TZU-MING HARRY HSU

Ph.D. in Computer Science, MIT

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EDUCATION

Ph.D. in Computer Science

Massachusetts Institute of Technology

Sep 2017 – Aug 2022 Cambridge, MA

- Research Area: Deep Learning for Clinical Decision Making

GPA: 5.0/5.0

S.M. in Electrical Engineering and Computer Science

Massachusetts Institute of Technology

Sep 2017 – May 2020 Cambridge, MA

B.S.E. in Electrical Engineering
B.S. in Physics

National Taiwan University

Sep 2011 – Jun 2016 Taipei, Taiwan

Class Rank: 1/190 GPA: 3.99/4.00

PUBLICATIONS

Journals

- **Emulating Clinical Diagnostic Reasoning for Jaw Cysts with Machine Learning** Diagnostics
  Balazs Feher, Ulrike Kuchler, Falk Schwendicke, Lisa Schneider, Jose Eduardo Cejudo Grano de Oro, Tong Xi, Shankeeth Vinayahalingam, **Tzu–Ming Harry Hsu**, Janet Brinz, Akhilanand Chaurasia, Kunaal Dhingra, Robert Andre Gaudin, Hossein Mohammad–Rahimi, Nielsen Pereira, Francesc Perez–Pastor, Olga Tryfonos, Sergio Uribe, Marcel Hanisch, Joachim Krois.
- **Artificial Intelligence to Assess Body Composition on Routine Abdominal CT Scans and Predict Mortality in Pancreatic Cancer – A Recipe for Your Local Application** European Journal of Radiology
  Tzu–Ming Harry Hsu, Khoschy Schawkat, Seth J. Berkowitz, Jesse L. Wei, Alina Makoyeva, Kaila Legare, Corinne DeCicco, S. Nicolas Paez, Jim S.H. Wu, Peter Szolovits, Ron Kikinis, Arthur J. Moser, Alexander Goehler.
- **Visceral Adiposity and Severe COVID–19 Disease: Application of an Artificial Intelligence Algorithm to Improve Clinical Risk Prediction** Open Forum Infectious Diseases
  Alexander Goehler, **Tzu–Ming Harry Hsu**, Jacqueline A. Seiglie, Mark J. Siedner, Janet Lo, Virginia Triant, John Hsu, Andrea Foulkes, Ingrid Bassett, Ramin Khorasani, Deborah J. Wexler, Peter Szolovits, James B. Meigs, Jennifer Manne–Goehler.
- **Three–Dimensional Neural Network to Automatically Assess Liver Tumor Burden Change on Consecutive Liver MRIs** Journal of the American College of Radiology
  Alexander Goehler, **Tzu–Ming Harry Hsu**, Ronilda Lacson, Isha Gujrathi, Raein Hashemi, Grzegorz Chlebus, Peter Szolovits, and Ramin Khorasani.

STRENGTHS

Computer Vision Federated Learning ML for Healthcare Machine Learning Signal Processing

WORK EXPERIENCE

Massachusetts Institute of Technology

Research Assistant

Jun 2018 – Aug 2022

- Investigate research problems with clinical collaborators
- Publish research findings in conference proceedings and journals
- Discover new clinical problems for research investigations

WorldQuant

Data Science Intern

Jun 2021 – Aug 2021

- Researched market front–running strategies

Google Taiwan (Google Health)

Software Engineer Intern

Jun 2020 – Sep 2020

- Implemented explainable deep learning model for lung cancer diagnosis
- Researched multiple techniques for interpretable deep learning

Beth Israel Deaconess Medical Center

Research Intern

Nov 2019 – May 2020

- Quantified patient risks for COVID with medical imaging models
- Integrated deep learning information system into hospital PACS workflow

PUBLICATIONS (CONT'D)

Journals

- **Transfer Neural Trees: Semi–Supervised Heterogeneous Domain Adaptation and Beyond** IEEE Transactions on Image Processing (TIP)
  Wei–Yu Chen, **Tzu–Ming Harry Hsu**, Yao–Hung Hubert Tsai, Ming–Syan Chen, and Yu–Chiang Frank Wang.

