

Wei-Hsi Chen PH.D.

Robotist | Mechanical/Electrical Engineer

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EDUCATION AND TRAINING

POSTDOCTORAL ASSOCIATE	University of Pennsylvania, ELECTRICAL AND SYSTEMS ENGINEERING	AUGUST 2022 - PRESENT
PH.D.	University of Pennsylvania, ELECTRICAL AND SYSTEMS ENGINEERING	AUGUST 2022
M.S.	University of Pennsylvania, ROBOTICS	AUGUST 2022
M.S.	National Taiwan University, MECHANICAL ENGINEERING, SYSTEM AND CONTROL DIVISION	JUNE 2013
B.S.	National Taiwan University, MECHANICAL ENGINEERING	JUNE 2011

HONORS AND AWARDS

- Finalist for the Penn Postdoctoral Association Mentorship Awards, 2025.
- Honorable mention for 2023 IEEE Transactions on Robotics King-Sun Fu Memorial Best Paper Award (paper [J6]).
- IEEE ICRA Best Video Award Finalist (paper [C2]), 2014.
- Application of the Year Award, National Instruments Taiwan, 2013.
- Advanced Control Systems Finalist in Graphical System Design Award, National Instruments Taiwan, 2013.
- 2nd place, Master's Thesis Award, Robotics Society of Taiwan, 2013.
- College Student Research Creativity Award, Ministry of Science and Technology, Taiwan, 2011.
- Scholarship, The Taiwan Society for Metal Heat Treatment, Taiwan, 2010.

PUBLICATIONS

PEER-REVIEWED JOURNAL PAPERS

- [J8] (In Prep) **W.-H. Chen**, K. Liu, K. Xu, S. Zang, C. Sung, and G. H. Paulino, "Unfolding the intelligence in origami robots," manuscripts in preparation to submit to Annual Review.
- [J7] (In Prep) **W.-H. Chen**, D. W. Kim, C. Sung, and D. E. Koditschek, "Scaling Robots for Dynamically Similar Tasks Across Sizes," manuscripts in preparation.
- [J6] **W.-H. Chen**, W. Yang, L. Peach, D. E. Koditschek, and C. Sung, "Kinegami : Algorithmic Design of Compliant Kinematic Chains From Tubular Origami," *IEEE Transaction on Robotics*, 2022, doi : 10.1109/TRO.2022.3206711.
- [J5] Y.-J. Lee, S. Misra, **W.-H. Chen**, D. E. Koditschek, C. Sung, and S. Yang, "Tendon-Driven Auxetic Tubular Springs for Resilient Hopping Robots," *Advanced Intelligent Systems*, 2100152. 2021.
- [J4] **W.-H. Chen**, S. Misra, Y. Gao, Y.-J. Lee, D. E. Koditschek, S. Yang and C. Sung, "A Programmably Compliant Origami Mechanism for Dynamically Dexterous Robots," *IEEE Robotics and Automation Letters*, Jan. 2020.
- [J3] **W.-H. Chen**, H.-S. Lin, Y.-M. Lin and P.-C. Lin, "TurboQuad : A Novel Leg-Wheel Transformable Robot with Smooth and Fast Behavioral Transitions," *IEEE Transactions on Robotics*, vol. 33, no. 5, pp. 1025-1040, Oct. 2017.
- [J2] S.-C. Chen, K.-J. Huang, **W.-H. Chen**, S.-Y. Shen, C.-H. Li, and P.-C. Lin, "Quattroped : A Leg-Wheel Transformable Robot," *IEEE/ASME Transactions on Mechatronics*, vol. 19, no. 2, pp. 730-742, Apr. 2014.
- [J1] **W.-H. Chen**, C.-P. Chen, J.-S. Tsai, J. Yang, and P.-C. Lin, "Design and implementation of a ball-driven omnidirectional spherical robot," *Mechanism and Machine Theory*, vol. 68, pp. 35-48, Oct. 2013.

PEER-REVIEWED CONFERENCE PUBLICATIONS

- [C12] (In Prep) **W.-H. Chen**, S. Misra, A. Zhou, S. Abramovitz, and C. Sung, "Control strategy for a Multiscale Actuation Tunable Stiffness Arm," in prep.
- [C11] (In Prep) **W.-H. Chen**, D. W. Kim, X. Qi, L. Fabricant, H. Westfall, V. Gong, and C. Sung, "Codesigning the gripper and controller of a quadrupedal robot walking through monkey-bar terrain," in prep.

