HAO-YU (HOWARD) LIAO, Ph.D.

haoyuliao@ufl.edu | haoyuliao929@gmail.com | Personal Website
LinkedIn | Google Scholar | Web of Sci. | ORCID | GitHub | Kaggle

EDUCATION

PhD **University of Florida, Environmental Engineering Sciences** May 2024

- **GPA: 3.97/4.0**
- PhD Dissertation: "Consideration of operator safety and robotic capability in human-robot collaboration for e-waste disassembly: a combination of optimization and artificial intelligence techniques," *University of Florida*. ufdc.ufl.edu/ufe0060572/00001

Graduate Machine Learning Certificate **UF, Department of Electrical and Computer Engineering**

MS **National Taiwan University, Bioenvironmental Systems Engineering** July 2016

- **GPA: 3.93/4.0**
- MS Thesis: "Applying the tabu search to develop an urban flood warning system," *National Taiwan University*. doi.org/10.6342/NTU201601908

BS **National United University, Civil and Disaster Prevention Engineering** July 2014

- **GPA: 4.0/4.0**
- BS Independent study: Liao, H.-Y., Wen-Cheng Liu, 2014, "Applying one-dimensional river routing model and artificial neural networks to forecast water stage of the tidal river during typhoons," Supported by the *Ministry of Science and Technology of Taiwan* under grant no. 102-2815-C-239-028-E (in Chinese with English abstract).

PUBLICATIONS

Journal Publications (12)

J1 Song, J., Zhao, C., Oduor, K. T., **Liao, H. Y.**, Tang, Z., Bretas, I. L., ... & Shao, W., 2025, "Mapping invasive Opuntia stricta in Kenya's Drylands using explainable machine learning with time-series remote sensing and geographic context," *International Journal of Applied Earth Observation and Geoinformation*, *144*, 104867. doi.org/10.1016/j.jag.2025.104867

J2 **H.-Y. Liao**, P. Terrin, J. R. Petters, and S. Behdad, 2025, "A Disassembly Scoring Framework for Human–Robot Collaboration Based on Robotic Capabilities," *Journal of Mechanical Design*, *147*(6), 062002. doi.org/10.1115/1.4068476
2024 DFMLC Best Paper Award at the ASME IDETC Conference

J3 **H.-Y. Liao**, Y. Chen, B. Hu, X. Liang, and S. Behdad, 2025, "Forecasting the Range of Possible Human Hand Movement in Consumer Electronics Disassembly Using Machine Learning," *Journal of Computing and Information Science in Engineering*, *25*(5), p.051001. doi.org/10.1115/1.4067987

J4 **H.-Y. Liao**, Behzad Esmaeilian, S. Behdad, 2024, "Automated evaluation and rating of product repairability using artificial intelligence-based approaches," *Journal of Manufacturing Science and Engineering*, *146*(2), **(IF: 4.0).** doi.org/10.1115/1.4063561

J5 Y. Chen, **H.-Y. Liao**, S. Behdad, B. Hu, 2023, "Human Activity Recognition in an End-Of-Life Consumer Electronics Disassembly Task," *Applied Ergonomics* **(IF: 3.94)**, **Co-first author.** doi.org/10.1016/j.apergo.2023.104090

J6 **H.-Y. Liao**, Y. Chen, B. Hu, and S. Behdad, 2022, "Optimization-Based Disassembly Sequence Planning Under Uncertainty for Human–Robot Collaboration." *Journal of Mechanical Design*, 145(2), 022001. **(IF: 3.441)** doi.org/10.1115/1.4055901

J7 **H.-Y. Liao**, S. Behdad, 2021, "Markov Chain Optimization of Repair and Replacement Decisions of Medical Equipment," *Resources, Conservation and Recycling,* 105609. **(IF: 10.204) Ranking: 5/54** in Engineering, Environmental doi.org/10.1016/j.resconrec.2021.105609

J8 **H.-Y. Liao**, W. Cade, S. Behdad, 2021, "Forecasting Repair and Maintenance Services of Medical Devices Using Support Vector Machine." *Journal of Manufacturing Science and Engineering*, 144(3), 031005. (**IF: 3.033**) doi.org/10.1115/1.4051886

