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Pioneering Next-Gen Wireless Networks

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(From Archive) Originally posted Oct. 16, 2014 – A Utah State University engineering professor is part of a collaborative team of researchers developing new technologies that will support next-generation wireless networks. Associate professor of computer and electrical engineering Rose Hu, has secured two National Science Foundation grants along with private funding from Intel to develop tomorrow's wireless systems.

Dr. Hu received an NSF grant totaling $274,305 that began Oct. 1. The funding will support collaborative research in improving scalability and reliability for network communication infrastructure in Smart Grid – the next generation power grid in which electricity distribution and management is upgraded by incorporating advanced two-way communications, advanced sensing and pervasive computing capabilities for improved control, efficiency, scalability, reliability, security and safety.

Last September, Dr. Hu was awarded $197,548 for research aimed at improving spectrum and energy efficiency in next-generation wireless access networks.In 2013 and 2014, she secured $640,000 in research funding from Intel, supporting research titled "Next Generation Wireless Network Design Optimization."

Hu says these awards make it possible for her and her team to carry out research in developing next generation novel wireless network architecture, protocols and algorithms that can greatly improve network capacity, energy efficiency, scalability and reliability.

"One area we are focusing on is Device-to-device (D2D) communication, underlying cellular networks, which is a promising technology in the future wireless networks to improve network capacity and user experience," she said. "While D2D communication has great potential to improve the wireless system spectral efficiency and energy efficiency due to the proximity of communication parties and a higher spectrum reuse gain, tremendous research such as interference control, multi-hop communications, etc., are still ongoing to make this promising technology a reality."She added, "The recent surge of global mobile traffic is stressing the mobile and wireless network infrastructure, pushing its capacity beyond limits. It is anticipated that this trend will continue in the future at a faster rate. The exponential growth of network traffic will undoubtedly have a significant impact on the energy and bandwidth consumption of future wireless infrastructure, greatly challenging their ability to deliver the users' expected quality of service and quality of experience."

Hu says video traffic exceeds 80 percent of consumer Internet traffic and that addressing the stringent requirements of mobile video streaming is a daunting challenge that must be addressed in next generation wireless network infrastructure.

Her research also has implications in the quickly-expanding Internet of Things – a web of interconnected computers and devices that provide ubiquitous communication among intelligent devices including those in the Smart Grid, within the existing networking infrastructure. This developing technology will also require the network to be scalable and reliable.

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