YI-PING CHEN

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Digital Twins, virtual models of physical systems continuously updated with real-time data, are transforming how we design, monitor, and operate engineering systems by enabling real-time decision-making, system-level optimization, and operational resilience. Central to this paradigm are the predictive models of the systems that drive Digital Twins, yet a key challenge remains: How can we trust the decisions made by Digital Twins in engineering applications? My research addresses this challenge by designing machine learning (ML) and artificial intelligence (AI) frameworks that enhance the adaptability, interpretability, and uncertainty-awareness of Digital Twin systems. Guided by George Box's famous quote that "All models are wrong, but some are useful," my work seeks to answer: *How can we make imperfect models useful in a high-stake decision-making? How do we improve models over time to maintain the quality of prediction and decisions?* And *how can we learn and extract knowledge from the models?* By integrating AI-driven control, adaptive sampling, data-efficient modeling, and robust real-time optimization, I dedicate myself to the following research questions:

- How can we integrate information from low-fidelity simulations and high-fidelity experiments to accelerate and improve the efficiency and quality of engineering decisions?
- How can we enable real-time, uncertainty-aware decision-making in complex, multi-physics systems?
- How can models continuously learn from physical systems, adapt to uncertain environments, and ultimately improve machine intelligence?
- How can machine learning methods improve our understanding and control of complex physical systems?

EDUCATION

[E3] Dep. of Mech. Eng., Northwestern University — Sep. 2022 - Present
Ph.D. Candidate, expected to graduate in Jun. 2026 — Evanston, IL, US

- Advisor: Dr. Wei Chen
- Management for PhDs Certificate Program, Kellogg School of Management, Class of 2025 (Currently enrolled)
- Doctoral Cluster in Predictive Science and Engineering Design
- Research Interest: Modeling and decision-making in Digital Twin, adaptive sampling and Bayesian optimization, integrative & automated design with simulation + experiment, AI-aided optimization
- Dissertation: *Continuous Learning and Decision-Making for the Digital Twin of Engineering Systems*

[E2] Dep. of Mech. Eng., National Taiwan University (NTU) — Jul. 2018 - Jul. 2020
Master of Science — Taipei, Taiwan

- Advisor: Dr. Kuei-Yuan Chan
- Overall GPA: 4.18/4.3; graduate ranking 2/41 in the design division
- Thesis: *Optimal Uncertain Parameter Excitation and Estimation: a Case Study on Vehicle Model Development*
- Dean's award for outstanding master's thesis (top 5% among all graduates of School of Engineering)

[E1] Dep. of Mech. Eng., National Cheng Kung University (NCKU) — Sep. 2014 - Jun. 2018
Bachelor of Science, Phi Tau Phi — Tainan, Taiwan

- Overall GPA: 3.96/4; ranking 2/198 in the department
- Graduated with Phi Tau Phi Honor (top 1% academic performance in the College of Engineering)
- Dean's list (top 10% academic performance of the class in the academic year, three times)
- Undergraduate Research Advisor: Dr. Hong-Sen Yan
- Undergraduate Thesis: *Integrated Design of Gear Type Differential and AC Motor with Planetary Gear Train for Electric Vehicles*

EXPERIENCE

[X6] Integrated DEsign and Automation Lab (IDEAL), Northwestern Univ. Sep. 2022 - present
Ph.D. Student Evanston, USA

- Project: NSF Engineering Research Center for Hybrid Autonomous Manufacturing Moving from Evolution to Revolution (ERC-HAMMER)
  - Proposed a multi-fidelity data fusion and adaptive sampling method for global fitting and Bayesian Optimization with Latent Variable Gaussian Process (LVGP). Applications include melt pool geometry prediction for powder mixing in LPBF and polymer discovery.
  - Proposing frameworks for the real-time decision-making and online model updating for the Digital Twin of data-driven systems.
  - Proposing a multi-step model predictive control framework (MPC) and its uncertainty quantification for the Direct Energy Deposition (DED) machine using Time Series Dense Encoder (TiDE) and deep quantile learning.
  - Proposing a parameter- and data-efficient online model adaptation framework using Low-Rank Adaptation (LoRA) to enhance MPC's performance and online model validation.
  - Building physics-based surrogate model for sheet metal deformation and constructing its corresponding MPC using Transformer-based Deep Koopman Operator.
- Project: NSF Manufacturing ADvanced Electronics through Printing Using Bio-based and Locally Identifiable Compounds (MADE-PUBLIC)
  - Optimizing process parameters for the graphite-graphene exfoliation via Wet Jet Milling process using single- and multi-objective Bayesian optimization (BO) with Gaussian Process.
  - Optimizing the lasing parameters for ion-selective electrodes (ISEs) for laser-induced graphene (LIG) production using BO with Latent Variable Gaussian Process (LVGP).