Conference Proceedings

- **DeepOPG: Improving Orthopantomogram Finding Summarization with Weak Supervision** MICCAI 2021
  Tzu–Ming Hsu, Yin–Chih Wang.
- **Federated Visual Classification with Real–World Data Distribution** ECCV 2020
  Tzu–Ming Harry Hsu, Hang Qi, Matthew Brown.
- **CheXpert++: Approximating the CheXpert labeler for Speed, Differentiability, and Probabilistic Output** MLHC 2020
  Matthew B. A. McDermott, **Tzu Ming Harry Hsu**, Wei–Hung Weng, Marzyeh Ghassemi, Peter Szolovits.
- **Baselines for Chest X–Ray Report Generation** Machine Learning for Healthcare Workshop, NeurIPS 2019
  William Boag, **Tzu–Ming Harry Hsu**, Matthew McDermott, Gabriela Berner, Emily Alesentzer, Peter Szolovits.
- **Measuring the Effects of Non–Identical Data Distribution for Federated Visual Classification** Federated Learning Workshop, NeurIPS 2019
  Tzu–Ming Harry Hsu, Hang Qi, Matthew Brown.
- **Clinically Accurate Chest X–Ray Report Generation** MLHC 2019
  Tzu–Ming Harry Hsu*, Guanxiong Liu*, Matthew McDermott, Willie Boag, Wei–Hung Weng, Peter Szolovits, Marzyeh Ghassemi.
- **3D–Aware Scene Manipulation via Inverse Graphics** NeurIPS 2018
  Tzu–Ming Harry Hsu*, Shunyu Yao*, Jun–Yan Zhu, Jiajun Wu, Antonio Torralba, William T. Freeman, and Joshua B. Tenenbaum.
- **Unsupervised Multimodal Representation Learning across Medical Images and Reports** Machine Learning for Healthcare Workshop, NeurIPS 2018
  Tzu–Ming Harry Hsu, Wei–Hung Weng, Willie Boag, Matthew McDermott, and Peter Szolovits .
- **Learning Food Quality and Safety using Wireless Stickers** Hotnets 2018
  Unsoo Ha, Yunfei Ma, Zexuan Zhong, **Tzu–Ming Harry Hsu**, and Fadel Adib.
- **Transfer Neural Trees for Heterogeneous Domain Adaptation** ECCV 2016
  Wei–Yu Chen, **Tzu–Ming Harry Hsu**, Yao–Hung Hubert Tsai, and Yu–Chiang Frank Wang.
- **Unsupervised Domain Adaptation With Imbalanced Cross–Domain Data** ICCV 2015
  Tzu–Ming Harry Hsu, Wei–Yu Chen, Cheng–An Hou, Yao–Hung Hubert Tsai, Yi–Ren Yeh, and Yu–Chiang Frank Wang.
- **Connecting the Dots Without Clues: Unsupervised Domain Adaptation for Cross–domain Visual Classification** ICIP 2015
  Wei–Yu Chen, **Tzu–Ming Harry Hsu**, Cheng–An Hou, Yi–Ren Yeh and Yu–Chiang Frank Wang.

WORK EXP. (CONT'D)

Google Research

Research Intern & Student Researcher

Jun 2019 – Mar 2020

- Investigated visual federated learning with large scale simulations
- Published on novel methods accelerating real–world federated learning

Brigham and Women's Hospital

Research Trainee

Sep 2019 – Mar 2020

- Automated liver lesion diagnosis process to augment radiologists

Ministry of National Defense, Taiwan

Substitute Military Service

Jul 2016 – Jun 2017

LEADERSHIP

MIT Taiwanese Student Association

President

May 2018 – April 2019

- Coordinate events for 100 members, speaker outreach, and career workshops

NTU Toastmasters Club

Public Relations/Member Vice President

Mar 2014 – Feb 2015

RESEARCH EXPERIENCE

MIT Clinical Decision Making Group (MEDG)

Prof. Peter Szolovits

Jul 2018 – Aug 2022 | MIT CSAIL

- Relax data requirement in medical imaging and beyond full supervision for uncovering underlying structure of medical radiology data and clinician reports
- 3D medical imaging including MRI and CT
- Medical report generation from radiographs

Google AI

Dr. Matthew Brown

Jun 2019 – Mar 2020 | Google

- Investigate the effect of non–identical data in training federated learning visual classifiers

MIT Computer Vision Group

Feb 2018 – June 2018 | MIT CSAIL

- Use 3D–aware vision as inverse–graphics for image editing

MIT Signal Kinetics Lab

Prof. Fadel Adib

Sep 2017 – Jan 2018 | MIT Media Lab

- Mobile localization in LTE cellular network
- Food quality and content detection with wireless signal

Multimedia and Machine Learning Lab

Prof. Yu–Chiang Wang

Apr 2014 – Jun 2016 | Academia Sinica, Taiwan

- Unsupervised domain adaptation with imbalanced cross–domain data
- Deep learning for heterogeneous domain adaptation

Access IC Lab

Prof. An–Yeu Andy Wu

Sep 2014 – Jun 2015 | NTU, Taiwan

- Noise removal of photoplethysmographic signals

Laboratory for Applied Logic and Computation in System Design (ALCom Lab)

Prof. Jie–Hong Roland Jiang

Jul 2013 – Jun 2014 | NTU, Taiwan

- Continuous–time mathematical models for neurons

AWARDS

NTU Taiwan Innovation Award

Second Place

2015

- Prototype earbud for music modulation and user sporting statistics

Altera Innovate Asia FPGA Design Competition

Silver Medal

2015

- Designed a custom PCB for music modulation and user sporting statistics

ICASSP Signal Processing Cup

Tenth Place

2015

- Ranked 10th globally in heartbeat detection for sports

International Physics Olympiad (IPhO)

Overall First Place

2011

- Ranked 1st in theory and experiment sections among 401 participants from over 80 countries

International Junior Science Olympiad (IJSO)

Gold Medal

2008

- Ranked top 10% among 300 international participants from over 60 countries