

## Education

University of Michigan	Robotics	Ph.D	2020 – 2024
University of Michigan	Robotics	M.S.	2018 – 2020
National Taiwan University	Mechanical Engineering	B.S.	2013 – 2017

## Professional Career

<b>Postdoctoral Associate</b> Biomimetic Robotics Lab Advised by Dr. Sangbae Kim Massachusetts Institute of Technology, Cambridge, MA, USA	Mar. 2025 – Present
<b>Graduate Student Research Assistant</b> Computational Autonomy and Robotics Laboratory Advised by Dr. Maani Ghaffari University of Michigan, Ann Arbor, Michigan, USA	May 2020 – Dec. 2024
<b>Applied Scientist Intern</b> Amazon Robotics AI Seattle, Washinton, USA	Jun. 2022 – Sep. 2022
<b>Graduate Student Instructor</b> NAVARCH/EECS 568/ROB 530: Mobile Robotics: Methods and Algorithms with Dr. Maani Ghaffari University of Michigan, Ann Arbor, Michigan, USA	Jan. 2022 – Apr. 2022
<b>Graduate Student Research Assistant</b> Biped Robotics Laboratory, advised by Dr. Jessy Grizzle Perceptual Robotics Laboratory, advised by Dr. Ryan Eustice & Dr. Maani Ghaffari University of Michigan, Ann Arbor, Michigan, USA	Jan. 2019 – Apr. 2020
<b>Graduate Student Instructor</b> NAVARCH/EECS 568/ROB 530: Mobile Robotics: Methods and Algorithms University of Michigan, Ann Arbor, Michigan, USA	Jan. 2020 – Apr. 2020
<b>Teaching Assistant</b> National Taiwan University, Taipei, Taiwan	Aug. 2017 – Jul. 2018
<b>Intern</b> Industrial Technology Research Institute, Hsinchu, Taiwan	Jul. 2016 – Aug. 2016
<b>Intern</b> Abbott Vascular, Taipei, Taiwan	Jul. 2015 – Oct. 2015

## Publications

### Journal Articles

- Wenzhe Tong, **Tzu-Yuan Lin**, Jonathan Mi, Yicheng Jiang, Maani Ghaffari, and Xiaonan Huang. "Tensegrity Robot Proprioceptive State Estimation with Geometric Constraints." *IEEE Robotics and Automation Letters (RA-L)* (2025). [[Paper Link](#)]
- M.A. Zakeri Harandi, **Tzu-Yuan Lin**, Chen Li, Sigurd L. Villumsen, Maani Ghaffari, Ole Madsen. "ScaloAdaptAlert, a novel framework for supervised anomaly detection in industrial acoustic data, integrating power scalograms, adaptive filter banks, and convolutional neural networks — A case study." *Journal of Manufacturing Systems* 79 (2025): 234-254. [[Paper Link](#)]

3. Xi Lin, Yewei Huang, Dingyi Sun, **Tzu-Yuan Lin**, Brendan Englot, Ryan M. Eustice, and Maani Ghaffari. "A Robust Keyframe-based Visual SLAM for RGB-D Cameras in Challenging Scenarios." *IEEE Access* (2023). [[Paper Link](#)]
4. Maani Ghaffari, Ray Zhang, Minghan Zhu, Chien Erh Lin, **Tzu-Yuan Lin**, Sangli Teng, Tingjun Li, Tianyi Liu, Jingwei Song. "Progress in symmetry preserving robot perception and control through geometry and learning." *Frontiers in Robotics and AI*, 9 (2022). [[Paper Link](#)]
5. Hao-Ming Hsiao, **Tzu-Yuan Lin**, Chien-Erh Lin, Han-Yu Lee, and Yi-Ping Wang. "Innovation of New Occlusion Devices for Cancers." *Applied Sciences* 7, no. 5 (2017): 530. [[Paper Link](#)]
6. Hao-Ming Hsiao, Yi-Ping Wang, Yu-Han Cheng, **Tzu-Yuan Lin**, and Chien-Erh Lin. "A Novel Spherical Stent Concept for Intracranial Aneurysm." *Sensors and Materials* 28, no. 9 (2016): 947-955. [[Paper Link](#)]