J9 Pan, T.-Y., H.-T. Lin, **H.-Y. Liao**, 2019, "A Data-Driven Probabilistic Rainfall-Inundation Model for Flash-Flood Warnings," Water, 11, 2534. (**IF: 2.524**) doi.org/10.3390/w11122534

J10 **H.-Y. Liao**, T.-Y. Pan, H.-K. Chang, C.-T. Hsieh, J.-S. Lai, Y.-C. Tan and M.-D. Su, 2019, "Using Tabu Search Adjusted with Urban Sewer Flood Simulation to Improve Pluvial Flood Warning Via Rainfall Thresholds," Water, 11, 348. (**IF: 2.524**) doi.org/10.3390/w11020348

J11 Chen, C.-K., M.-J. Chang, H.-K. Chang, **H.-Y. Liao** and Y.-F. Cheng, 2019, "Hourly Streamflow Forecasting for Agriculture Water Supply Using Artificial Neural Network," *Journal of Taiwan Agricultural Engineering*, vol. 65, iss. 3. (in Chinese with English abstract) (EI-Compendex) 10.29974/JTAE.201909_65(3).0006

J12 **H.-Y. Liao**, T.-Y. Pan, Y.-C. Tan, J.-S. Lai and M.-D. Su, 2018, "Applying the Tabu Search to Optimize a Rainfall-Inundation Warning Threshold: Case Studies in Wenshan, Taipei City, and Xindian, New Taipei City," *Journal of Taiwan Agricultural Engineering*, vol. 64, iss. 1. (in Chinese with English abstract) (EI-Compendex) 10.29974/JTAE.201803_64(1).0002

Book Chapter Publications (2)

B1 **H.-Y. Liao**, C. Zhao, 2026, "Ecosystem degradation." *Data-Driven Earth Observation for Disaster Management*. Elsevier, 303-325. doi.org/10.1016/B978-0-443-33803-8.00021-4

B2 B. Esmaeilian, **H.-Y. Liao**, and S. Behdad, 2025, "Circular Economy through blockchain and Data Analytics." *Blockchain for Good*. CRC Press. 170-188. ISBN 9781032598062. doi.org/10.1201/9781003456346-10

Peer-Reviewed Full Conference Papers (9)

P1 **H.-Y. Liao**, C. Zhao, J. Song, and W. Shao, 2025. "Mapping Cultural Ecosystem Services Using One-Shot In-Context Learning with Multimodal Large Language Models." In *Proceedings of the 33rd ACM International Conference on Advances in Geographic Information Systems*, pp. 1071-1074. doi.org/10.1145/3748636.3764178

P2 J. Song, C. Zhao, **H.-Y. Liao**. and W. Shao, 2025. "FoundationSoil: Enhancing Soil Organic Carbon Mapping Using a Multi-Temporal Geospatial Foundation Model." In *Proceedings of the 33rd ACM International Conference on Advances in Geographic Information Systems*, pp. 1067-1070. doi.org/10.1145/3748636.3764177

P3 **H.-Y. Liao**, P. Terrin, J. R. Petters, and S. Behdad, 2024, "A disassembly score for human-robot collaboration considering robots' capabilities," *ASME 2024 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, IDETC/CIE*, August 25-18, 2024, Washington, DC, USA. doi.org/10.1115/DETC2024-143517

P4 **H.-Y. Liao**, Y. Chen, B. Hu, X. Liang, and S. Behdad, 2023, "Forecasting the range of possible human hand movement in consumer electronics disassembly using machine learning," *Proceedings of the ASME 2023 18th International Manufacturing Science and Engineering Conference*, June 12-16, 2023, New Brunswick, New Jersey, USA. doi.org/10.1115/MSEC2023-104792

P5 **H.-Y. Liao**, M. Zheng, B. Hu, S. Behdad, 2022, "Human Hand Motion Prediction in Disassembly Operations," *ASME 2022 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, IDETC/CIE*, August 14-17, 2022, St. Louis, Missouri, USA. doi.org/10.1115/DETC2022-89967

P6 **H.-Y. Liao**, Y. Chen, B. Hu, S. Behdad, 2022, "Optimization-Based Disassembly Sequence Planning Under Uncertainty for Human-Robot Collaboration," *ASME 2022 17th International Manufacturing Science and Engineering Conference, MSEC*, June 27-July 1, 2022, West Lafayette, Indiana, USA. doi.org/10.1115/MSEC2022-85383

