

# Peter JuChin Chao

New York, NY

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## Skills

<b>Programming Languages</b>	Python, C, CUDA, JavaScript, HTML, CSS, Bash Shell, MATLAB
<b>Deep Learning Libraries</b>	PyTorch, TensorFlow, Keras, ONNX
<b>Tools &amp; Technologies</b>	Git, Docker, Linux, GNU Debugger, Apache, MongoDB, Nginx, OpenCV, LaTeX

## Education

<b>Columbia University, M.S. in Computer Science</b>	New York, NY
GPA: 3.7   Taiwanese Student Association, Vice President	Sept. 2022 – Dec. 2023
<b>National Taiwan University, M.S. in Communication Engineering</b>	Taipei, Taiwan
GPA: 4.2   Rank: 16/108	Sept. 2018 – June 2020
<b>National Central University, B.S. in Communication Engineering</b>	Taipei, Taiwan
GPA: 3.9   Rank: 2/50	Sept. 2014 – June 2018

## Work Experience

<b>Research Assistant, Columbia University</b>	New York, NY   March 2023 – present
<ul style="list-style-type: none"><li>Conducted research on test-time detection and defenses against adversarial attacks in machine learning models, specializing in using Masked Autoencoder, a deep learning technique</li><li>Collaborated with Prof. Junfeng Yang and General Electric on paper for CVPR's AdvML Workshop 2023</li></ul>	

<b>Research Assistant, National Taiwan University</b>	Taipei, Taiwan   Aug. 2021 – Aug. 2022
<ul style="list-style-type: none"><li>Developed a two-stage algorithm to position drones for deployment, published in IEEE IoT journal</li><li>Leveraged genetic algorithm techniques to enhance Wi-Fi Sniffer deployments' entropy, significantly improving Wi-Fi positioning precision, with results published in Sensors Journal</li><li>Translated and compiled lecture slides into textbooks for Prof. Ruey-Beei Wu's Internet of Things special topics course, gaining a strong understanding of IoT systems and technologies</li></ul>	

<b>Artificial Intelligence Engineer, Delta Electronics</b>	Taipei, Taiwan   July 2020 – March 2021
<i>Delta Electronics is a company specializing in batteries and biomedical equipment.</i> <ul style="list-style-type: none"><li>Built a convolutional neural network (CNN) model using Pytorch to detect cancer cells in whole slide images</li><li>Improved the speed of the Feature Ranking and Selection Tree algorithm by 4x</li><li>Implemented active learning techniques to help doctors select slides images from noisy datasets, achieving equivalent performance with just 30% of the data</li></ul>	

<b>Software Engineering Intern, Chunghwa Telecom Company</b>	Taoyuan, Taiwan   July – Aug. 2019
<i>Chunghwa Telecom Company is the largest telecommunications provider in Taiwan.</i> <ul style="list-style-type: none"><li>Built a machine learning model using Python and TensorFlow to verify that protective equipment was being worn properly by company technicians</li><li>Discovered that Mask R-CNN would best fit the project's use case, after researching Mask R-CNN and YOLOv3 instance segmentation, as well as U-Net and FCN semantic segmentation</li><li>Wrote a script to convert data annotated in various formats to unified Pascal, improving compatibility and ease of use for future machine learning tasks</li></ul>	

## Publications

- Ju-Chin Chao** and Pei-Yuan Wu, "UNet-AIR2: A Single Image Dehazing Network," IEEE Transactions on Emerging Topics in Computational Intelligence | Under Review
- Yun-Yun Tsai, **Ju-Chin Chao**, Junfeng Yang et al., "Test-time Defense against Adversarial Attacks: Detection and Reconstruction of Adversarial Examples via Masked Autoencoder," The IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR), AdvML Workshop, 2023
- Chan, Poh Yuen, **Ju-Chin Chao**, and Ruey-Beei Wu. 2023. "A Wi-Fi-Based Passive Indoor Positioning System via Entropy-Enhanced Deployment of Wi-Fi Sniffers" Sensors 23, no. 3: 1376
- Chen, Y. E., Liew, H. H., **Chao, J. C.**, & Wu, R. B. (2022). Decimeter-Accuracy Positioning for Drones Using Two-Stage Trilateration in a GPS-Denied Environment. IEEE Internet of Things Journal
- C. O. Ancuti et al., "NTIRE 2020 Challenge on NonHomogeneous Dehazing," IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW), 2029~2044, Seattle, WA, USA, Jun. 2020

## Selected Projects

<b>Interactive Image Segmentation</b>	Jan. 2023 – present
<i>Interactive image segmentation is a critical part of creating labeled datasets for computer vision.</i> <ul style="list-style-type: none"><li>Improved segmentation by incorporating annotators' click order and mask generation sequence</li></ul>	
<b>Depth Map Generation from Dual-Camera Data</b>	Jan. – June 2020
<ul style="list-style-type: none"><li>Computed depth and disparity maps, using deep pruning and unsupervised appearance matching loss</li></ul>	
<b>Text Style Transfer</b>	Jan. – June 2020
<ul style="list-style-type: none"><li>Built system to translate language from happy to sad, informal to formal, polite to impolite, etc.</li><li>Evaluated translation quality via classification accuracy and BLEU content preservation algorithm</li></ul>	