

Pioneers in the Field of Wireless Technology

MISSION STATEMENT

The mission of Wireless @ Virginia Tech is to:

- Produce students who continue to make advances in wireless networks and technologies as members of government, industry, and academia
- Perform pioneering research that impacts next generation wireless networks and technologies
- Serve the wireless industry and government through rapid response research, consulting, symposia and short courses
- Bring together interested outside parties and group members who have synergistic technical needs and expertise

WIRELESS SYMPOSIUM AND SUMMER SCHOOL

Wireless @ Virginia Tech continues to lead the way in research and education with its annual Wireless Symposium and Summer School held the last week of every May. Now in its 25th year, the Wireless Symposium & Summer School features guest speakers from military, government, industry, and academia, along with tutorials and panel sessions discussing the economic impact, regulatory issues, and future research and innovations. We are one of the largest - and the oldest - research group dedicated to wireless technology in academia.



INDUSTRIAL AFFILIATE PROGRAM



Wireless @ Virginia Tech is supported in large part by its Industrial Affiliate Program, a dedicated program that affords sponsoring companies the opportunity to help chart the future development of wireless technology and lead the way in research. There are three levels of sponsorship, Silver, Gold, and Wireless Industry Fellow. Silver membership applies to those companies that are interested in membership in Wireless @ Virginia Tech only. The Gold level includes membership in both Wireless @ Virginia Tech and the Broadband Wireless Access and Applications Center (BWAC), an Industry/University Cooperative Research Center (I/UCRC) sponsored by the National Science Foundation. The Wireless Industry Fellow is an optional program that offers an opportunity to support a fellowship designated for a specific faculty member to award to a selected graduate student. Benefits to our affiliates include access to IP licensing, personal student recruiting, and access to our password protected “Affiliates Only” section of the website that includes our students’ résumés, technical reports, and prepublication material. Complete details on our Industrial Affiliate Program are available on our website, <https://wireless.vt.edu>.

RESEARCH THRUST OVERVIEW

Cognitive and Dynamic Spectrum Access Systems

The goal of this thrust is to develop intelligent algorithms to harness the capabilities of modern wireless devices and to advance the stewardship of the radio spectrum. This thrust is also devoted to advancing the study of the radio spectrum, a critical resource that has been managed into scarcity. We examine new technologies for better, more dynamic allocation of the radio spectrum – including the application of cognitive techniques – and we assess the engineering and technology implications of proposed changes to spectrum regulation.

Wireless and Spectrum Security

The goal of the Wireless and Spectrum Security thrust area is to address the security and privacy challenges associated with the next-generation wireless technologies, including frequency-agile systems, adaptive and cognitive radios, emerging cellular standards, and cyber physical systems. Specific topics of interest include (1) resilient communications in contested and congested environments; (2) location and utilization privacy of spectrum users; (3) security issues with LTE and LTE Advanced; (4) integrity of decision making and machine learning processes in cognitive and adaptive wireless systems; (5) trusted support infrastructure for wireless access, such as spectrum management databases; (6) privacy and security issues for cyber physical systems.

Emerging Communication Networks

The goal of this thrust is to develop tools and techniques to help manage emerging communication networks and applications, such as heterogeneous cellular networks, machine to machine communications, and the Internet of things (IoT). Research products include foundational frameworks, grounded in solid analytical techniques such as stochastic geometry and game theory, for modeling, analyzing, and optimizing such emerging networks while factoring in their density, heterogeneity, and dynamics.

Applied Signal Processing

The goal of this thrust is to develop signal processing techniques to improve the efficiency and the performance (accuracy and/or data rate) of wireless systems, including communications, radar, and geolocation systems. We focus in particular on interference mitigation, MIMO (including massive MIMO) and array processing, spectrum sensing, modulation classification, iterative receiver processing, collaborative and single node geolocation, and device tracking.

RF Analysis and Technologies

This thrust area addresses antennas, propagation, and radio frequency systems associated with wireless communications and related applications. Work in antennas includes analysis and design of conventional antennas as well as research in electrically-small, broadband, reconfigurable, active/integrated, and array antenna systems. Work in propagation includes measurement, characterization, and prediction in indoor, outdoor, and complex environments including vehicular interior and interior-to-exterior scenarios. Work in RF hardware includes development of electronics and systems for measurement applications.

Durham Hall, Home of Wireless @ Virginia Tech



VirginiaTech
Institute for Critical Technology
and Applied Science

*Wireless @ Virginia Tech is an
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