P7 **H.-Y. Liao,** W. Cade, S. Behdad, 2021, "Machine Learning to Predict Medical Devices Repair and Maintenance Needs," *ASME 2021 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2021*, Aug. 19, 2021, virtual meeting. doi.org/10.1115/DETC2021-71333

P8 S. Hu, X. Zhang, **H.-Y. Liao**, X. Liang, M. Zheng, S. Behdad, 2021, "Deep Learning and Machine Learning Techniques to Classify Electrical and Electronic Equipment," *ASME 2021 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2021*, Aug. 19, 2021, virtual meeting. doi.org/10.1115/DETC2021-71403

P9 **H.-Y. Liao**, W. Cade, S. Behdad, 2021, "Forecasting Repair and Maintenance Services of Medical Devices Using Support Vector Machine." *Proceedings of the ASME 2021 16th International Manufacturing Science and Engineering Conference, MSEC 2021*, June 21, 2021, virtual meeting. doi.org/10.1115/MSEC2021-63966

Conference Presentations

C1 **H.-Y. Liao**, C. Zhao, C. Koylu, H. Cao, J. Qiu, C. Callaghan, J. Song, W. Shao, 2025, "Mapping Cultural Ecosystem Service Flows from Crowdsourced Imagery: A Zero-Shot Learning Approach with the Vision–Language Model CLIP," *The Conference of American Geophysical Union (AGU)*, New Orleans, American, December 11-19.

C2 C. Zhao, **H.-Y. Liao**, D. C. Gogineni, C. Koylu, 2024, "Mapping Flows of Nature-based Outdoor Recreational Services at Large-scale based on Crowdsourced Data and Multimodal Learning," *A Community on Ecosystem Services (ACES) conference*, Dec. 9-12, 2024, Austin, Texas, USA. conference.ifas.ufl.edu/aces/index.php

C3 **H.-Y. Liao**, C. Zhao, 2024, "Advancing Ecosystem Services Assessment Through Geospatial Artificial Intelligence (GeoAI): A Comprehensive Review and Future Directions," *The Symposium on Spatiotemporal Data Science*, Jul 23-24, 2024, Virginia Tech Research Center, Virginia, VA, USA. stds2024.stcenter.net/index.php/test/#CLT-1-i

C4 **H.-Y. Liao**, S. Behdad, 2023, "An artificial intelligence-based framework to assess product repairability," *2023 Production and Operations Management Society, POMS*, May 25, 2023, Orlando, FL, USA. pomsmeetings.org/conf-2023/documents/Full-Schedule-PDF.pdf

C5 **H.-Y. Liao**, S. Behdad, 2021, "Deep Transfer Learning to Evaluate Product Repairability," *The 2021 INFORMS Annual Meeting*, October 24-27, 2021, Anaheim, CA.

C6 **H.-Y. Liao**, W. Cade, S. Behdad, 2020, "Machine Learning, Frequency Analysis and Markov Chain Model for Analyzing Product Repair and Maintenance Service Decisions," *IDETC/CIE 2020*, virtual meeting, technical presentation. event.asme.org/Events/media/library/resources/idetc-cie/IDETC-Virtual-Technical-Session-Breakdown.pdf

C7 Lin, Y.-J., **H.-Y. Liao**, H.-K. Chang, R.-K. Shang, H.-C. Kuo, J.-S. Lai and Y.-C. Tan, 2017, "A Web-Based Tamsui River Flood Early-Warning System with Correction Of Real-Time Water Stage Using Monitoring Data," *The Conference of American Geophysical Union (AGU)*, New Orleans, American, December 11-15. ui.adsabs.harvard.edu/abs/2017AGUFMNH41A0150L

C8 **H.-Y. Liao**, T.-Y. Pan, M.-D. Su, M.-C. Hsieh and Y.-C. Tan, 2016, "Optimization of Rainfall Thresholds for A Flood Warning System to Taiwan Urban Areas During Storm Events," *The Conference of European Geophysical Union (EGU)*, Vienna, Austria, April 17-22. ui.adsabs.harvard.edu/abs/2016EGUGA..1810875L