[X5] National Chung-Shan Institute of Science & Technology (NCSIST) Jan. 2021 - Jun. 2022
Assistant Researcher, Control Law Team, Flight Control Group, Aeronautical Research Laboratory Taichung, Taiwan

- Built 6 Degree of Freedom (DoF) dynamic models with multi-body dynamics in Simulink
- Designed/validated nonlinear dynamic inversion (NDI) control laws on UAVs and fifth-generation fighter
- Implemented Model-based Design of software with Matlab System Qualification Toolkit
- Built a data processing GUI for analyzing flight test data, which saves more than 90% of effort on filtering noise and identifying eccentric values

[X4] Army of Republic of China (Taiwan) Sep. 2020 - Dec. 2020
Private, mandatory military service Kaohsiung, Taiwan

[X3] System Optimization Laboratory, NTU Jul. 2018 - Aug. 2020
Master's Student / Research Assistant (Part-time) Taipei, Taiwan

- Project: Validation and Verification of Machine Parameters in Dynamic Manufacturing Environment - Dynamic Parameter Calibration in Cyber-Physical Systems, sponsored by the Ministry of Science and Technology (MOST), Taiwan
- Built a 6 DoF three-wheeled vehicle model in Simulink
- Proposed a procedure of vehicle model calibration that decouples and estimates unknown model parameters via Global Sensitivity Analysis, optimization, and polynomial chaos-based Kalman Filter

[X2]Advance Power Research and Development Center, NTU Jul. 2018 - Jun. 2019
Research Assistant (Part-time), supervisor: Prof. Jung-Ho Cheng Taipei, Taiwan

- Project: Design of the X-by-wire EV Open Platform for AI Autonomous Driving R&D and XiL Validation Technique Development, sponsored by MOST
- Led a group to construct fail-safe strategies via System Theoretic Process Analysis (STPA), Failure Mode and Effect Analysis (FMEA), and Statistical process control
- Built and completed HiL testing platform for an autonomous vehicle

[X1] Creative Mechanism Design & Research Laboratory, NCKU Mar. 2016 - Jun. 2018
Undergraduate Research Assistant (Part-time) Tainan, Taiwan

- Designed a novel electric vehicle transmission subsystem by synthesizing a geared-motor, a reduction, and a differential covering conceptual and detailed design phases.

PEER REVIEWED JOURNAL PAPERS

[J7] Tsai, Y.-K., **Chen, Y.-P.**, Karkaria, V., Chen, W., "Control Co-Design for Digital Twin-enabled Systems with Deep Reinforcement Learning", *Journal of Mechanical Design*, under review.

[J6] Karkaria, V., **Chen, Y.-P.**, Tsai, Y.-K., Chen, W., "Digital Twin Framework for Predictive Maintenance: Tire Resource Optimization, Drift Detection, and Model Updates", *Journal of Computing and Information Science in Engineering*, under review.

[J5] **Chen, Y.-P.**, Tsai, Y.-K. Karkaria, V., Chen, W., 2025, "Uncertainty-Aware Digital Twins: Robust Model Predictive Control using Time-Series Deep Quantile Learning", *Journal of Mechanical Design*, under review. (DOI: 10.48550/arXiv.2501.10337).

[J4] **Chen, Y.-P.**, Karkaria, V., Tsai, Y.-K., Rolark, F., Quispe, D., Gao, R., Cao, J., Chen, W., (2025), "Real-Time Decision-Making for Digital Twin in Additive Manufacturing with Model Predictive Control using Time-Series Deep Neural Networks", *Journal of Manufacturing Systems*, 80(2025):412-424. (DOI:10.1016/j.jmsy.2025.03.009).

[J3] Karkaria, V., Tsai, Y.-K., **Chen., Y.-P.**, and Chen, W., (2024), "An Optimization-Centric Review for Integrating AI and Digital Twin Technologies in Manufacturing", *Engineering Optimization*, 57(1):1-47, (DOI: 10.1080/0305215X. 2024.2434201).

