

# CHAN-MIN HSU

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## HIGHLIGHTS

- Research focused on **biomedical microscopy imaging** and **magnetic resonance imaging (MRI)**.
- Extensive experience in **deep learning and data preprocessing** for **biomedical images**.
- Familiar with interdisciplinary collaboration, including **confocal microscopy imaging** and biomedical **data collection**.

## EDUCATION

### 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
- GPA: 4.03/4.30

### 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
- GPA: 3.24/4.30, last60: 4.03/4.30

## RESEARCH EXPERIENCES

### Multimodal Medical Imaging Optimization Lab, NTU, Advisor: Prof. Kevin T. Chen

Sep. 2021 – PRESENT

*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.
- 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**:  $\text{\LaTeX}$ , Linux
- **Microscopy**: Zeiss LSM800, ZEN Blue

## PUBLICATION <sup>(† indicates equal contribution)</sup>

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<sup>†</sup>, **Chan-Min Hsu**<sup>†</sup>, 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).

## LANGUAGE

- **English**, TOEFL iBT: R28/L28/S22/W22
- **German**, Goethe-zertifikat: A1
- **Chinese**, Native