Jyun-Ping, Kao

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EDUCATION

- **National Taiwan University** Aug 2023 - Present
  MS in Biomedical Electronics and Bioinformatics Taipei, Taiwan
  - GPA: 4.3/4.3 (Rank 1st in the department)
- **National Yang Ming Chiao Tung University** Sep 2019 - Aug 2023
  BS in Electronics and Electrical Engineering (Double Major) Taipei & Hsinchu, Taiwan
  BS in Digital Healthcare (Double Major)
  - GPA: 3.8/4.3
  - Awards : Phi tau Phi Awards (Top 1 % student in the school)

RESEARCH EXPERIENCE

- **National Taiwan University Hospital (NTUH)** July 2023 - Present
  Research Assistant, Department of Physical Medicine and Rehabilitation Taipei, Taiwan
  - Developed deep learning models for ultrasound image generation and anatomical structure detection.
  - Pioneered a novel Transformer-based object detection model, integrating LoRA for efficient fine-tuning and enhanced performance
  - Identified and addressed clinical challenges in musculoskeletal ultrasound imaging, specializing in the shoulder, arm, and leg regions, proposing innovative solutions to improve diagnostic accuracy
  - Led participant recruitment, managed data collection, and performed detailed data labeling to ensure high research accuracy

- **The University of Hong Kong** Jun 2024 - Present
  Visiting Research Student, Department of Orthopaedics and Traumatology Hong Kong
  - Applied deep learning models to quantify injuries of the Posterior Cruciate Ligament, improving diagnostic precision
  - Developed and implemented a real-time system for clinical use, ensuring the stability and reliability of the model in a practical setting
  - Recruited participants, collected data using diagnostic ultrasound machines, and conducted accurate data labeling for comprehensive analysis

- **National Yang Ming Chiao Tung University** July 2020 - Present
  Undergraduate Research Student, Institute of Biophotonics Taipei, Taiwan
  - Developed the first 3D Generative AI techniques, such as 3D cGAN, for Femto-Laser Scanning Microscopy, generating high-quality harmonic generation images
  - Implemented deep learning models for analysis and image generation on human skin samples
  - Designed and optimized optical systems in laser microscopy, incorporating non-linear optics for advanced imaging and simulation

PUBLICATIONS

C=CONFERENCE, J=JOURNAL, S=IN SUBMISSION, T=THESIS

[T.1] **Jyun-Ping Kao** (2025). **LoRA-Enhanced RT-DETR : First Low-Rank Adaptation Based DETR Model and Enable Real-Time Full Body Anatomical Structures Detection in Musculoskeletal Ultrasound in Clinical Use**. *Graduate Institute of Biomedical Electronics and Bioinformatics, National Taiwan University*. Advisor : Chun-Ping Chen Ph.D., Wen-Shiang Chen M.D., Ph.D.

[S.1] **Jyun-Ping Kao**, et al. (2024). **Deep Learning-Based Posterior Cruciate Ligament Ultrasound Injury Detection System**. *npj Artificial Intelligence*, Nature Publishing Group.

[S.2] **Jyun-Ping Kao**, et al. (2024). **LoRA-Enhanced RT-DETR : First Low-Rank Adaptation Based DETR Model and Enable Real-Time Full Body Anatomical Structures Detection in Musculoskeletal Ultrasound in Clinical Use**. *Machine Learning: Science and Technology*, IOP Publishing.

[C.1] **Jyun-Ping Kao**, et al. (2024). **Transformer Based Real Time Muscleskeletal Anatomical Structure Detection in Clinical Use**. *The IEEE International Conference on Bioinformatics & Bioengineering*, IEEE. Nov 2024, Kragujevac, Serbia. Doi: 10.1109/BIBE63649.2024.10820491.

