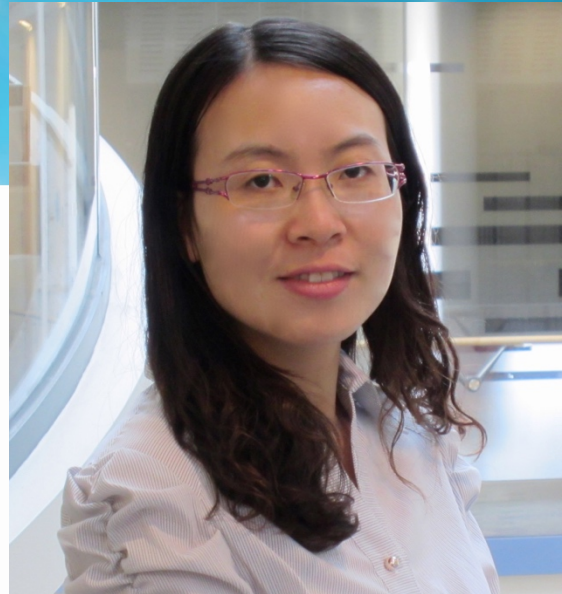


# ECE Final PhD Defense



## Ning Wang

### *High Sensitivity Terahertz Receivers Based on Plasmonic Photoconductors*

Wednesday July 27, 2016

3:00 pm – 5:00 pm • 3316 EECS

Chair: Mona Jarrahi

**Abstract:** Terahertz radiation can offer unique functionalities in a wide range of applications including medical imaging, biosensing, industrial quality control, and security screening, etc. However, high power terahertz transmitters and high sensitivity terahertz receivers are necessary for practical feasibility of these applications. This PhD work is focused on new types of high sensitivity terahertz receivers based on plasmonic photoconductors. The first category is plasmonic photoconductive terahertz receivers used for pulsed terahertz detection in time-domain terahertz spectroscopy systems. We demonstrate that incorporating plasmonic contact electrodes in photoconductive terahertz receivers can significantly enhance light concentration inside the device active area, leading to more than one order of magnitude higher terahertz detection sensitivities. The second category is plasmonic heterodyne terahertz receivers, which eliminate the need for terahertz local oscillators and conventional nonlinear mixers used in conventional heterodyne terahertz receivers. We demonstrate that utilizing a plasmonic photomixer pumped by a heterodyning optical beam can offer a significant increase in terahertz detection sensitivity, bandwidth, and dynamic range.

\*\* The public is invited to attend \*\*