



UNIVERSITY AT ALBANY

State University of New York

College of Computing and Information Department of Computer Science Colloquium



Date: Monday, April 27, 2015

Time: 11:30 a.m. - 12:30 p.m.

Venue: BA 231

Title: **Modular Wireless Networks for
Infrastructure-Challenged Environments**

Speaker: **Prof. Mariya Zheleva, University at
Albany – SUNY**

Abstract: Access to connectivity has been deemed by the United Nations as a basic human right as it is critically important for economic growth and promotion of freedom. In line with this recommendation, programs are being developed worldwide, to support ubiquitous connectivity. Despite these efforts, affordability and accessibility vary widely across nations and between rural and urban areas within nations. As a result, only 20% of developing countries residents have access to mobile broadband and mere 6% -- to fixed broadband. The reason for the high cost and the consequent low adoption of connectivity is that traditional solutions are highly centralized and very infrastructure-intensive. To address these problems we design modular network systems that can provide different tiers of connectivity depending on available resources, and user demand. The base-line operation of our solutions provides local communications within a community. Simultaneously, these networks can morph to deliver more global connectivity where physical links and Internet access allow. Finally, such modular networks must coexist with commercial networks and adapt to their operation accordingly to avoid service disruption.

In this talk I will present results from our analysis of real-world networks that motivate our system designs. I will then talk about two systems we have designed to address the communication needs of users in infrastructure-challenged environments. The first system is called Kwizya and provides reliable cellular network connectivity in disconnected regions. The second system dubbed TxMiner is designed to support broadband dynamic spectrum access communications by determining spectrum availability and quality. I will conclude by presenting some results from in-situ operation of our systems in the rural village of Macha in Zambia.

Speaker's brief bio: Dr. Mariya Zheleva is a visiting assistant professor in the Department of Computer Science at University at Albany, SUNY. Prior to joining SUNY she graduated with her PhD in Computer Science from University of California Santa Barbara under the supervision of Prof. Elizabeth Belding. Mariya's research is on information and communication technology for development and she is currently focusing on the design and implementation of low-cost cellular and broadband networks for challenged environments.