- [C10] R. Chen, J. Kwon, K. Wu and **W.-H. Chen**, “Tunable Stiffness for Energy-Efficient Vertical Hopping in a Monopedal Robot Across Varying Ground Profiles,” in *2025 IEEE International Conference on Robotics and Automation (ICRA)*, 2025.
- [C9] D. A. Feshbach, **W.-H. Chen**, D. E. Koditschek and C. R. Sung, “Kinegami : Open-source Software for Creating Kinematic Chains from Tubular Origami,” in *Eighth International Meeting on Origami in Science, Mathematics, and Education (8OSME)*, 2024.
- [C8] R. Chen, J. Kwon, **W.-H. Chen** and C. F. Sung, “Design and Characterization of a Pneumatic Tunable-Stiffness Bellows Actuator,” in *2024 IEEE International Conference on Soft Robotics (RoboSoft)*, 2024.
- [C7] D. A. Feshbach, **W.-H. Chen**, L. Xu, E. Schaumburg, I. Huang and C. R. Sung, “Algorithmic Design of Kinematic Trees Based on CSC Dubins Planning for Link Shapes,” in *International Workshop on the Algorithmic Foundations of Robotics (WAFR)*, 2024.
- [C6] A. Carter, **W.-H. Chen**, S. Misra and C. Sung, “A Task-to-Intelligence Mapping : When is embodied intelligence worth designing?” In *IOP Conference Series : Materials Science and Engineering*, vol. 1292, no. 1. IOP Publishing, 2023.
- [C5] **W.-H. Chen**, S. Misra, J. D. Caporale, D. E. Koditschek, S. Yang and C. Sung, “A Tendon-Driven Origami Hopper Triggered by Proprioceptive Contact Detection,” in *2020 3rd IEEE International Conference on Soft Robotics (RoboSoft)*, Apr. 2020.
- [C4] G. Kenneally, **W.-H. Chen**, and D. E. Koditschek, “Actuator Transparency and the Energetic Cost of Proprioception,” in *International Symposium on Experimental Robotics (ISER)*, Buenos Aires, Argentina, 2018.
- [C3] H.-S. Lin, **W.-H. Chen**, and P.-C. Lin, “Model-based dynamic gait generation for a leg-wheel transformable robot,” in *2015 IEEE International Conference on Robotics and Automation (ICRA)*, 2015, pp. 5184-5190.
- [C2] **W.-H. Chen**, H.-S. Lin, and P.-C. Lin, “TurboQuad : A leg-wheel transformable robot using bio-inspired control,” in *2014 IEEE International Conference on Robotics and Automation (ICRA)*, 2014, pp. 2090-2090.
- [C1] **W.-H. Chen**, C.-P. Chen, W.-S. Yu, C.-H. Lin, and P.-C. Lin, “Design and implementation of an omnidirectional spherical robot Omnicron,” in *2012 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, 2012, pp. 719-724.

WORKSHOPS AND POSTERS

- [W5] D. A. Feshbach, E. Schaumburg, **W.-H. Chen**, C. Sung, “Generalized Gimbal Construction : Algorithmic Design of Kinematic Chains with No Self-Collision in Any Configuration,” in the *Late Breaking Results*, held in *2025 IEEE International Conference on Robotics and Automation (ICRA)*, Atlanta, US.
- [W4] **W.-H. Chen**, J. D. Caporale, D. E. Koditschek, and C. R. Sung, “Robogami Reveals the Utility of Slot-Hopper for Co-Design of DOQ’s Body and Behavior,” in the workshop : *Workshop on Co-design in Robotics : Theory, Practice, and Challenges*, held in *2024 IEEE International Conference on Robotics and Automation (ICRA)*, Yokohama, JP.
- [W3] **W.-H. Chen**, X. Qi, D. Feshbach, S. J. Wang, D. Kuang, R. Full, D. Koditschek, and C. R. Sung, “Bio-inspired quadrupedal robot with passive paws through algorithmic origami design,” in the workshop : *Soft Robotics Inspired Biology Workshop*, held in *2024 IEEE-RAS International Conference on Soft Robotics (RoboSoft)*, San Diego, US.
- [W2] **W.-H. Chen**, S. Rozen-Levy, G. Addison, L. Peach, D. E. Koditschek, and C. R. Sung, “DOQ : A Dynamic Origami Quadrupedal Robot,” in the workshop : *Origami-based structures for designing soft robots with new capabilities*, held in *2023 IEEE International Conference on Robotics and Automation (ICRA)*, London, UK.
- [W1] **W.-H. Chen**, W. Yang, L. Peach, D. E. Koditschek, and C. R. Sung, “Kinegami : Algorithmic Design of Compliant Kinematic Chains from Tubular Origami,” in the workshop : *Computational design of soft robots (CD-SoRo)*, held in *2022 IEEE RSJ International Conference on Intelligent Robots and Systems (IROS)*, Kyoto, JP.