Preprint (3)

Liao, H. Y., Zhao, C., Koylu, C., Cao, H., Qiu, J., Callaghan, C. T., ... & Shao, W. (2025). "Mapping Cultural Ecosystem Service Flows from Social Media Imagery with Vision–Language Models: A Zero-Shot CLIP Framework." *EcoEvoRxiv.*

Gao, G., **Liao, H. Y.**, & Hu, Z. (2024). Ai for equitable tennis training: Leveraging ai for equitable and accurate classification of tennis skill levels and training phases. *arXiv preprint arXiv:2406.16987*.

Chen, Y., **Liao, H. Y.**, Behdad, S., & Hu, B. (2023). Human activity recognition in an end-of-life consumer electronics disassembly task. *Applied Ergonomics*, *113*, 104090.

Patent (1)

Gao, G., Gao, Y., Wang, F., **Liao, H.Y.** and Liu, P., 2024. "*Machine-Learning Based Motion Analysis and Training Method and System*." U.S. Patent Application 18/519,196. patents.google.com/patent/US20240420819A1/

HONORS AND AWARDS

UF Postdoctoral Travel Award, UF Postdoc Association and Postdoctoral Affairs (UFPDA)	2024
DFMLC Best Paper Award, International Design Engineering Technical Conferences (IDECT)	2024
Florida AWMA Scholarship Award, Florida Section Air & Waste Management Association (FLAWMA)	2022
Don Maurer Memorial Scholarship Award, Department of EES, University of Florida	2022
MSEC Student Travel Award, North American Manufacturing Research Conference (NAMRC) and International Manufacturing Science and Engineering Conference (MSEC)	2022
MSEC Student Travel Award, NAMRC and MSEC	2021
International Academic Conferences Scholarship, Research Center of Climate Change and Sustainable Development	2018
International Academic Conferences Scholarship, Research Center of Climate Change and Sustainable Development	2017
International Academic Conferences Scholarship, Ministry of Science and Technology of Taiwan	2016
Kuo Hsi-Liu Foundation Scholarship, Kuo Hsi-Liu Foundation	2016
Chi-Sing Irrigation Association Scholarship, Chi-Sing Irrigation Association	2015

College Student Research Scholarship, Ministry of Science and Technology of Taiwan 2013
Academic Achievement Award, National United University 2013
Academic Achievement Award, National United University 2011
Academic Achievement Award, National United University 2011

PROFESSIONAL EXPERIENCE

Postdoctoral Associate – Geospatial Artificial Intelligence (GeoAI), *led three projects* May 2024 – Present
University of Florida, Gainesville, FL

- **Project: Multimodal Large Language Models for Mapping Cultural Ecosystem Services**
  - Developed AI pipelines on Super HiPerGator HPC (NVIDIA B200 GPUs) to process large-scale remote sensing data.
  - Optimized Contrastive Language-Image Pretraining (CLIP) model with a Genetic Algorithm (GA) for prompt engineering and zero-shot learning.
  - Implemented a multimodal AI pipeline (e.g., Qwen2.5-VL) to automatically assess cultural ecosystem services by classifying millions of crowdsourced Flickr image–text pairs.
- **Project: Tree Detection Models on Large-Scale Remote Sensing Data**
  - Applying DeepForest, LangRS, and HR-SFANet to detect 17M trees and SR3 super-resolution to improve NAIP imagery resolution.
- **Project: Interactive Web-GIS Mapping Services**
  - Developed an interactive Web-GIS system using the Bootstrap framework and Leaflet.js to visualize ecosystem services, integrating outputs from AI models for geospatial analysis.