[J2] **Chen, Y.-P.**, Wang, L., Comlek, Y., and Chen, W., 2024, "A Latent Variable Approach for Non-Hierarchical Multi-Fidelity Adaptive Sampling ", *Computer Methods in Applied Mechanics and Engineering*, 421 (2024) 116773. (DOI: 10.1016/j.cma.2024.116773).

[J1] **Chen, Y.-P.**, and Chan, K.-Y., 2021, "Unknown Parameter Excitation and Estimation for Complex Systems with Dynamic Performances," *Journal of Mechanical Design*, 143(9):1-25, 2021. (DOI: 10.1115/1.4050107)

REFEREED FULL-LENGTH CONFERENCE PAPER

[C6] **Chen, Y.-P.**, Tsai, Y.-K. Karkaria, V., Chen, W., 2025, "Uncertainty-Aware decision-making for Digital Twin in Additive Manufacturing: Robust Model Predictive Control using Time-Series Deep Quantile Learning", *Proceedings of the 2025 ASME International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDETC-CIE).* Anaheim, California. August 17–20, 2025.

[C5] Dewberry, N. K., AlHmoud, I., Benton, K., Suarez, D., **Chen, Y.-P**, Karkaria, V., Tsai, Y.-K., Brock, M., Alazzawi, N., Chowdhury, S., Chen, W., Cao, J., Gokaraju, B., 2024, "A Real-Time VR-Enabled Digital Twin Framework for Multi-User Interaction in Industry 4.0," *Manufacturing Letter, Proceeding of 53rd SME North American Manufacutring Research Conference (NAMRC)*, June 23 - 27, 2025, Clemson, USA.

[C4] **Chen, Y.-P.**, and Chan, K.-Y., 2020, "Designing Excitation Maneuvers With Maximal Parameter Sensitivity for an X-by-Wire Autonomous Tricycle," *Proceedings of the 2020 ASME International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDETC-CIE).*. Virtual, Online. August 17–19, 2020. V11BT11A025. ASME. (DOI: 10.1115/DETC2020-22257)

[C3] **Chen, Y.-P.**, and Chan, K.-Y., 2020, "A Model Validation Approach: Designing Excitation Operation via Simulation-based Global Sensitivity Analysis," the 37th Chinese Society of Mechanical Engineers Conference, Yunlin, Taiwan, 16-17 Nov.

[C2] **Chen, Y.-P.**, and Chan, K.-Y., 2020, "Excitation and Estimation of Unknown Model Parameters in a Vehicle System," the 37th Chinese Society of Mechanical Engineers Conference, Yunlin, Taiwan, 20-24 Oct.

[C1] **Chen, Y.-P.**, and Yan, H.-S., 2018, "Integrated Design of Gear Type Differential and AC Motor with Planetary Gear Train for Electric Vehicles," 21th Conference on The Chinese Society of Mechanism and Machine Theory. Taipei, Taiwan, 11-12 Dec.

PRESENTED CONFERENCE PAPER WITH ABSTRACT SUBMISSION

[P8] Wang, Z., Dolar, T., **Chen, Y.-P.**, Chen, W., Adaptive Collaborative Bayesian Optimization With Resource-Aware Sampling, *ASME 2025 International Design Engineering Techical Conferences and Computer and Information in Engineering Conference.*

[P7] Lee, S, **Chen, Y.-P.**, Tsai, Y.-K., Chen, W., Enhancing Model Predictive Control for Digital Twins via Fully Differentiable Policy Learning, *ASME 2025 International Design Engineering Techical Conferences and Computer and Information in Engineering Conference.*

[P6] **Chen, Y.-P.**, Tsai, Y.-K., Karkaria, V. N., and Chen, W., 2025, "Uncertainty-Aware Digital Twin: a Simultaneous Multistep Robust Model Predictive Control for Additive Manufacturing ", *18th US National Congress on Computational Mechanics.* Chicago, July 20–24, 2025.

[P5] **Chen, Y.-P.**, Karkaria, V., Tsai, Y.-K., Rolark, F., Quispe, D., Gao, R., Cao, J., Chen, W., (2025), "Real-Time Decision-Making for Digital Twin in Additive Manufacturing with Model Predictive Control using Time-Series Deep Neural Networks", *53rd SME North American Manufacturing Research Conference (NAMRC)*, June 23 - 27, 2025, Clemson, USA. (Submission was recommended for fast-tracking to the Journal of Manufacturing Systems).

