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

haoyuliao@ufl.edu | LinkedIn; G. Scholar; Web of Sci.; ORCID

RESEARCH INTERESTS

Sustainable Remanufacturing, Robotic Risk Analysis and Mitigation, Machine Learning and Big Data Analysis, Work Safety Optimization in Human-Robot Collaboration, Manipulation Control, Intelligent Automation, AI Applications in Ecosystem Services

EDUCATION

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

- **GPA: 3.97/4.0**
- PhD Dissertation: Liao, H.-Y., 2024, "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

Machine Learning Certificate (ECE) **University of Florida, Department of Electrical & Computer Engineering** May 2023

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

- **GPA: 3.93/4.0**
- MS Thesis: Liao, H.-Y., 2016, "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).

Information System Training Program of Department of Computer Science and Information Engineering, National Taiwan University

- Data Structure & Advanced C++ Programming (Ref. No. 2950288) 2018
- Advanced JavaScript and Front-End Engineering (Ref. No. 2770167) 2017
- Interactive Data Visualization with D3.js - Basic (Ref. No. 2760167) 2017
- PHP & MYSQL Active Webpages Programming (Ref. No. 2760125) 2017
- Linux (Ref. No. 2770196) 2017
- Python Programming (Ref. No. 2750187) 2016
- HTML5, CSS3, jQuery, Bootstrap - Frontend Web Development (Ref. No. 2750079) 2016

PUBLICATIONS (scholar.google.com/citations?hl=en&user=cSZdfP8AAAAJ)

Journal Publications (11)

J1 **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

J2 **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

J3 **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

J4 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

J5 **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

J6 **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

J7 **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

J8 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

J9 **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

J10 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

J11 **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, "Data-Driven Earth Observation for Disaster Management: From Theory to Practical Applications," *Elsevier, Under process*.

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

Conference Proceedings Publications (7)

P1 **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. (**Peer-Reviewed Full Paper**) doi.org/10.1115/DETC2024-143517

P2 **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. **(Peer-Reviewed Full Paper)** doi.org/10.1115/MSEC2023-104792

P3 **H.-Y. Liao**, 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. (**Peer-Reviewed Full Paper**) doi.org/10.1115/DETC2022-89967

P4 **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. (**Peer-Reviewed Full Paper**) doi.org/10.1115/MSEC2022-85383

P5 **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. (**Peer-Reviewed Full Paper**) doi.org/10.1115/DETC2021-71333

P6 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. (**Peer-Reviewed Full Paper**) doi.org/10.1115/DETC2021-71403

P7 **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. (**Peer-Reviewed Full Paper**) doi.org/10.1115/MSEC2021-63966

Conference Presentations (17)

C1 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

C2 **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

C3 **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

C4 **H.-Y. Liao**, S. Behdad, 2021, "Deep Transfer Learning to Evaluate Product Repairability," *The 2021 INFORMS Annual Meeting*, October 24-27, 2021, Anaheim, CA.

C5 **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

C6 **H.-Y. Liao**, M.-J. Chang, F.-Z. Lee, J.-S. Lai and G.-F. Lin, 2019, "Suspended Sediment Concentration Forecasting at Downstream Water Intake During Reservoir Desilting Operation," *The Conference of 3rd International workshop on Sediment Bypass Tunnels (IWSBT)*, Taipei, Taiwan, April 9-12.

C7 **H.-Y. Liao**, M.-J. Chang, F.-Z. Lee, J.-S. Lai, 2018, "Artificial Intelligences Application on Suspended Sediment Concentration Forecasting," *The Conference of Taiwan Agricultural Engineering*, Kaohsiung, Taiwan, November 9. (in Chinese with English abstract) www.twaes.org.tw/soae/Public/Data/2019052817451967.pdf

C8 Lin, Y.-J., **H.-Y. Liao**, H.-K. Chang, H.-T. Ouyang, J.-S. Lai, B. J.-D. Jou and Y.-C. Tan, 2018, "Application of Time Series Models For Flood Forecasting: A Case Study in Dawulun River," A*sia Oceania Geosciences Society-European Geosciences Union Joint Conference (AOGS-EGU)*, Tagaytay, Philippines, February 04-08.

