

T4. Heterogeneous Cellular Networks: WCDMA, LTE and Beyond

Abstract:

Wireless broadband is forecast to increase by 26 times in the next 4 years (Cisco). Current outdoor wireless networks will not be able to scale to this demand. Industry and research has recognised that small cell technology (femtocells) can provide significant data offload while using the same frequencies. Heterogeneous wireless cellular networks are an evolution of this and utilize multiple tiers of cells to serve users. Leveraging the low-cost femtocell technology (essentially a low-power wireless access points for cellular technology) that operate in licensed spectrum to connect standard mobile devices to a mobile operator's network. Heterogeneous wireless networks enable a much lower cost wireless deployment architecture with orders of magnitude increase in overall data throughput per unit area. This course offers an introduction to heterogeneous wireless network architecture (3G/4G), the market, and the technical challenges associated with deploying the technology. The presentation will describe details of the various standards as well as real-world insights into the challenges associated with network operations and management and the radio interference problems. A discussion on alternative fixed mobile convergence solutions will be performed as well as details of resource allocation and system level performance of such a network.

Speaker's Biography:

Mark Reed, The Australian National University, Canberra, Australia

Dr. Mark Reed is an Adjunct Assoc. Prof. at the Australian National University where he leads a team of students and researchers on the topic of small cell wireless cellular, specifically focused on heterogeneous wireless networks. The team is currently working on developing a framework to determine the performance limits of a heterogeneous wireless network from both the radio and network limitations. Mark pioneered the area of iterative detection techniques and is a leading researcher in the field with more than 60 publications and eight patents. Mark has a mix of real-world industrial experience as well as research experience where he continues to put his techniques into practice. Recently Mark was the team leader that realized a real-time world-first WCDMA Femtocell modem containing advanced receiver techniques that significantly improved the receiver throughput performance.

Web Link :http://nicta.com.au/research/research_themes/networked_systems/interferex

Mark is a co-editor of a special IEEE Journal on Selected Areas on Femtocells (Due to be published in 2012) and is actively involved in industrial commercialization of small cell wireless technology.