Graduate Researcher – Optimization and AI in Human-Robot Collaboration, *led two projects* Jan. 2020 – May 2024
University of Florida, Gainesville, FL

- **Project: AI for Human-Robot Collaboration & Disassembly (NSF FW-HTF-RL: #2026276)**
  - Developed real-time hand motion forecasting models using ConvLSTM and YOLO for human-robot collaboration in remanufacturing.
  - Developed a new Sequence-based correction (SBC) algorithm with IMU-based deep learning modes such as CNN, LSTM, and GoogLeNet for the human activity recognition system
  - Build GRU, LSTM, and BNN with Monte Carlo Dropout and Bagging algorithm for three-dimensional hand motion (x, y, z) possible movement area on IMU sensors.
  - Proposed an optimization model with the multi-attribute utility function for disassembly sequence planning and work settings in human-robot collaboration.
  - Proposed a disassembly scoring framework considering component weight, shape, size, accessibility, and positioning to evaluate robotic capabilities using UR5e as an example.
  - Analyzed the risk of safety for human operators and wrote academic papers on human-robot collaboration research
- **Project: AI-driven Decision Models for Medical Device Remanufacturing (NSF GOALI: #2017971)**
  - Data analysis and life cycle analysis by implementing frequency analysis to evaluate the performance of different healthcare medical devices.
  - Developed the DTMC (Discrete-Time Markov Chain) optimization decision-making model for the medical device in repair or replacement determination, increasing income benefits.
  - Developed a repair and maintenance forecasting model using Support Vector Machine (SVM) to predict failures in medical devices
  - Build an automated rating system of 111 different brands of smartphone repairability by K-mean clustering and ConvNeXt, GoogLeNet, ResNet, and VGG with an ablation study.

Research Assistant – Artificial Intelligence for Real-Time Flood Warning Systems, *led one project* July 2016 – Dec. 2019
National Taiwan University, Taipei, Taiwan

- **Project: AI-Based Flood Forecasting Models in 2D and 3D Web-GIS Systems (Link)**
  - Developed **machine learning pipelines (SVM, BPNN)** for **real-time flood forecasting** and deployed them with IoT integration.
  - Developed a web-based Tamsui River flood early-warning system by using HTML, CSS3, JavaScript, MySQL, PHP, and Python.

- Developed a web-based Taipei summer storm experiment (TASSE) information system using Google Maps API and 3D visualization by using CesiumJS.

Research Assistant – Rainfall thresholds for early flooding warning, *led one project* July 2014 – June. 2016
National Taiwan University, Taipei, Taiwan

- **Project: Applying the tabu search to develop an urban flood warning system (Link)**
  - Developed and applied tabu search optimization algorithms to improve the accuracy of flooding risk prediction.
  - Conducted statistical modeling, such as frequency analysis and data analysis, for flood forecasting.
  - Delivered practical research outcomes enhancing disaster warning systems and public safety.

TEACHING EXPERIENCE

Agronomy Department, University of Florida, Gainesville, FL
Guest Lecturer 2025
Course: *AGR 6932* **Geospatial AI for Sustainability Science**

- Presented the lecture for Geo-visualization and Interactive Mapping including tools and techniques for 2D/3D mapping; interactive dashboards; story maps; digital twins for sustainability applications.

Environmental Engineering Sciences, University of Florida, Gainesville, FL
Teaching Assistant 2023
Course: *ENV 4601* **Environmental Resources Management** Syllabus

- Graded assignments, taught undergraduate courses, prepared assignment solutions, and supervised examinations.

Environmental Engineering Sciences, University of Florida, Gainesville, FL
Guest Lecturer 2022
Course: *ENV 6932* **System Analysis for Sustainable Design and Lifecycle Decisions** Syllabus

- Presented the lecture for multi-attribute utility function, frequency analysis, and the house of quality (product planning matrix).

Environmental Engineering Sciences, University of Florida, Gainesville, FL
Guest Lecturer 2021
Course: *ENV 6932* **Artificial Intelligence and Machine Learning with Engineering Applications**

- Presented the technical modules on supervised learning algorithms and AI-driven decision-making in environmental systems.

Bioenvironmental Systems Engineering**, National Taiwan University**, Taipei, Taiwan
Teaching Assistant 2014
Course: Special Topics on Bioenvironmental Systems Engineering

- Graded course assignments and assisted invited speakers for seminars.

