Chan-Min Hsu

chanminhsu@tamu.edu https://villahsu.github.io/ Chan-Min Hsu VillaHsu Google Scholar

Highlights

- Research focused on **machine Learning** and **objective-driven data reduction**.
- Extensive experience in **deep learning and data preprocessing** and **image segmentation** for **biomedical images**.

Education

Texas A&M University (TAMU) **Sep. 2022 – PRESENT**

Ph.D. in Electrical and Computer Engineering (ECE)

- Research Area: Machine Learning and Objective-Driven Data Reduction
- Selected Courses: Pattern Recognition, Applied Convex Optimization, Bayesian Statistics

National Taiwan University (NTU) **Sep. 2018 – Jun. 2020**

M.S. in Graduate Institute of Biomedical Electronics and Bioinformatics (BEBI)

- Master Thesis: "**Mitochondrial Structure Prediction in Label-free Microscopy Images Using Convolutional Neural Networks**"
- Selected Courses: Computer Vision, Medical Image Analysis, Fundamentals of Biomedical Image Processing, Super Resolution Microscopy Techniques

National Taiwan University (NTU) **Sep. 2014 – Jun. 2018**

B.S. in Electrical Engineering (EE)

- Honor: **Dean's List (F'17), Government Special Education Scholarship (F'16 – S'17, F'17 – S'18)**
- Selected Courses: Data Structure, The Design and Analysis of Algorithms, Intro. to Digital Speech Processing

Research Experiences

Lab of Machine Learning and Bayesian Methods, TAMU, *Advisor: Prof. Xiaoning Qian* **Aug. 2022 – PRESENT**

PhD student *Texas, United States*

- Researched on **Generative Machine Learning Model** for molecules detection in cryogenic electron microscopy images.
- Researched on **Bayesian Methods**.

Multimodal Medical Imaging Optimization Lab, NTU, *Advisor: Prof. Kevin T. Chen* **Sep. 2021 – Jun. 2022**

Research Assistant *Taipei, Taiwan*

- Researched on **Positron Emission Tomography (PET) reconstruction** using deep learning and multimodal medical imaging.
- Set up the laboratory and the network.

Biomedical System Engineering Lab, NTU, *Advisor: Prof. An-Chi Wei* **Sep. 2018 – Jun. 2021**

Master Student, Research Assistant *Taipei, Taiwan*

- Researched on **Transformer-based U-Net** for Biomedical Image Segmentation.
  - Submitted to IEEE Transactions on Medical Imaging
- Built a **Deep Learning model for Biomedical Image Segmentation**.
  - Accepted to IFMIA2021, Poster in ICSB2019
- Used Zeiss LSM800 for **Confocal Imaging** and **Data Collection**. (AC16 Mitochondria Dataset)

Microfluidics Innovated Bio-Applications Lab, CUHK, *Advisor: Prof. Megan Y.P. HO* **Jul. 2018 – Aug. 2018**

Visiting Research Student *Hong Kong*

- Learned the practical skills on biomedical research (cell culture) and assisted in sample preparation for cell analysis.

Research Center for Information Technology Innovation, Academia Sinica, *Advisor: Dr. Yu Tsao* **Jul. 2017 – Aug. 2018**

Research Intern *Taipei, Taiwan*

- Researched on **Generative Adversarial Networks (GANs)** for throat disease detection.
- Researched on **Speech Enhancement** using Autoencoder.

Speech Processing Lab, NTU, *Advisor: Prof. Lin-Shan Lee* **Mar. 2017 – Jan. 2018**

Undergraduate Researcher *Taipei, Taiwan*

- Built a **Seq2Seq Chatbot** with sequence GANs and other deep learning methods.
- Surveyed literature on state-of-the-art deep learning methods for Natural Language Processing.

Technical Skills

- **Programming Language**: Python, C/C++, HTML/CSS, JavaScript, MATLAB, Shell Scripting
- **Machine Learning/Deep Learning**: PyTorch, Keras, Scikit-learn
- **Image Processing**: OpenCV, ImageJ Macro, Scikit-image
- **Libraries & Toolkits**: LaTeX, Linux
- **Microscopy**: Zeiss LSM800, ZEN Blue

Publication († indicates equal contribution)

1. **Chan-Min Hsu**, Yi-Ju Lee, An-Chi Wei, "Convolutional neural networks predict mitochondrial structures from label-free microscopy images". *Accepted to International Forum on Medical Imaging in Asia 2021. Vol. 11792. International Society for Optics and Photonics, 2021 (IFMIA 2021)*
2. **Chan-Min Hsu**, Yi-Ju Lee, An-Chi Wei. "Using deep learning to predict mitochondria structure in label-free microscopy images". *Accepted to 2019 Taiwan Society for Mitochondrial Research and Medicine Conference (TSMRM 2019)* Poster
3. **Chan-Min Hsu**, An-Chi Wei, Shao-Ting Chiu, Zih-Hua Chen, Ko-Hong Lin. "Subcellular mitochondria structure prediction in label-free microscope images using convolutional neural networks". *Accepted to The 20th International Conference on Systems Biology (ICSB 2019)* Poster
4. Cheng-You Lee†, **Chan-Min Hsu**†, Chiou-Shann Fuh. "FASTER FACE CHANGING TECH". *Accepted to Proceedings of IPPR Conference on Computer Vision, Graphics, and Image Processing, Taitung, Taiwan, D2-1, Paper# CV-0006, pp. 1-8, May 2019 (CVGIP 2019)*

Teaching Experiences

Teaching Assistant on Introduction to Biomedical Engineering, Fall 2019 Course **Sep. 2019 – Jan. 2020**

- In charge of Homeworks on different topics (**BioModel, Microfluidics, Medical Imaging, Biomedical Optics, etc.**).

Guest Lecturer on Advanced Computer Vision, Spring 2019 Course **Mar. 2019 – Jun. 2019**

- Introduced **3D Reconstruction**.
- Slide Link:

Honors & Awards

Dean's list, EE at NTU **Fall '17**

Government Special Education Scholarship (twice), EE at NTU **Fall '16 – Spring '17, Fall '17 – Spring '18**

Cathay Financial Holdings Enterprise Award, MakeNTU 2019 (out of 50 teams) **Mar. 2019**

MediaTek Inc Enterprise Award, MakeNTU 2017 (out of 50 teams) **Feb. 2017**

1st Place, 2015 NTU Physics Creative Competition of General Physics Experiment **May. 2015**

Selected Projects

Mitosis Classification with CNN and Explainable Model **Jun. 2019**

Course Final Project of "Medical Image Analysis"

- Built a CNN model for microscopy image classification on mitosis stages.
- Performed **Model Explanation** on CNNs via LIME algorithm.

Faster Face Changing Tech **Jun. 2019**

Course Final Project of "Advanced Computer Vision"

- Accepted to CVGIP 2019.
- Developed a machine learning program which can transfer one's face to others.
- Redesigned the algorithm and network architecture while reducing the execution time significantly.

Eye Controlled Robotic Arm **Jun. 2017**

Course Final Project of "Electrical Engineering Lab (Biomedical Engineering)"

- Built a robotic arm controlled by electrooculography (EOG).
- Designed the algorithm of EOG detection on the open-source electronics platform (Arduino).