

# Cheng-Yeh Chen

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## Education

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### Georgia Institute of Technology

Ph.D. in Electrical and Computer Engineering

2023/08-present

### National Taiwan University

M.S. in Communication Engineering (GPA 4.00/4.00)

2019/09-2021/06

B.S. in Electrical Engineering (GPA 3.70/4.00)

2015/09-2019/06

## Publications

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- [1] Ekansh Gupta, **Cheng-Yeh Chen**, and Raghupathy Sivakumar, "Hyper-Accelerated Learning for Brain-Computer Interfaces via Partial Target-Aware Optimal Transport," *2023 ACM Workshop on Smart Wearable Systems and Applications*
- [2] **Cheng-Yeh Chen** and Hung-Yun Hsieh, "Cross-Frame Resource Allocation with Context-Aware QoE Estimation for 360° Video Streaming in Wireless Virtual Reality," *IEEE Transactions on Wireless Communications*, 2023. **[Paper]**
- [3] **Cheng-Yeh Chen** and Hung-Yun Hsieh, "SweeTile: Efficient Tiling for 360° Video Streaming on Light-Weight VR Devices," accepted to *2023 IEEE International Conference on Communications Workshops (ICC Workshops)*.
- [4] Hung-Yun Hsieh, Hung-Hsien Chen, **Cheng-Yeh Chen** and Ching-Wei Yang, "Resource Optimization for Machine-Type Communications with Lossy Links Based on Compressive Sensing," Draft.
- [5] Hung-Yun Hsieh, Hao-Zhong Hou and **Cheng-Yeh Chen**, "Analysis and Optimization of Area Spectral Efficiency in Clustered Wireless Networks," Draft.
- [6] **Cheng-Yeh Chen** and Hung-Yun Hsieh, "Does Queue Correlation Matter in 5G Multi-Connectivity with Packet Duplication?," *IEEE Wireless Communications Letters*, 2022. **[Paper]**
- [7] **Cheng-Yeh Chen**, Guo-Liang Hung and Hung-Yun Hsieh, "A Study on a New Type of DDoS Attack against 5G Ultra-Reliable and Low-Latency Communications," *2020 European Conference on Networks and Communications (EuCNC)*. **[Paper][Slides]**

## Research Experiences

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NTU Mobile Networks and Wireless Communications Lab, supervised by Prof. Hung-Yun, Hsieh

### Scheduling optimization in wireless virtual reality

*Accepted to IEEE TWC, 2023*

- Formulated a novel cross-frame optimization problem, the first work able to incorporate complete series of viewport prediction into tile-based 360° video streaming to enhance QoE by 10.2% and reduce wasted payload by 18.7%.
- Developed an online-learning algorithm for per-tile QoE estimation to accommodate general types of viewport predictors and dynamically adjust the prediction window.

### Efficient tiling in 360° streaming

*Accepted to IEEE ICC Workshops, 2023*

- Proposed "SweeTile", an efficient adaptive tiling mechanism targeted on large-scale 360° video streaming service with light-weight VR devices.
- Improved both the encoding efficiency and transmission efficiency by 10% with respect to the traditional fixed tiling mechanisms.

### Analysis and optimization in 5G multi-connectivity

*Published in IEEE WCL, 2022*

- Proposed a cross-layer model to incorporate both channel and queue condition over two correlated paths and analytically derived the joint blocking probability and joint waiting time distribution for the two-queue system.
- Revealed queue correlation existing in 5G multi-connectivity for the first time in literature, which could impact outage probability by orders of magnitude.

### DDoS Attack against 5G standardization

*Published in EuCNC, 2020*

- Developed a standard compliant 5G simulator by implementing 3GPP Release 16 specifications on the preemption mechanism for URLLC/eMBB coexistence.
- Studied 3GPP RAN1 specifications related to URLLC/eMBB coexistence and proposed a low-volume highly-synchronized DDoS attack model capable to increase 8.25 times of URLLC outage and waste 1.66 times of eMBB resource.

## Teaching Experiences

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### Teaching Assistant, Probability and Statistics, NTU (2020 Spring)

- Wrote solid solutions for assignments/exams and graded the written work from 80-90 students.
- Provided individual instruction for students with various levels.

### Teaching Assistant, Computer Programming, NTU (2019 Fall & 2020 Fall)

- Prepared the assignments/exams for the corresponding lectures through an online judge system.
- Instructed 80-90 students about a C++ module in several lectures to help them build a gaming application.

## Working Experiences

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### Research Associate, NTU Computer and Information Networking Center

*Taipei, Taiwan*

Organization and establishment of a real-time packet analysis platform

2021/12-2022/07

- Organized and executed a project with funding of \$200,000 for Department of Cyber Security at Executive Yuan to build a real-time packet storage system and collect network traffic dataset for a local area network with peak traffic of 25 Gbps.
- Managed a research group with 4 graduate students to design packet analysis techniques including packet fingerprinting and forensics to enrich the network traffic dataset with diversified cyberattack events.

### Software Engineering Intern, Trendmicro

*Taipei, Taiwan & Tokyo, Japan*

Behavior analysis on spear-phishing email attack

2019/07- 2019/09

- Proposed a model to extract social interaction topology efficiently from the interaction graph containing 10,000,000+ emails and designed a detection method to identify spear-phishing email attack.
- Improved the accuracy of spear-phishing detection to 98.6%, which was an increase of 30% compared to the original system performance.

## Selected Projects

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### 5G simulator for 3GPP Release 16

2019/09-2020/02

- Developed a simulation platform compliant to 3GPP specifications on top of 5G LENA, an extension of ns-3.
- Implemented mechanisms for the coexistence of uplink URLLC and eMBB, including mini-slot allocation, cancellation mechanism, and deployed DDoS attack against the whole system.

## Skills

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**TOEFL iBT**

107 (R30, L29, S22, W26)

**GRE General**

324 (V155, Q169, AW4.0)

**Programming Language**

C/C++, Python, Matlab,  $\text{\LaTeX}$