANET 2007 and 2008, Technical Program Co-Chair of IEEE WiMesh 2009, and he is involved in the organizational and technical program committee of several conferences in the field. Dr. Santi is Associate Editor for IEEE Transactions on Mobile Computing and IEEE Transactions on Parallel and Distributed Systems. He is a member of IEEE CS, and a senior member of ACM and SIGMOBILE.