MENTORING EXPERIENCE

- Active Learning Program (ALP) Summer 2025 Intern, University of Florida, 2025
  - Mentored undergraduate students for the project: National wide-scale image labelling for training ML models.
- Active Learning Program (ALP) Spring 2025 Intern, University of Florida, 2025
  - Mentored undergraduate students for the project: Bootstrap responsive website development.
- Active Learning Program (ALP) Fall 2024 Intern, University of Florida, 2024
  - Mentored undergraduate students for the projects:
  - Project 1: Perform manual data annotation of urban tree canopy on NAIP aerial images for the regulation service
  - Project 2: Assess the content of Flickr photographs with an image labeling software (i.e., LabelMe) to assign images into different outdoor recreation classes and cross-verify human annotations for cultural service.
- Research project "Leveraging Machine Learning for Accurate Classification of Tennis Skill Levels and Training Phases", 2023-2024
  - Mentored a high school student who was recognized at the symposium for outstanding performance:
    - State Recognition Award in Florida Junior Science and Humanities Symposium (JSHS), 2024
    - First place in the computer science category at the 2024 Alachua County Science Fair, 2024
    - Finalist in the 2024 Florida State Science and Engineering Fair (SSEF), 2024

- Writing guidance for the machine learning research paper published in the *International Journal of High School Research* (Peer-reviewed full paper). doi.org/10.36838/v7i4.1

GRANT PROPOSAL WRITING EXPERIENCES

Technical Writer, "Harnessing Active Learning and Geospatial AI for Enhanced Agroecosystem Services Monitoring", submitted to USDA DSFAS program, 2024.

Technical Writer, "Collaborative Research: Inclusive and Advanced Learning of Education in Robotics (I-ALERT)", submitted to *NSF RITEL* program, 2024. (NSF, $737,161, PI: Dr. Sara Behdad)

Technical Writer, "Advanced Autonomous Solutions for Marine Debris Collection and Recovery", submitted to *NSF TRAILBLAZER* program, 2023. (PI: Dr. Sara Behdad)

Technical Writer, "Applying Data Driven and Optimization Theory to Build a Fast and Practical Flooding Warning Mechanism", MOST 104-2625-M-002-017- (in Chinese forms with English report content), Submitted to National Science and Technology Council (NSTC) Program, Taiwan, Funded 386,000 TWD (Around 12,450 USD), 2016 (PI: Dr. Tsung-Yi Pan)

PROFESSIONAL SERVICE

Academic Reviewer: www.webofscience.com/wos/author/record/KRO-8697-2024.

- Robotics and Computer-Integrated Manufacturing
- ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC-CIE)
- Environmental Monitoring and Assessment
- Earth Science Informatics
- Energy, Ecology and Environment
- The Journal of Supercomputing
- Scientific Reports
- Limnology
- Water
- Sensors
- Algorithms
- Biomimetics
- Information
- Data
- Remote Sensing in Earth Systems Sciences
- The Journal of Supercomputing
- Signal, Image and Video Processing
- Agronomy
- Procedia CIRP

Conference Session Organization & Chairing

- Chair & Early Career Convener, GC31H – GeoAI for Ecosystem Services and Biodiversity: Innovations in Monitoring, Modeling, and Integration (Poster), AGU Fall Meeting 2025, New Orleans, LA, Dec 17, 2025. Link

PROFESSIONAL INVOLVEMENT

Competition Attendance

- Binary Prediction with a Rainfall Dataset, 2025 Link (Howard Liao)
  1. Solo ranking **11/4,381 (top 0.25%)**
  2. Building AutoGluon pipeline to predict rainfall events
- Detect AI vs. Human-Generated Images, 2025 Link (Howard Liao)
  1. Solo ranking **41/554 (top 7%)**
  2. Building a PyTorch-based deep learning model to detect fake or real images.
- ESSIE Poster Symposium, 2024 Link
  Presented the project "Automated evaluation and rating of product repairability using artificial intelligence-based approaches".
- ASABE Robotics Student Design Competition, July 9-13, 2023, Omaha, Nebraska, USA
  1. Built URDF file for manipulation by Moveit2 and ROS2.
  2. The manipulation collected cotton from cotton trees.

