

### Seminar On

## Sensing, Tracking, and Secured Communication with Artificial Electromagnetic Materials

**Professor Chung-Tse Michael Wu**  
**National Taiwan University**

**Date : 28 November 2025 (Friday)**

**Time : 11:00 am – 12:00 noon**

**Venue : Room 15-202, 15/F, State Key Laboratory of Terahertz and Millimeter Waves,  
Lau Ming Wai Academic Building, City University of Hong Kong**

### Abstract

Metamaterials (MTMs) are synthetic electromagnetic materials possessing unique properties not found in natural materials. Their introduction has spurred the creation of innovative circuits with enhanced components. One notable metamaterial-based design is the composite right/left-handed transmission line (CRLH-TL) leaky-wave antennas (LWAs). These antennas offer continuous frequency-dependent beam scanning from backfire to endfire with a true broadside beam. They also ensure excellent impedance matching throughout their operational range, using a straightforward feeding mechanism. The CRLH LWAs' ability to map frequency to space means unknown target locations can simply be pinpointed by analyzing the spectral components of the returning wave. This paves the way for real-time detection, with data acquisition speeds mainly determined by the signal source's frequency sweep rate. The sensor's field-of-view is also expanded thanks to the wide scanning angle of CRLH LWAs. Such features enable applications like swift 2-D beamforming, expansive real-time remote sensing, vital sign monitoring, motion detection, and microwave imaging. Additionally, applying spatiotemporal modulation to CRLH LWAs can generate harmonic waves and enhance physical layer security, promoting safer wireless communication.

### Biography



Dr. Chung-Tse Michael Wu's research interests span applied electromagnetics, antennas, passive and active microwave and millimeter-wave components, MMIC, RF systems, and metamaterials. He earned his B.S. degree from National Taiwan University (NTU) in 2006, followed by his M.S. and Ph.D. degrees from the Department of Electrical Engineering at the University of California, Los Angeles (UCLA) in 2009 and 2014, respectively. From 2014 to 2017, he was an Assistant Professor in the ECE department at Wayne State University (WSU) in Detroit, Michigan. In 2017, he joined Rutgers University as an Assistant Professor and was promoted to tenured Associate Professor in 2022. Since 2024, he has been an Associate Professor with NTU.

Dr. Wu is a member of the Technical Committee for IEEE MTT-28 and MTT-4. He has received several prestigious awards, including the National Science Foundation (NSF) Faculty Early Career Development (CAREER) Award, the WSU College of Engineering Faculty Research Excellence Award in 2016, the Defense Advanced Research Projects Agency (DARPA) Young Faculty Award (YFA) in 2019, and the DARPA Director's Fellowship Award in 2021. In 2022, he was also honored with the Board of Trustees Research Fellowship for Scholarly Excellence at Rutgers University. He is the Vice Chair for the joint AP/ED/MTT chapter of the IEEE Princeton Central Jersey Section. Currently, he serves as an Associate Editor for IEEE Microwave and Wireless Components Letters, the IEEE Journal of Electromagnetics, RF and Microwaves in Medicine and Biology, and IEEE Access.

**\*\*\* ALL ARE WELCOME \*\*\***

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