[P4] **Chen, Y.-P.**, Tsai, Y.-K., Karkaria, V. N., and Chen, W., 2024, "Multi-step Robust Model Predictive Control with Time-series Learning and Quantile Regression", *ASME International Design Engineering Technical Conferences and Computers and Information in Engineering Conference.* Washington D.C., August 25–28, 2024. ASME.

[P3] **Chen, Y.-P.**, Wang, L., Comlek, Y., Chen, W., 2023, "A Unified Adaptive Sampling Framework for Multi-Fidelity Modeling and Bayesian Optimization via Latent Variable Gaussian Process", *2023 Society of Engineering Science (SES) Annual Technical Meeting*, Minnesota, USA, 8-11 Oct.

[P2] **Chen, Y.-P.**, Wang, L., Comlek, Y., Chen, W., 2023, "Data Fusion of Multi-fidelity Systems via Latent Variable Gaussian Process for Active Learning Applications", *2nd IACM Mechanistic Machine Learning and Digital Engineering for Computational Science Engineering and Technology*, El Paso, Texas, USA, 23-27 Sep.

[P1] **Chen, Y.-P.**, Chen, Y.-H., and Yan, H.-S., 2019, "The Innovation Concept Designs of Mechanisms for Variable Compression Ratio Engine," 22th International Conference on Advances in Materials and Processing Technology. Taipei, Taiwan, 16-17 Nov.

PUBLICATIONS UNDER PREPARATION

Journal Article:

[Pr1] Karkaria, V., Lee, D, **Chen, Y.-P.**, Tsai, Y.-K., Li, Y., Yu, Y., Chen, W., "A Neural Operator for Manufacturing: Spatio-Temporal Learning with Uncertainty Awareness", *Computer Method for Applied Mechanics and Engineering*, will be submitted in May, 2025.

[Pr2] Sang, Z., **Chen, Y.-P.**, Chen, W., Wagner, G., "Multi-Fidelity Bayesian Optimization for the Powder Mixing of Laser Powder Bed Fusion", *To Be Determined*, will be submitted in July, 2025.

[Pr3] Suraz, D., **Chen, Y.-P.**, Karkaria, V., Tsai, Y.-K., Chen, Z., Hu, G., Guo, P., Chen, W., Cao, J., "A Digital Twin of the Sheet Metal Forming via English Wheel (Temp.)", *To Be Determined*, will be submitted in August, 2025.

[Pr4] **Chen, Y.-P.**, Khalaj, M., Zhou, Y., Chaney, L, Hui, J., Dunn, J., Chen, W., Hersam, H., "LCA and TEA-guided Bayesian Optimization of High Throughput Graphene Ink Production via Wet Jet Milling", *SMALL*, will be submitted in Sep, 2025.

[Pr5] **Chen, Y.-P.**, Karkaria, V., Tsai, Y.-K., Chen, W., "Online Model Adaptation with Parameter Efficient Fine-Tuning for the Real-Time Decision-Making of Digital Twins (Temp.)", *Engineering Application of Artificial Intelligence*, planned to be submitted in Sep, 2025.

[Pr6] **Chen, Y.-P.**, Karkaria, V., Tsai, Y.-K., Chen, W., "A Review on the Real-Time Decision-Making of Digital Twins: Machine-Learning Supported Optimization, Control, Adaptation, and Continuous Learning (Temp.)", *Structural and Multidisciplinary Optimization*, planned to be submitted in Oct, 2025.

Book:

[Pr7] Chen, W., Karkaria, V., **Chen, Y.-P.**, Tsai, Y.-K., "AI-Driven Digital Twin for Smart Manufacturing and Sustainable Remanufacturing (Temp.)", *Wiley*, expected to be published in 2027.