3. Social media: x.com/UF_ABE/status/1679172578479599616; Poster: Link

Professional Membership

- ACM (Association for Computing Machinery)
- Chi Epsilon (XE).
- Kaggle. www.kaggle.com/haoyuliao14116

INVITED TALKS FOR PRESENTATIONS

H.Y. Liao et al., (2024), Plenary Vision Panel, "Advancing Ecosystem Services Assessment Through Geospatial Artificial Intelligence (GeoAI): A Comprehensive Review and Future Directions," *The Symposium on Spatiotemporal Data Science*, Virginia Tech Research Center, Virginia, VA, USA, July 23.
H.Y. Liao et al., (2023) "Forecasting the range of possible human hand movement in consumer electronics disassembly using machine learning," *MSEC*, Rutgers University, New Brunswick, New Jersey, USA, June 14.
H.Y. Liao et al., (2022) "Human Hand Motion Prediction in Disassembly Operations", *IDETC/CIE*, St. Louis, Missouri, USA, August 16.
H.Y. Liao et al., (2022) "Optimization-based Disassembly Sequence Planning under Uncertainty for Human-Robot Collaboration," *The Future of Human-Robot Partnerships in Remanufacturing Workshop*, Virtual, August 11.
H.Y. Liao et al., (2022) "Optimization-based Disassembly Sequence Planning under Uncertainty for Human-Robot Collaboration," *MSEC*, Purdue University, West Lafayette, Indiana, USA, July 1.
H.Y. Liao et al., (2021) "Machine Learning to Predict Medical Devices Repair and Maintenance Needs," *IDETC/CIE*, Virtual, **August** 19.
H.Y. Liao et al., (2021) "Forecasting Repair and Maintenance Services of Medical Devices Using Support Vector Machine," *MSEC*, Virtual, June 22.
H.Y. Liao et al., (2020) "Machine Learning, Frequency Analysis and Markov Chain Model for Analyzing Product Repair and Maintenance Service Decisions," *IDETC/CIE*, Virtual, August 17.

PROFESSIONAL CERTIFICATIONS (LINK)

Fundamentals of Accelerated Data Science (NVIDIA)	2025
Building Transformer-Based Natural Language Processing Applications (NVIDIA)	2025
Fundamentals of Deep Learning (NVIDIA)	2025
Data Parallelism: How to Train Deep Learning Models on Multiple GPUs (NVIDIA)	2025
Completed 5-Day Gen AI Intensive (Google & Kaggle)	2025
Machine Learning (ECE, UF)	2023
Professional Civil Engineer in Taiwan (PE in Civil) (No. 014887)	2018
Data Structure & Advanced C++ Programming (No. 2950288, NTU)	2018
Advanced JavaScript and Front-End Engineering (No. 2770167, NTU)	2017
Interactive Data Visualization with D3.js - Basic (No. 2760167, NTU)	2017
PHP & MYSQL Active Webpages Programming (No. 2760125, NTU)	2017
Linux (No. 2770196, NTU)	2017
Python Programming (No. 2750187, NTU)	2016
HTML5, CSS3, jQuery, Bootstrap - Frontend Web Development (No. 2750079, NTU)	2016

PROJECTS & OPEN-SOURCE CONTRIBUTIONS

A Zero-Shot CLIP Framework for Mapping Cultural Ecosystem Services: Proposed an advanced CLIP-BRF-ZS for zero-shot prediction in recreational activities before mapping to a web-GIS system. Link
Foundation Models & Multimodal AI: Built DeepSeek-Janus Pro-based multimodal AI models pipeline for text-image understanding. Link
Personal Finance AI Agent: Developed a generative AI agent via the Gemini model on finance reasoning for sell, buy, and hold actions. Link
AI in Autonomous Systems: Build a reinforcement learning agent using Deep Q-Network to play Connect-X. Link
AI-driven Product Repairability Scoring: Developed ML models for automated repairability assessment. Link
Deep Learning for Song Classification: CNN, GoogLeNet, and ResNet-50 models to classify non-progressive vs. progressive songs. Link
Building ML Models to Play Tic Tac Toe: Implemented various ML models to play against humans. Link
Deep Colorization for Grayscale Images: Built a Fully Convolutional Network (FCN) to transform grayscale images to colorful images. Link

Image Semantic Segmentation and Detection for Hard Drive Devices: Developed models to identify hard drive components with GoogLeNet and ResNet-50 on semantic images via FCN. Link
Image Classification of Different Types of Bricks: Built Edge Histogram Descriptor (EHD to extract each image's features and Probabilistic Generative Classifier (PGC) to classify 4 types of bricks and non-brick objects. Link