



## Fall 2010 Distinguished Colloquium Computer and Information Sciences

### *New Challenges in 4G Wireless Networks*

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Wednesday 12/01, 11am, Wachman Hall 447

**Abstract:** The Internet is still growing rapidly. Much of its recent expansion has involved smartphones and high-speed wireless devices. The introduction of Apple's iPhone had the effect of giving AT&T a great boost in its numbers of subscribers, but also a major overload of its existing 3G networks. New 4G technologies such as WiMAX and LTE are expected to engender another great expansion of the Internet, as well as continuing to reshape user expectations and demands. To take just one example, for many years it was assumed that using a wired Internet connection would always be considered superior to using a wireless connection. This is now forgotten -- while it's true that wired connections are faster, wireless is fast enough so that the speed difference usually does not matter any more. In this presentation, I will discuss some basics about 4G wireless networks. Then I will explain existing designs for mobility between heterogeneous networks, and point out some potential design flaws. These problems could be resolved by judicious application of well-known IETF-based mobility management protocols, but the latter have their own inadequacies that need resolution. I hope to suggest avenues for continued research towards ubiquitous availability of the future high-speed wireless Internet for all.

**Bio:** Charles E. Perkins is a technical Fellow at the WiChorus division of Tellabs, investigating mobile wireless networking and dynamic configuration protocols, in particular WiMAX and LTE. He is serving as document editor for the mobile-IP working group of the Internet Engineering Task Force (IETF), and is author or co-author of standards-track documents in the mip4, next, manet, dhc, and autoconf working groups. He is an editor for several ACM and IEEE journals for areas related to wireless networking. While at Tellabs, he has continued strong involvement with performance issues related to Internet access for billions of portable wireless devices as well as activities for ad hoc networking and scalability. Charles has authored and edited books on Mobile IP and Ad Hoc Networking, and has published a number of papers and award winning articles in the areas of mobile networking, ad-hoc networking, route optimization for mobile networking, resource discovery, and automatic configuration for mobile computers. Charles was also one of the creators of MobiHoc, the premier conference series that has provided the forum for many of the most important publications in the field of ad hoc networking; he remains on the steering committee for that conference. He has served as general chair and Program Committee chair for MobiHoc, MASS 2006, ICWUS 2010, and other conferences and workshops. Charles has served on the Internet Architecture Board (IAB) of the IETF and, at last count, has authored or co-authored at least 25 RFCs. He has made numerous inventions and been awarded dozens of patents; he was recently nominated for Inventor of the Year by the European Patent Office. He has served on various committees for the National Research Council, as well as numerous technical assessment boards for Army Research Lab and the Swiss MICS program. He has also served as associate editor for Mobile Communications and Computing Review, the official publication of ACM SIGMOBILE, and has served on the editorial staff for IEEE Internet Computing magazine.