

Chia-Yi Yeh

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Education

Rice University

PhD of Electrical and Computer Engineering (GPA 3.70/4.0)

MS of Electrical and Computer Engineering (GPA 3.75/4.0)

- Thesis: Feasibility of Passive Eavesdropping in Massive MIMO: An Experimental Approach
Committee: Edward W. Knightly (Chair), Ashutosh Sabharwal, Lin Zhong

Houston, TX

Expected 05/2021

12/2017

National Taiwan University (NTU)

BS in Electrical Engineering (GPA 3.65/4.0)

Taipei, Taiwan

06/2014

Research Experience

Ph.D. Student in Rice Networks Group

Advisor: Edward W. Knightly

Houston, TX

08/2015 - Present

Location-assisted Massive MIMO beamforming for LoS dominant high mobility scenario

- Propose and evaluate experimentally geometric-based beamforming for route pre-known system

Physical layer security of highly-directional sub-THz communication

- Studied the reflectivity and blockage of small objects in 100-400 GHz highly-directional link
- Designed experiments to examine the effectiveness of potential eavesdropping strategies

Experimental analysis of passive eavesdropping in Massive MIMO

- Identified differences between theoretical and practical Massive MIMO systems and the potential advantages for a passive eavesdropper (Eve)
- Designed metrics, experiments, and simulations to systematically study passive eavesdropping
- Conducted channel measurements between a 96-antenna BS and 8 users across 52 subcarriers
- Post-processed the CSI dataset in MATLAB to emulate practical downlink transmissions
- Identified Eve's advantages in practical systems and proposed power allocation as a countermeasure

Energy efficient cross-layer jamming attack against TCP in 802.11 (WiFi) WLAN

- Proposed an energy-efficient periodic jam-and-sleep attack in 802.11 WLAN targeting TCP retransmission timeout mechanism
- Simulated the attack in NS3 and showed the persistent effect of MAC-layer jamming on transport layer

Research Assistant in NTU Wireless Mobile Network Laboratory

Advisor: Hung-Yu Wei

Taipei, Taiwan

09/2014 - 07/2015

- Proposed auction-based resource allocation for energy-aware M2M devices in cellular network
- Led 5 undergrad students' research projects in mmWave and game theory

Skills

Wireless: OFDM, IEEE 802.11, LTE, TCP, Information Theory, Digital Communication

Programming: MATLAB, C++, Python, LaTeX

Hardware: Argos Large-Antenna BS, Iris, WARP

Simulation Software: NS3 network simulator

FPGA Design: Xilinx System Generator/Vivado/SDK

Machine Learning

Language: English, Chinese

Course Projects

RF System Design and Implementation

01/2018 - 04/2018

- Simulated, designed, and implemented RF systems on Skylark Iris board with Xilinx Zynq SoC

Downlink Multi-User Precoder Designs in Massive MIMO

08/2017 - 12/2017

- Compared performance of Conjugate and ZF beamforming in large-antenna regime
- Studied performance loss due to pilot contamination and survey methods to mitigate

Human Activity Recognition Using Smartphone Internal Sensors

01/2017 - 04/2017

- Compared performance of neural network, KNN, SVM, and random forest on sensor data

Multiuser Detection

01/2016 - 04/2016

- Reviewed the optimum detector for synchronous & asynchronous multi-user systems

Publications

- Chia-Yi Yeh, and EW Knightly. "[Feasibility of Passive Eavesdropping in Massive MIMO: An Experimental Approach.](#)" in Communications and Network Security (CNS). IEEE, 2018.
- J Ma, R Shrestha, J Adelberg, Chia-Yi Yeh, Z Hossain, EW Knightly, JM Jornet, and DM Mittleman. "[Security and Eavesdropping in Terahertz Wireless Links.](#)" Nature 563, no. 7729 (2018): 89.
- MJ Shih, Chia-Yi Yeh, KD Huang, and HY Wei. "[Energy-Aware Waiting-Line Based Resource Allocation in Cellular Network with M2M/H2H Co-existence.](#)" in Communications (ICC), IEEE, 2015.