TEACHING EXPERIENCE

INSTRUCTOR UNIVERSITY OF PENNSYLVANIA

- (MEAM 5200, GRADUATE) INTRODUCTION TO ROBOTICS (Co-Instructor)

FALL 2022

TEACHING ASSISTANT NATIONAL TAIWAN UNIVERSITY

- (UNDERGRAD) MEASUREMENT AND MECHANICAL ENGINEERING LAB
(As a TA/Lab Instructor, I developed and taught laboratory experiments to over 190 students.)

AY 2014 - 15

TEACHING ASSISTANT UNIVERSITY OF PENNSYLVANIA

- **(ROB4X, EdX ONLINE COURSE) LOCOMOTION ENGINEERING** AY 2016 - 17
(As TA I developed a sub-module of the course.)
- **(ESE 210, UNDERGRAD) INTRODUCTION TO DYNAMIC SYSTEMS** FALL 2017
- **(ESE 512, GRADUATE) DYNAMICAL SYSTEMS FOR ENGINEERING & BIOLOGICAL APPLICATIONS** FALL 2016

MENTORSHIP UNIVERSITY OF PENNSYLVANIA

* = publication published , ‡ = publication in preparation

- **MECHANICAL ENGINEERING AND APPLIED MECHANICS** : Rosalind Shinkle (M.S., 2019), Chun Chang (M.S., 2021), Lucien Peach* (M.S., 2023), Griffin Addison (submatriculated, 2024), Lindsay Fabricant† (B.S.), Vanessa Gong† (B.S.), Sophie Abramovitz† (B.S.), Henry WestFall† (B.S.).
- **ROBOTICS** : Shivangi Misra* (M.S. 2020), Woohyeok Yang* (M.S., 2021), Ronngqian Chen* (M.S., 2023), Dong Wook Kim† (M.S., 2024), Solomon Gonzalez (M.S., Expected 2026), Dhyey Shah (M.S., Expected 2026), Ken Suzuki (M.S., Expected 2027).
- **COMPUTER SCIENCE** : Yiyu Wu (M.S., 2023).
- **ELECTRICAL AND SYSTEMS ENGINEERING** : Chen Ze Dong, Jerrell K. Walker, Ronald Moore, Scarlett Luis, and Yixing Du (B.S., 2016), Xueyang Qi (M.S. 2024)

OUTREACH

ARTIST RESIDENCY PROGRAM UNIVERSITY OF PENNSYLVANIA 2021

- Offered mentorship to an artist on how to incorporate engineering technologies into her arts.

MOVIE TECHNICAL CONSULTANT NEW YORK, NY 2019 - 2020

- Served as a robotics consultant and operator for the sci-fi movie, *Lapsis*, directed by Noah Hutton.

RESEARCH EXPERIENCE WITH TEACHERS (NSF PROGRAM) UNIVERSITY OF PENNSYLVANIA AY 2016 – 18

- Offered mentorship to middle school teachers on learning about and conducting research in the field of robotics and engineering.
- Assisted in developing a curriculum that is then applied in the classroom to inspire the students to learn about and develop skills in engineering and science.

GRASP REPRESENTATIVE (ORGANIZING AND DEMOING)

- **INTERNATIONAL CONFERENCE ON ROBOTICS AND AUTOMATION DEMO**, Philadelphia, PA 2022
- **PHILADELPHIA SCIENCE FESTIVAL CARNIVAL**, Philadelphia, PA 2019
- **USA SCIENCE & ENGINEERING FESTIVAL**, Washington, DC 2016

FIRST LEGO LEAGUE CHALLENGE JUDGE (PENNFLR REGION CHAMPIONSHIP) PHILADELPHIA, PA 2016 - 2018

- Robot Design Judge (2016), Core Values Judge (2017), Robot Design Judge (2018)

ACADEMIC SERVICE

REVIEWER FOR

- **Journal** : IEEE Transactions on Robotics (T-RO), IEEE Transactions on Mechatronics (TMECH), IEEE Robotics and Automation Letters (RA-L), IOP Bioinspiration & Biomimetics, IOP Smart Materials and Structures, Springer Autonomous Robots, Hindawi Complexity
- **Conference proceeding** : IEEE International Conference on Robotics and Automation (ICRA), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Robotics : Science and System (RSS), IEEE International Conference on Soft Robotics (RoboSoft), IEEE RAS/EMBS International Conference of Biomedical Robotics & Biomechatronics (BioRob), ACM/IEEE International Conference on Human-Robot Interaction (HRI), IFRR International Symposium on Experimental Robotics (ISER), International Symposium on Robotics Research (ISRR).

PRE-EVALUATION ADMISSIONS COMMITTEE

- University of Pennsylvania, Electrical and Systems Engineering, admission cycle 2024-2025.