

Spring Seminar Series
Department of Electrical and Computer Engineering

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Video Available for Faculty, Please email han.wang.hw@temple.edu

Wideband Wireless System Coexistence Enabled by Photonic Circuits: Cross-Layer Design and Implementation

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Abstract: Evolving communication systems rely on using increasingly higher frequencies for larger channel bandwidths. The increased channel capacities enabled by higher carrier frequencies provide high speed communication for commercial and active users, however, these benefits do not extend to passive users, such as radio astronomy. My research is to create a framework for radio spectrum coexistence that is beneficial for both active and passive users. Instead of simply switching to higher and undeveloped frequencies - which passive users cannot - my research uses high frequency, optical signal carriers for interference separation, enabling the coexistence of active and passive users at the same time and in the same physical location. The coexistence solution enables the continuous availability of wideband spectrum for passive users, an important requirement for detecting unknown signals, since the bandwidth and the time window for unknown astronomical, atmospheric and geospace signals cannot be manipulated.

In addition to the application of enabling radio spectrum coexistence, other applications, including hiding signals in wideband noise for private and anonymous communications, will also be discussed. Other ongoing projects, including three-dimensional image processing and directional ultraviolet irradiation for disinfection, will also be discussed.



Biography: Ben Wu received his Ph.D. degree in Electrical and Computer Engineering from Princeton University in 2015. He is currently an Associate Professor at Rowan University, started in 2016 as an Assistant Professor and promoted in 2022. He is also a Visiting Fellow at Princeton University. He is the principal investigator for multiple federal, state, industry, and university funded project. He has published 2 book chapters, and more than 70 articles in peer review journals and conferences papers. He is an active reviewer for over 20 journals and conferences. He has several patents in the areas of physical layer communication network and three-dimensional image processing.