Yuan-Yao (Mike) Lou | Curriculum Vitae

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Education

2021 – 2026 (expected) **Purdue University** — West Lafayette, IN
Ph.D. student in Electrical and Computer Engineering `GPA: 3.7/4.0`
Advisors: Prof. Mung Chiang, Prof. Kwang Taik Kim
Coursework: Computer Network Systems, Linear Model, Deep Learning, Programming Parallel Machines

2015 – 2017 **National Taiwan University** — Taipei, Taiwan
M.S. in Computer Science `GPA: 3.8/4.0`
Advisor: Prof. Ai-Chun Pang
Thesis: Fog-based Virtualization for Low-Latency Wearable Services

2011 – 2015 **National Chiao Tung University** — Hsinchu, Taiwan
B.S. in Computer Science `GPA: 3.8/4.0`

Research Interest

Wireless Communication | Distributed Systems | Mobile Edge Computing | Computation Offloading | Cellular Networks | AR/VR/XR | Autonomous Driving | Path Planning | Model Predictive Control | Deep Reinforcement Learning | Transfer Learning | Generative Model

Publications

2023 [9] "Reinforcement Learning for Cellular Networking in 5G NR Experimental Testbed" *(ongoing)*
[8] "Real-time Multi-Object Tracking System for Embedded Devices," *(under review)*
2022 [7] "Sampling-based Local Path Planning in Edge Computing for Autonomous Driving," *(under review)*
[6] "Dynamic Task Orchestration for Multi-Tier Edge Computing in Heterogeneous Networks," *(under review)*
2021 [5] S. B. Weinstein, **Y.-Y. Lou**, and T. R. Hsing, "Intelligent Network Edge with Distributed SDN for the Future 6G Network," in **IEEE COMCAS,** 2021 [Link]
2020 [4] Y.-Y. Shih, A.-C. Pang, and **Y.-Y. Lou,** "Chapter 13 - Development of Wearable Services with Edge Devices," in **Fog and Fogonomics**, Wiley Telecom, 2020 [Link]
2018 [3] Y.-Y. Shih, A.-C. Pang, **Y.-Y. Lou,** C.-C. Chuang, L. Zhao, and Z. Ren, "Modularized Service Provisioning at Fog Networks," in **IEEE VTS APWCS,** 2018
2016 [2] H.-P. Lin, Y.-Y. Shih, A.-C. Pang, and **Y.-Y. Lou,** "A Virtual Local-hub Solution with Function Module Sharing for Wearable Devices," in **ACM MSWiM**, 2016 [Link]
[1] X.-L. Wang, M.-J. Sheng, **Y.-Y. Lou,** Y.-Y. Shih, and M. Chiang, "Internet of Things Session Management Over LTE – Balancing Signal Load, Power, and Delay," in **IEEE Internet of Things Journal**, vol. 3, no. 3, pp. 339-353, June 2016 [Link]

Skills

Languages Python | Java | Javascript | TCL | Shell Script | C/C++ | SQL
Web Django/MongoDB | Flask/Eve | Frappe/MariaDB | Jekyll | Bootstrap | HTML/CSS
Tools PyTorch | TensorFlow | Scikit-learn | Matplotlib | Seaborn | Git | Vim | Notion
Platforms Linux | AWS (EC2/S3/DynamoDB/APIGateway/Lambda) | Google App Engine | Android

Research Experience

2021 – Present **Purdue University – EDGE Lab** West Lafayette, IN
Graduate Research Assistant

Open Edge Platform
- Design and propose alternative open architecture of MEC and O-RAN integrated systems to optimize edge applications and RAN performance jointly
- Quantify and analyze trade-off between each option of open architecture including deployment of radio and computing nodes and RAN functional splits
- Explore deep reinforcement learning and adapt collaborative intelligence in containerized systems to orchestrate RAN control tasks and to optimize edge services [9]
- Deployed computation offloading framework of multi-tier edge computing in real testbed on CBRS 4G network and evaluated end-to-end latency [6]

Autonomous Vehicles
- Introduced novel framework of edge-assisted model predictive control in local path planning to exploit unique characteristics of edge network [7]
- Identified and analyzed three different ways that heterogeneity of edge networks can benefit robot agent and reduce cost-to-go
- Conducted series of numerical evaluations with visualized driving results to demonstrate effectiveness and performance advantages of each method

2020 – 2021 **Independent Researcher** Remote
Collaborator: Prof. Stephen B. Weinstein and Prof. T. Russell Hsing
- Proposed distributed SDN system coupled with localized edge platforms and storage to support emerging edge applications such as autonomous driving
- Served as speaker in Edge and Fog Computing track on IEEE 7th World Forum on Internet of Things [Link]
- Published introductory paper on IEEE COMCAS 2021 [5]