[C.2] Hao-Yu Hong, **Jyun-Ping Kao**, et al. (2024).**Real Time Musculoskeletal Ultrasound Image Annotations**. *The 10th Biomedical Imaging and Sensing Conference (BISC2024)*, SPIE. 2024, Yokohama, Japan. DOI:10.1117/12.3052319

[J.1] Hsin-Yuan Chu, Chueh-Hung Wu, Ping-Xuan Chen, Hao-Yu Hung, **Jyun-Ping Kao**, et al. (2024). **Enhancing Multi-Object Detection in Ultrasound Images through Semi-Supervised Learning, Focal Loss, and Relation of Frame**. *Ultrasound in Medicine & Biology 50 (12), 1868-1878*, DOI: 10.1016/j.ultrasmedbio.2024.08.012

[C.3] Yu-Yang Chang, Shih-Hsuan Chia, **Jyun-Ping Kao**, et al. (2024). **Enhanced In Vivo Skin Diagnostics: A Comparative Study of Reflective Confocal Microscopy and Harmonic Generation Microscopy**. *2024 Optics & Photonics Taiwan International Conference (OPTIC)*. Dec 2024, Taiwan.

[C.4] **Jyun-Ping Kao**, et al. (2023). **Deep-Learning-Enabled Third-Harmonic-Generation Imaging for Skin Virtual Biopsy from Reflectance Scanning Microscope**. *2023 Optics & Photonics Taiwan International Conference (OPTIC)*. Dec 2023, Taiwan.

[C.5] **Jyun-Ping Kao**, et al. (2022). **Optical design and realization of nonlinear mesoscope**. *2022 Optics & Photonics Taiwan International Conference (OPTIC)*. Dec 2022, Taiwan.

Honors and Awards

- **The Phi Tau Phi Scholastic Honor Society of the Republic of China Honorary Membership** July 2023
  The Phi Tau Phi Scholastic Honor Society of the Republic of China, Taiwan
  ◦ The top 1% of undergraduate students in the college of National Yang Ming Chiao Tung University
- **2023 Synopsys ARC AIoT Design Contest Award – Finalist** Jun 2023
  Synopsys, Taiwan
  ◦ Using deep learning for super-resolution in microscopic imaging by using Synopsys ARC EM9D Processors
- **Undergraduate Research Fellowship** Feb 2023
  Ministry of Science and Technology (MOST), Taiwan
  ◦ Granted by the MOST, Taiwan of Research focuses on achieving nonlinear optic microscopic images by using generative AI with fundamental microscopic images and its optical design
- **2022 Intel DevCup x OpenVINO Toolkit Award – Finalist** Jan 2023
  Intel Corporation, Taiwan
  ◦ Using deep learning for generating microscopic imaging by using the Intel Openvino Toolkit to achieve Edge Computing
- **2021 Intel DevCup x OpenVINO Toolkit Award – Second Place** Jan 2022
  Intel Corporation, Taiwan
  ◦ Using deep learning for analyzing ECG and GWAS, predicting Hemochromatosis by using the Intel Openvino Toolkit to achieve Edge Computing

Extracurricular Experience

- **Teaching Assistant** Sep 2023 - Present
  National Taiwan University
  ◦ Affiliation : Electrical Engineering
  ◦ Course : Service Learning, Introduction to Biomedical Engineering
- **Teaching Assistant** Sep 2020 - Jan 2023
  National Yang Ming Chiao Tung University
  ◦ Affiliation : Institute of Biophotonics, Department of Life Sciences
  ◦ Course : Calculus, Introduction to Optical Engineering, Laboratory in Fundamental Genetics and its Applications
- **President of Yang Ming Board Game Club** Sep 2021 - Jun 2022
  National Yang Ming Chiao Tung University
  ◦ Founder of Yang Ming Board Game Club
- **Student councilor** Sep 2020 - Jun 2021
  National Yang Ming Chiao Tung University
  ◦ Supervise the operation of the student council, audit its budget, and revise its regulations

Relative courses

- **Electronics and Electrical Engineering:** Electronics, Circuit Theory, Electromagnetics, Logic Design, Signal and systems, VLSI circuits, DSP in VLSI, Advanced Embedding system, Principle and Lab of RF circuits, Micro-nano fabrication technology, Schematic MOS Device
- **Programming:** Python, C++ programming, Data structures and Algorithms, Probability, Linear algebra, Mathematics in machine learning, Computer vision practice in deep learning, Generative Artificial Intelligence
- **Photonics:** Photonics Engineering , Biophotonics, Laser and nonlinear optics, Photonic materials and technology
- **Biomedical Engineering:** Biomedical signals and image processing, Biomedical tomography, Biostatistics, Bioinformatics, Nano chemistry, Biochemistry, Organic chemistry, Materials Sciences, Synthetic biology