ACADEMIC ACHIEVEMENTS AND AWARDS

[A13] **Outstanding (Best) Paper Award**, North American Manufacturing Research Conference (NAMRC), 2025
Selected as the best paper in Manufacturing Systems at NARMC 53 out of over 1,000 submissions. *merit-based*

[A12] **HIWIN Master's Thesis Award, Honorable Mention Award**, HIWIN, 2021
Awarded the 17th HIWIN Master's Thesis Award, the highest master's thesis award in M.E. field in Taiwan, with $3,500 USD, *merit-based*

[A11] **Dean's Award for Outstanding Master's Thesis**, College of Engineering, National Taiwan University, 2020
Selected as the top 5% outstanding master's thesis among the College of Engineering, *merit-based*

[A10] **Best Paper Award at Matlab Expo, Taiwan**, Matlab, 2020
Also got invited to be a keynote speaker at Matlab Expo 2020, Taiwan, *merit-based*

[A9] **1st Place in Master Thesis Award**, Chinese Society of Mechanical Engineering (CSME), 2020, *merit-based*

[A8] **Outstanding Teaching Assistant**, National Taiwan University, 2020
Being invited as a speaker at NTU TA workshop, *teaching- & service-based*

[A7] **Phi Tau Phi Member**, Phi Tau Phi Scholastic Honor Society of the Republic of China, 2018
Awarded the honorable membership by ranking 1% of the College of Engineering. *merit-based*

[A6] **Award of Student Engineering Paper Competition**, Chinese Institute of Engineering, 2018, *merit-based*

[A5] **National Electric Vehicle Innovation Design and Construction Competition: 2nd in racing section, 3rd in technical report section**, SAEV.Taiwan, 2018, *merit-based*

[A4] **Young College Elite of NCKU**, China Youth Corps, 2017
Selected 2/12000 for significant contribution in service and dedication to campus, *teaching- & service-based*

[A3] **Gold Medalist and Ford Special Award on Capstone Project Competition**, Dep. of ME, NCKU, 2017, *merit-based*

[A2] **Outstanding Engineering Mechanics Elite Award**, China Engineering Consultants, Inc., 2016
Selected as 6 out of 60 participants of the Engineering Mechanics Elite Camp based on presentations/oral defense, and intellectual contributions. *merit-based*

[A1] **Dean's List**, National Cheng Kung University, 2016 - 2019
Selected as performing the top 10% of the class for 3 academic years. *merit-based*

GRANTS AND FELLOWSHIPS

[F12] **Taiwan-Northwestern University Scholarship**, The Ministry of Education in Taiwan, 2022-2026
Awarded with funding for half of the expenses of doctoral study for four years. *merit-based*

[F11] **Martin Outstanding Doctoral Fellowship**, Department of Mechanical Engineering, Northwestern University, 2025
Selected as one of the four recipients out of the entire department for this mid-career fellowship, awarded for stipends and tuition for six months, *merit-based*

[F10] **Travel Grant**, The Graduate School, Northwestern University, 2025
Awarded funding to support travel for research presentation at ASME IDETC-CIE 2025, *merit-based*

[F9] **Travel Grant**, National Science Foundation, 2025
Awarded funding to support travel for research presentation at NAMRC 53, *merit-based*

[F8] **Travel Grant**, U.S. National Congress on Computational Mechanics, 2025
Awarded funding to support travel for research presentation at USNCCM 18. *merit-based*

[F7] **Predictive Science & Engineering Design Fellow**, The Graduate School, Northwestern University, 2023
Awarded for full Ph.D. expense coverage for one year. *merit-based*

[F6] **Travel Grant**, National Science Foundation, 2023
Awarded funding to support travel for research presentation at 2nd IACM MMLDE-CSET conference, *merit-based*

[F5] **Leon M. Keer and Family Fellowship**, Department of Mechanical Engineering, Northwestern University, 2023
Awarded for family support, *need-based*

[F4] **Walter-Murphy Scholarship**, The Graduate School, Northwestern University, 2022
Awarded for outstanding Ph.D. applicants, supporting Ph.D. expense coverage for one year. *merit-based*

[F3] **Recruiting Fellowship of NCSIST**, NCSIST, 2019
Providing monthly stipend of $650 USD (8 months) and reserved full-time R&D engineer position after graduation, *merit-based*

[F2] **Scholarships for outstanding academic performance**, Dept. of ME, NCKU, 2015 - 2019 (six times), *merit-based*

[F1] **Undergraduate Research Fellowship**, Ministry of Science and Technology, Taiwan, 2017
Funded the stipend for undergraduate research under the supervision of Dr. Hong-Sen Yan. *merit-based*