2015 – 2017 **Ministry of Science and Technology** Taipei, Taiwan
Graduate Researcher

Wearable Edge Computing
- Proposed Virtual Local-Hub framework to enable microservice computation offloading for Android devices
- Hacked Android OS to intercept system calls and redirect application API calls to wireless base stations
- Reduced execution time of wearable microservices by up to 60% and CPU usage by up to 70%
- Published conference paper on ACM MSWiM 2016 and book chapter in 2020 [2] [3] [4]

Networked System Development
- Built real WLAN testbed from scratch including DHCP and NAT configuration to evaluate E2E latency and power consumption of wearable edge computing framework
- Designed telemetry platform using Django to monitor system and manage service provisioning [Link]
- Developed latency-sensitive applications on Android devices such as speech recognition using CMUSphinx

2014 – 2015 **Princeton University – EDGE Lab** Princeton, NJ
Research Intern | Mentor: Prof. Mung Chiang and Dr. Ming-Jye Sheng

4G LTE (RRC/DRX) & IoT
- Built Markov chain model based on RRC inference algorithms in AT&T tools to analyze DRX impact on 4G LTE IoT session management factors (signal load, power, delay)
- Conduct probabilistic model simulations to reveal the efficacy of algorithms in power saving and signal reduction for IoT
- Developed toolkits based on AT&T Lab tools to analyze packets and profile Android apps performance
- Published journal paper in IEEE Internet of Things Journal (IoT-J) in 2016 [5]

Work Experience

2021 — **IoT Eye Inc.** — Basking Ridge, NJ / Remote
Full-stack Cloud Developer (Internship)

- Deployed multi-agency management platform on AWS using Frappe framework to support five customers
- Developed DevOps toolkit automating product deployment and management to improve scalability
- Automated Flask Eve API testing using Postman and Python to boost product robustness
- Improved free-trial feature of Bootstrap-based official website to speed up product delivery
- Released tutorial of developed proof-of-concept applications in Frappe framework on GitHub [Link]

2020 – 2021 — **Silicon Motion – Algorithm and Technology R&D** `NASDAQ: SIMO` — Milpitas, CA / Taipei, Taiwan
Software Engineer (Supervisor)

- Devised microservice-based platform in on-premise servers automating design flows and improving verification robustness to boost development efficiency
- Acted as primary external contact to collaborate with international partners for researching new solutions
- Established programming disciplines (Python) and organized training sessions for new employees

2017 – 2020 — Software Engineer (Senior)

- Developed in-house design verification tools reviewing timing and power analysis to improve reliability
- Automated library maintenance flow using Python and shell script to save manual effort by up to 80%
- Cooperated with Human Resources as technical campus recruiter to promote on-campus brand awareness
- Promoted twice within 24 months for outstanding performance on software development and solution finding

Teaching Experience

2016 – 2017 — **National Taiwan University** — Taipei, Taiwan
Teaching Assistant `CSIE 3510 Computer Network` `CSIE 5057 Advanced Computer Network`

TCP/IP & Socket Programming

- Lectured TCP/IP protocol (802.11, 802.3) and demonstrated network packet analysis using WireShark
- Designed IRC chatbot application as project assignment to teach students socket programming
- Enhanced program robustness by peer-testing system and stimulated creativity by flexible score criterion
- Received two times of Outstanding Teaching Assistant awards

Selected Projects

2021 - 2022 — **Deep Learning Related Projects** — West Lafayette, IN
Purdue courses ECE 59500DL ECE 69500DL

- Trained CNNs for image classification using MNIST and COCO dataset in TensorFlow and PyTorch
- Implemented various types of autoencoder neural networks using MNIST dataset of hand-written digits
- Trained GANs using MNIST and CelebA dataset in TensorFlow and PyTorch and implemented four adversarial attack algorithms as well as four defenses

Certificates

2022 — Machine Learning | Coursera / Stanford ONLINE
2021 — Modern Application Development with Python on AWS | Coursera / AWS
2020 — IEEE Winter School on Fog/Edge Computing | IEEE SA & ComSoc

Honors & Awards

2017 — Valedictorian of Graduation Ceremony | Department of Computer Science, National Taiwan University
2016 & 2017 — Outstanding Teaching Assistant Awards | National Taiwan University
2014 & 2015 — Presidential Awards | National Chiao Tung University
2014 — Research Project Funding | Ministry of Science and Technology (Taiwan)