

## Title: **Achieving Optimal Performance for Programmable Wireless Networks**

**Speaker:** Dr. Tom Hou, IEEE Fellow  
Bradley Distinguished Professor of Electrical and Computer Engineering  
Virginia Tech, Blacksburg, VA, USA

**URL:** <http://www.cnsr.ictas.vt.edu>

**Abstract:** Traditionally, achieving optimal performance for a distributed multi-hop wireless network is known to be difficult, if not possible. In recent years, advances in programmable physical layer (PHY) and decoupling of data and control planes motivate us to reconsider the possibility of performing global optimization directly for multi-hop wireless networks. This idea is further fueled by the fact that powerful computing resource is becoming readily available in the cloud and complex optimization problems may now be solved efficiently in real-time. These exciting trends have reinvigorated a new pursuit of optimal solutions to complex cross-layer optimization problems. In this talk, I will focus on some case studies on how the new centralized control plane allows us to achieve optimal performance on the data plane. In the first example, we consider a throughput maximization problem in multi-hop MIMO networks. The key challenge here is to efficiently use MIMO's degree-of-freedom (DoF) resources in a network-wide setting to maximize throughput for communications sessions. In the second example, I will describe how a centralized control paradigm can help improve spectrum coexistence between multi-hop primary and secondary networks.

**Speaker Biography:** Tom Hou is the Bradley Distinguished Professor of Electrical and Computer Engineering at Virginia Tech, USA. His research interests are to develop innovative solutions to complex cross-layer optimization problems in wireless networks. He is particularly interested in exploring new limits of network performance by exploiting advances at the physical layer and other new enabling technologies.

Prof. Hou was named an IEEE Fellow for contributions to modeling and optimization of wireless networks. He has published two textbooks: *Cognitive Radio Communications and Networks: Principles and Practices* (Academic Press/Elsevier, 2009) and *Applied Optimization Methods for Wireless Networks* (Cambridge University Press, 2014). The first book has been selected as one of the Best Readings on Cognitive Radio by the IEEE Communications Society. Prof. Hou's research was recognized by five best paper awards from the IEEE and two paper awards from the ACM. He holds five U.S. patents. He is a Distinguished Lecturer of the IEEE Communications Society.

Prof. Hou is a prominent leader in the research community. He was an Area Editor of IEEE Transaction on Wireless Communications (Wireless Networking area), and an Editor of IEEE Transactions on Mobile Computing, IEEE Journal on Selected Areas in Communications – Cognitive Radio Series, and IEEE Wireless Communications. Currently, he is an Editor of IEEE/ACM Transactions on Networking and ACM Transactions on Sensor Networks. He is the Steering Committee Chair of IEEE INFOCOM conference – the largest and top ranked conference in networking. He is a member of the IEEE Communications Society Board of Governors.