C9 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

C10 **H.-Y. Liao**, T.-Y. Pan, Y.-C. Tan, J.-S. Lai and M.-D. Su, 2017, "Analyzing the Impacts of The Cumulative Rainfalls with Different Durations as Disastrous Rainfall Features on Multi-Variable Rainfall-Flood Warning Mechanism," *The Conference of Taiwan Agricultural Engineering*, Kaohsiung, Taiwan, November 8. (in Chinese with English abstract) www.twaes.org.tw/soae/Public/Data/2018030218010943.pdf

C11 Lai, J.-S., H.-K. Chang, **H.-Y. Liao**, Y.-J. Lin and M.-J. Chang, 2017, "Influence of Spatial Precipitation Variability on Flood Inundation Simulation," *The Conference of International Conference on Mesoscale Convective Systems and High-Impact Weather in East Asia (ICMCS-XII)*, Taipei, Taiwan, October 17-20.

C12 Lin, Y.-J., M.-R. Chen, H.-K. Chang, **H.-Y. Liao**, J.-S. Lai and Y.-C. Tan, 2017, "Flood Warning System of Tamsui River Using Ensemble Rainfall Forecasting," *13th APRU Multi-Hazards Research Symposium*, Beijing, China, August 28-29. (English abstract)

C13 **H.-Y. Liao**, R.-K. Shang, H.-K. Chang, J.-S. Lai, S.-C. Lin and Y.-C. Tan, 2017, "Developing the Tamsui River Flood Early-Warning System," *The Conference of Taiwan Geographic Information Society (TGIS)*, Taipei, Taiwan, July 3-4. (Chinese abstract)

C14 **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

C15 **H.-Y. Liao**, T.-Y. Pan, Y.-C. Tan, M.-C. Hsieh and M.-D. Su, 2015, "Research on Rainfall Threshold for Flood Warning System of Deterministic Algorithm- A Case of Xinzhuang, New Taipei City," *The Conference of Taiwan Agricultural Engineering*, Taipei, Taiwan, October 14. (in Chinese with English abstract) www.twaes.org.tw/soae/Public/Data/2016041518111407.pdf

C16 **H.-Y. Liao**, T.-Y. Pan, Y.-C. Tan, M.-C. Hsieh and M.-D. Su, 2015, "Improvement of Rainfall Thresholds for A Flood Warning System in Taiwan – A Case Study of Xinzhuang Rain Gauge," *The Conference of Federation of Engineering Institutions of Southeast Asia and the Pacific (FEIAP)*, Taipei, Taiwan, July 5-7.

C17 **H.-Y. Liao**, T.-J. Lin, T.-Y. Pan, Y.-C. Tan and M.-C. Hsieh, 2014, "A Study on the Deterministic Algorithm of the Rainfall Threshold for Flood Warning System," *The Conference of Taiwan Agricultural Engineering*, Kaohsiung, Taiwan, October 29. (in Chinese with English abstract) www.twaes.org.tw/soae/Public/Data/2015060214573977.pdf

WORK AND RESEARCH EXPERIENCE

Department of Agronomy, Institute of Food and Agricultural Sciences (IFAS), University of Florida

Post-Doctoral Associate 2024 to Current

- Develop GeoAI models applied to large-scale remote sensing data and data analysis in Pro ArcGIS for ecosystem change detection and monitoring.
- Apply object detection models such as DeepForest to detect 17 million trees for carbon storage evaluation by Kernel Density Estimation (KDE).
- Rescale NAIP 60 cm low-resolution remote-sensing images into 10 cm high-resolution images with SR3 model in large-scale aerial photos.
- Develop the CLIP (Contrastive Language-Image Pretraining) pipeline by zero-shot learning and prompt engineering to identify recreational activities, successfully achieving 92% accuracy in 12 different recreational activities.
- Apply the LLaVA model with crowd-sourced image and text data mining to produce text descriptions of recreational images for cultural ecosystem service assessments.

