PAWS
Princeton Advanced Wireless Systems

Lab Introduction & Overview of Current Research

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The interdisciplinary **Princeton Advanced Wireless Systems (PAWS) Lab** designs, builds, and evaluates wireless systems, innovating in wireless and mobile networking, wireless based sensing/localization, and the computational structures that support cutting edge wireless networks. We take a systems approach, building our designs to a level of practicality that reveals salient performance issues and leads to a more informed system design.

6G Wireless/Mobile Networks to Support Tomorrow's Interactive Applications

Tomorrow's interactive videoconferencing and immersive AR/VR applications demand cutting edge 6G wireless networks, but the larger internet's design is divorced from the architecture of these wireless networks. With extensive domain knowledge in both areas, the PAWS approach emphasizes cross-layer design to define the best layer abstractions for the next generation wireless and internet. *Recent work:* [Athena] [NR-Scope] [CLCP] [Dashlet]

Physics-Inspired and Quantum Computing for Wireless NextG Processing

Tomorrow's 6G networks anticipate user demand for increasing amounts of wireless capacity that continues to outpace supply. In large NextG wireless networks there is elasticity in the relationship between spectral efficiency and expended compute cycles. PAWS is transforming the current research landscape by leveraging physics-inspired and quantum computation to overcome previous computational limitations, enabling new levels of wireless network performance, with the eventual outcome of incorporating the technology into tomorrow's Next Generation wireless cellular networking standards and designs. *Recent work:* [QuAMax] [RI-MIMO] [MDI-MIMO]

Reconfigurable Intelligent Surfaces for Wireless Networks

Instead of changing the ways in which the wireless endpoints (mobiles, base stations) behave, our reconfigurable intelligent surface research is exploring ways of changing the perceived channel along the wireless link to create more favorable conditions for wireless communication, at microwave up to millimeter-wave frequencies. Overcoming blockages, enabling out-to-indoor communication links, and handling vehicular-speed mobility are all topics of interest in this area. Our past and current work targets 5G and 6G networks in the FR1, FR2, and FR3 frequency ranges. *Recent Work:* [WaveFlex] [mmWall] [LAIA]

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