

## Integrated Systems

**Redefining Scalable Arrays using Bandwidth, Aperture,  
and Temperature for Next-Generation Wireless Networks****Dr. Subhanshu Gupta**

Washington State University

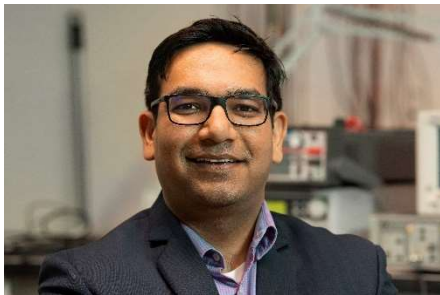
Date: Friday, September 22<sup>nd</sup>, 2023 - Time: 2:00pm -Location: EEB 248

Zoom Meeting ID: 919 9842 7261, Passcode: 520437

Refreshments will be served

**Abstract:** Emerging millimeter-wave and sub-THz communications promises to address the bandwidth limitations faced at sub-6GHz bands. Communications at this higher frequency however requires multiple antennas to compensate for propagation loss resulting in pointed beams. Conditional on the link being established, these beams provide wide bandwidths. However, these links can be short-lived for users with high mobility necessitating energy-efficiency and low-latency direction-finding approaches. These challenges necessitate rethink of multi-antenna radio front-ends for them to not only synergistically work with the digital signal processor but also satisfy new features meeting the energy- and spectral-efficiencies.

This talk will present recent research in true-time-delay based spatial signal processors to enable fast direction finding as well as wideband data communications for mobile communication applicable to sub-6GHz and millimeter-wave frequencies. Leveraging nanoseconds of delay ranges with picosecond resolutions, we describe true-time-delay based phased arrays capable of handling wide fractional bandwidths and enabling fast link discovery while maximizing the spectral- and energy-efficiencies. Pursuant to this, we will elaborate on interference-mitigation techniques in congested and contested networks that are critical for high energy- and spectral efficiencies. We will conclude this talk highlighting ongoing research on optimization of joint communications and wideband sensing, and temperature-scalable arrays that can potentially transform emerging wireless and space communications harnessing conjoined operations at room- and ultra-low-temperatures.

**Biography:**

**Subhanshu Gupta** received his Ph.D. from the University of Washington in 2010. Before joining the electrical engineering and computer science at Washington State University as an Assistant Professor in 2015, he worked in the radio frequency group at MaxLinear Inc. from 2011 to 2014. He is currently an Associate Professor at WSU.

Subhanshu serves on the editorial boards for IEEE TCAS-1 (2019-present) and IEEE RFIC TPC since 2021. He has also been a recipient of the National Science Foundation CAREER Award in 2019, Cisco Faculty Award in 2017, and Defense Research Instrumentation Awards (DURIP) in 2020. His research interests lie in wideband energy-efficient next-generation wireless / wired communications, stochastic optimization, and temperature-scalable electronics.

*Hosted by Prof. Hossein Hashemi, Prof. Mike Chen and Prof. Constantine Sideris*

*Organized and hosted by Juzheng Liu([juzhengl@usc.edu](mailto:juzhengl@usc.edu)).*