Green Engineering Technologies for the Community of Tomorrow, University of Florida

Graduate Research Assistant 2020 to 2024

- Project 1: "**Data-Driven Remanufacturing: Foundation for Modeling the Impact of Product Middle-of-Life Data on End-of-Life Recovery Decisions**". #2026276
  - Develop real-time forecasting hand motion detection with ConvLSTM and YOLO framework for human-robot collaboration in remanufacture research, achieving 0.79 IOU and 0.41 MSE pixels.
  - Build GRU, LSTM, and BNN with Monte Carlo Dropout and Bagging algorithm for three-dimensional hand motion (x, y, z) possible movement area forecasting 50 ms on 60hz IMU sensors, achieving very low MAE less than 2 cm difference.
  - Propose 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, successfully reaching 95% accuracy with the GoogLeNet&SBC model.

- Developed machine learning and deep learning models to quantify repairability scores of consumer electronics.

- Project 2: "**The Future of Remanufacturing: Human-Robot Collaboration for Disassembly of End-of-Use Products**". #2017971
  - Data analysis and life cycle analysis by implementing frequency analysis to evaluate different healthcare medical devices' performance.
  - Develop the DTMC (Discrete-Time Markov Chain) optimization decision-making model for the medical device in repair or replacement determination, increasing 5% and 27% income benefits compared to only repair or replacement.
  - Build an automated rating system of 111 different brands of smartphone repairability by K-mean cluster and ConvNeXt, GoogLeNet, ResNet, and VGG with ablation study, achieving 87% accuracy via smartphone teardown images.
  - Set up UR5e to work collaboratively with the human operator.
  - Analyzed risk of safety for human operators and wrote academic papers on human-robot collaboration research

Research Center of Climate Change and Sustainable Development, National Taiwan University, Taipei, Taiwan
Research Assistant 2016 to 2019 Dec.

- Executed the "**Development and Application of Operational Information Platform for Precipitation and Inundation Forecasting to Disaster Reduction**" project.
  - Developed a web-based Tamsui River flood early-warning system by using HTML, CSS3, JavaScript, MySQL, PHP, and Python. Link
  - Developed a web-based Taipei summer storm experiment (TASSE) information system using Google Maps API and 3D visualization by using CesiumJS.
  - Developed Machine learning models such as SVM (Support vector machines), BPNN (Back Propagation Neural Network), etc. on forecasting flooding.
  - Validated the accuracy of machine learning models, updated parameters in offline learning, and deployed the models in real-time forecasting combined with IoT technology.
  - Watershed delineation by using QGIS and applying Google Maps API to show real-time information on drainage locations and water level.

Center for Weather Climate and Disaster Research, National Taiwan University, Taipei, Taiwan
Research Assistant 2014 to 2016

- Executed the "**Service Corps of Disaster Emergency Operation Team of WRA, MOEA**" project.
- Executing the "**Applying Data Driven and Optimization Theory to Build a Fast and Practical Flooding Warning Mechanism**" project.
  - Updated approximately 600 stations of rainfall thresholds monthly by self-coding with MATLAB that speeds up renewing process.
  - Wrote situations report of rainfall thresholds for Water Resource Agency (WRA).
  - Participated emergency response personnel in WRA to monitor warning area that may cause inundation.
  - Developed new methods for rainfall thresholds based on data-driven.

TEACHING EXPERIENCE

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

- Graded assignments.
- Taught undergraduate courses when needed.
- Prepared solutions for each assignment and supervised exams.

Environmental Engineering Sciences, University of Florida, Gainesville, FL
Guest Lecturer 2022
Course: **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).

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

- Graded assignments.
- Assisted invited speakers for each seminar.