GRANT PROPOSAL WRITING

[G3] Sustainable Recovery of Rare Earth Metals from Decommissioned Wind Turbines Jan. 2025
Funded by Department of Energy (DOE) *Pending*

[G2] Foundation Models and Decisions for Digital Twins as a Learning System Sep. 2024
2025 Vannevar Bush Faculty Fellowship (VBFF), $300,000 for 5 years *Rejected*

[G1] Enhancing Product and Process through Model Predictive Control in the Digital Twin of Directed Energy Deposition (DED) Additive Manufacturing Aug. 2023
Predictive Science and Engineering Design Cluster, Northwestern University *Funded*

TEACHING EXPERIENCE

[T6] Computational Methods for Engineering Design (2025 Winter, NU, Grader), undergraduate/graduate-level.

[T5] Gaussian Process and Bayesian Optimization, research group orientation (2024 Fall, NU, Lecturer), graduate-level.

[T4] Engineering Optimization for Product Design and Manufacturing (2023 Winter, NU, Grader), graduate-level.

[T3] Statistical Mechanics (2023 Fall, NU, Grader), graduate-level.

[T2] Introduction to Civic Education (2020 Spring, NTU, TA), undergraduate course given by NTU D-school

[T1] Optimization in Engineering (2019 Fall, NTU, TA), graduate-level course given in English

PROFESSIONAL DEVELOPMENT COURSES

- 2025 Winter - Preparing for a Life in Academia (ISE 6970, Oklahoma University), given by Dr. Farrokh Mistree, virtual participation
- 2023 Spring - Professional Essentials (ME 513)

ACADEMIC MENTORSHIP

[M2] Research Mentorship

- Seul Lee, Ph.D. student, Sep. 2025 - current, Junior Ph.D. research mentorship on AI-based and AI-aided decision-making in Digital Twin.
- Prarthana Chakrabarti, MS, Mar. 2024 - Jun. 2024, Graduate research assistant, *Constrained Time-series based Model Predictive Control*

- Christopher Luey, BS, Sep. 2023 - Dec. 2023, Undergraduate research assistant, *A GUI of Bayesian Optimization using Gaussian Process*
- Jin-Yi Li, MS, mentorship on completing his master thesis, Jan. 2021 - Jun. 2021, *A Composite Similarity Index in Analysis and Quantification of Two-dimensional Trajectories*
- Chun-Han Lin, BS, Undergraduate research assistant, Dec. 2018 - Jun. 2019, *Simulation of vehicle dynamics considering joint tolerance using ADAMS*

[M1] Graduate School Application Mentorship Sep. 2022 - present

I have been serving as a graduate program application mentor since 2022 under the Taiwanese Young Researcher Association (TYRA). Most of the students I mentored were either connected from TYRA or my academic siblings. I help proofread application materials, connecting them to other Ph.D. students, and mock interviews

- Yu-Lin Chen, May. 2024 - current, committed to Ph.D. program in Mechanical Engineering at Texas A&M.
- Cheng-Wei Wang, Aug. 2024 - current, applying for Ph.D. program in 2025 Fall in Aerospace.
- Jing-Yin Lin, Aug. 2024 - current, applying for Ph.D. degree in 2025 Fall in Material Science/Chemistry.
- Tzu-Yuan Huang, July. 2022 - Dec. 2022, committed to Ph.D. program in School of Computation, Information and Technology at Technical University of Munich.
- Wei-Chen Tseng, Sep. 2022 - Dep. 2022, committed to Ph.D. program in Computer Science at University of Texas in Austin.
- Leo (Yuan-Mao) Lee, Sep. 2022 - Dec. 2022, committed to Ph.D. program in Material Science and Engineering, Stanford University.
- Emma (Yi-Chen) Lin, Sep. 2022 - Dec. 2022, committed to M.Eng. program in Biomedical Engineering at Duke University.