MENTORING EXPERIENCE

- 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:
    - Florida JSHS (Junior Science and Humanities Symposium) State Recognition Award, 2024
    - First place in the computer science category at the 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, "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

SERVICE AND INVOLVEMENT

- **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

- **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 PyTorch based deep learning model to detect fake or real images.
  - ESSIE Poster Symposium, 2024 Link
    1. 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

- **Professional Member**
  - 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.

HONORS AND AWARDS

UF Postdoctoral Travel Award 2024
UF Postdoc Association and Postdoctoral Affairs (UFPDA) Award to support postdocs presenting their research at a national conference.

DFMLC Best Paper Award 2024
Provided by the Design for Manufacturing and Life Cycle Committee to **recognize the best paper** in the IDETC-CIE 2024 conference.

Florida AWMA Scholarship Award 2022
Provided by Florida Section Air & Waste Management Association (FLAWMA) for students who are excellent in academic coursework.

Don Maurer Memorial Scholarship Award 2022
Selected by the Department of Environmental Engineering Sciences (EES) at the University of Florida for achieving excellent academic research.

MSEC Student Travel Award 2022
Provided by NAMRC and MSEC for students to attend international academic conference, *International Manufacturing Science and Engineering Conference (MSEC)*, Purdue University, West Lafayette, Indiana, USA.

MSEC Student Travel Award 2021

Provided by NAMRC and MSEC for students to attend international academic conference, *International Manufacturing Science and Engineering Conference (MSEC), Virtual Conference.*

International Academic Conferences Scholarship 2018
Provided by the Research Center of Climate Change and Sustainable Development to attend international academic conference, *Asia Oceania Geosciences Society-European Geosciences Union Joint Conference (AOGS-EGU),* Tagaytay, Philippines.

International Academic Conferences Scholarship 2017
Provided by the Research Center of Climate Change and Sustainable Development to attend international academic conference, *The Conference of American Geophysical Union (AGU)*, New Orleans, United States.

International Academic Conferences Scholarship 2016
Provided by the Ministry of Science and Technology of Taiwan to attend international academic conference, *The Conference of European Geophysical Union (EGU)*, Vienna, Austria.

Kuo Hsi-Liu Foundation Scholarship 2016
Provided by the Kuo Hsi-Liu Foundation to excellent students for outstanding academic performance.

Chi-Sing Irrigation Association Scholarship 2015
Provided by the Chi-Sing Irrigation Association to excellent students for outstanding academic performance.

College Student Research Scholarship 2013
Provided by the Ministry of Science and Technology of Taiwan to support students in conducting independent study.

Academic Achievement Award 2013
Provided by the National United University to excellent students for outstanding academic performance during the spring semester of 2012.

Academic Achievement Award 2011
Provided by the National United University to excellent students for outstanding academic performance during the fall semester of 2010.

Academic Achievement Award 2011
Provided by the National United University to excellent students for outstanding academic performance during the spring semester of 2010.

PROFESSIONAL SKILLS

- **Programming:** Python, MATLAB, C++, HTML+CSS+JavaScript, PHP+MySQL
- **AI frameworks:** PyTorch, TensorFlow+Keras, Scikit-learn, OpenCV, Azure ML, cuML, AutoGluon
- **AI platforms:** Hugging Face, Kaggle
- **Cloud & HPC:** HiPerGator HPC, Google Cloud
- **Robotics:** ROS2, Gazebo, Moveit 2, Nav2, UR5e
- **Geospatial tools**: Google Map API, Leaflet, CesiumJS, QGIS, ArcGIS Pro

- **Environmental decision support tools:** Pcswmm 2006, EPA WARM, EPA SWMM
- **Others:** AutoCAD, Linux, Git, Anaconda

CERTIFICATIONS (drive.google.com/drive/folders/1D3ekFGfyw3T2Hb_KY_BYX9qOZZTsqu2h?usp=drive_link)

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

PROJECTS & OPEN-SOURCE CONTRIBUTIONS

- **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