ACADEMIC SERVICES: PEER REVIEW JOURNALS AND PROCEEDINGS

- 2025, International conference on Time Series and Forecasting (Subreviewers)
- 2024, North American Manufacturing Research Conference (Subreviewers)
- 2024 - *current* Structural and Multidisciplinary Optimization
- 2023 - *current*, Computational Methods for Applied Mechanics and Engineering
- 2021 - *current*, Reliability Engineering & System Safety
- 2020 - *current*, Applied Mathematical Modelling

LANGUAGES AND SKILLS

Language	Mandarin (Native), English (Fluent, TOEFL: 106/120)
Software	Matlab, Simulink, ADAMS, Solidworks
Programming	Python, R
Technical Strength	Optimization, Metamodel techniques, Design Under Uncertainty, Design & Analysis of Computer Experiment (DACE), Nonlinear Dynamic Inversion, Multi-Fidelity Methods, Machine learning/Deep learning (Pytorch) Model Predictive Control and Real-Time Decision-Making
Hobbies	Music: A drummer in worship teams for more than 10 years, Harmonica Sport: High school basketball team, still a lock-down defender and a shooter Hobbies: Culinary, Photography

LEADERSHIPS & EXTRACURRICULAR ACTIVITIES

[L10] Chair of Marketing and Networking, AI@NU Graduate Student Group Feb. 2025 - Current

- Inviting external speakers and hosting webinars to nurture the AI research and development environment at Northwestern University.

[L9] Peer Mentor, English Language Program July. 2023 - Aug. 2024

- Mentored incoming international Ph.D. students through a 5-week online program for two cycles, prepared them for a smooth transition to Northwestern.
- Interacted with incoming students via commenting and responding to their assignments, hosting info sessions and open chats, and in-person companion (airport pickup, lunch, campus tour) as soon as the mentee arrived.

[L8] Student Chair, Predictive Science & Engineering Design (PSED) Fellows Sep. 2023 - Jun. 2024

- Coordinated progress presentations to and organized social events to foster student engagement and collaboration.

[L7] President, Northwestern Taiwanese Student Association Feb. 2023 - Feb. 2024

- Initiated and led a mentoring and orientation program for incoming graduate students, providing guidance, building peer connections, and facilitating a smooth transition into the academic environment.
- As the representative of the Taiwan Northwestern Scholarship recipients, I collaborated with The Graduate School (TGS), the Foreign Tax Team (FN Tax), and the Office of International Student and Scholar Services (OISS) to address an erroneous tax withholding issue related to foreign funding. After a year of persistent advocacy and coordination, I successfully facilitated the resolution of the issue and contributed to the implementation of a robust system to prevent similar errors in the future for all foreign-funded students.

[L6] Co-Founder & CEO, NCKU Student Formula Racing Team Sep. 2017 - Jun. 2018

- Founded and led an electronic vehicle racing team of 20 members with solid leadership and project management skills
- Built our first race car in a year and raised funds of more than $6000 USD
- Won 2nd place in racing section and 3rd place in technical report section in a national competition

[L5] Vice President, United Department Association (UDA), NCKU Jul. 2017 - Jun. 2018

- Served as a student representative, actively advocating for students' rights and interests through policy discussions, institutional engagement, and collaborative problem-solving at the campus-level.
- Held 11th NCKU Bicycle Festival, the largest department & school expo for high schools in southern Taiwan, with 20,000 participants from all over Taiwan

[L4] President, Student Association of Mechanical Engineering (MESA), NCKU Jul. 2016 - Jun. 2017

- Launched 2 technical clubs with industry sponsors Kymco (Motorcycle Club) and Syntex (Robotic Club)
- Successfully negotiated with the Bureau of Transportation, Tainan City Government, to secure 300 parking spots for the M.E. department building, significantly improving accessibility for students and faculty

[L3] Chair & Instructor, NCKU Harmonica Club Jul. 2015 - Jun. 2016

- Gave lessons and led practices on harmonica quartet and group ensembles
- Won the champion in both harmonica quartet and small group ensemble in college group, National Student Music Competition, 2016
- Held 8th NCKU Harmonica Cup – a major competition for harmonica lovers in Taiwan

[L2] Oversea Learning

- 2023 Semicon @ Tokyo, visitor, sponsored by HIWIN Corp.
- 2018 Enterprise Visits @ Chengdu, China, sponsored by NTU.
- 2017 Business investigation and visits @ Vietnam, sponsored by Syntex Corp.
- 2016 JIMTOF Student attendee selected and sponsored by HIWIN Corp.
- 2014 Short-term Overseas Exchange @ Beihang University, Beijing, China

[L1] Summer Camps

- Held several camps on leadership training in NCKU
- Participated in bilingual camp with Village Gospel Mission and NCKU campus fellowship for the rural kids in Yulin, the poorest region in Taiwan