## Refereed Conference Papers

1. Zijian He, Sangli Teng, **Tzu-Yuan Lin**, Maani Ghaffari, Yan Gu. "Legged Robot State Estimation within Non-inertial Environments. In *2024 Conference on Decision and Control (CDC)*. 2024. [[arXiv preprint](#)]
2. **Tzu-Yuan Lin**, Minghan Zhu, and Maani Ghaffari. "Lie Neurons: Adjoint-Equivariant Neural Networks for Semisimple Lie Algebras." In *The Forty-first International Conference on Machine Learning (ICML)*. 2024. [[Paper Link](#)]
3. Xihang Yu, Sangli Teng, Theodor Chakhachiro, Wenzhe Tong, Tingjun Li, **Tzu-Yuan Lin**, Sarah Koehler, Manuel Ahumada, Jeffrey M. Walls, and Maani Ghaffari. "Fully Proprioceptive Slip-Velocity-Aware State Estimation for Mobile Robots via Invariant Kalman Filtering and Disturbance Observer." In *IEEE International Conference on Intelligent Robots and Systems (IROS)*. 2023. [[Paper Link](#)]
4. **Tzu-Yuan Lin**, Ray Zhang, Justin Yu, and Maani Ghaffari. "Legged Robot State Estimation using Invariant Kalman Filtering and Learned Contact Events." In *5th Annual Conference on Robot Learning (CoRL)*, pp. 1057-1066. PMLR, 2022. [[Paper Link](#)]
5. Ray Zhang, **Tzu-Yuan Lin**, Chien Erh Lin, Steven A. Parkison, William Clark, Jessy W. Grizzle, Ryan M. Eustice, and Maani Ghaffari. "A new framework for registration of semantic point clouds from stereo and RGB-D cameras." In *2021 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 12214-12221. IEEE, 2021. [[Paper Link](#)]
6. Yen-Ting Wang, Yi-Ping Wang, **Tzu-Yuan Lin**, Chien-Erh Lin, and Hao-Ming Hsiao. "Drug-eluting stent with rhombic-shape reservoirs for drug delivery." In *2016 International Conference on Applied System Innovation (ICASI)*, pp. 1-4. IEEE, 2016. [[Paper Link](#)]

## Preprints

1. **Tzu-Yuan Lin**, Tingjun Li, Wenzhe Tong, and Maani Ghaffari. "Proprioceptive Invariant Robot State Estimation." [[arXiv preprint](#)]
2. **Tzu-Yuan Lin**, William Clark, Ryan M. Eustice, Jessy W. Grizzle, Anthony Bloch, and Maani Ghaffari. "Adaptive Continuous Visual Odometry from RGB-D Images." [[arXiv preprint](#)]

## Teaching Experience

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### Guest Lecture

NAVARCH/EECS 568/ROB 530: Mobile Robotics: Methods and Algorithms

Winter 2024

Graduate Course, University of Michigan

- Guest lecture on "DRIFT: Dead Reckoning in Field Time"

### Teaching Assistant

NAVARCH/EECS 568/ROB 530: Mobile Robotics: Methods and Algorithms

Winter 2020, 2022

Graduate Course

College of Engineering, University of Michigan

with Dr. Maani Ghaffari

**ME 2001: Engineering Mathematics**  
Undergraduate Course  
Department of Mechanical Engineering, National Taiwan University  
with Dr. Wen-Fang Wu

Fall 2017, Spring 2018

**ME 1003: Engineering Graphics**  
Undergraduate Course  
Department of Mechanical Engineering, National Taiwan University  
with Dr. Wei-Jiun Su

Spring 2018

**ME 2004: Machine Design Theory**  
Undergraduate Course  
Department of Mechanical Engineering, National Taiwan University  
with Dr. Shana Smith

Fall 2017

**ME 2005: Thermodynamics**  
Undergraduate Course  
Department of Mechanical Engineering, National Taiwan University  
with Dr. Mei-Jiau Huang

Fall 2017

## Invited Talks

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- IROS 2024 Equivariant Robotics Workshop Keynote Talk  
"Computational Symmetry and Learning for Robotics"  
Joint talk with Chien Erh Lin on behalf Dr. Maani Ghaffari  
Oct. 2024
- University of Notre Dame Robotics Seminar  
"It's the Same Everywhere: Leveraging Symmetry for Robot Perception and Localization"  
Joint talk with Chien Erh Lin  
Jun. 2024
- NVIDIA GTC AI Conference 2022  
"Legged Robot State Estimation using Invariant Kalman Filtering and Learned Contact Events"  
Mar. 2022

## Awards

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- Government Scholarship to Study Abroad, the Ministry of Education, Taiwan  
May 2023
- Rackham International Student Fellowship and the Chia-Lun Lo Fellowship, University of Michigan  
Dec. 2019
- Presidential Award, National Taiwan University  
2015-2017
- Altruism Award, National Taiwan University  
Apr. 2016
- Gold Winner in the International Design Awards (IDA), USA  
Jun. 2016
- Second Prize in the STAM Student Thesis Competition, Taiwan  
Nov. 2016
- Honorable mention in the CGMH Medical Robot Competition, Taiwan  
Dec. 2016

## Mentoring

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### Master's & Undergraduate Students

- Hande Huang (Equivariant Learning)  
2024
- Chankyo Kim (IMU dynamic modeling, Equivariant Neural Network)  
Next Position: Ph.D. Student, UM  
2023 – 2024
- Wenzhe Tong (Proprioceptive State Estimation)  
Next Position: Ph.D. Student, UM  
2022 – 2023

– Xihang (Jimmy) Yu (Slip Aware State Estimation) Next Position: Ph.D. Student, MIT	2022 – 2023
– Theodor Chakhachiro (Data-driven Friction Estimation) Next Position: Ph.D. Student, USC	2022 – 2023
– Tingjun Li (Proprioceptive State Estimation) Next Position: Software Engineer, Amazon	2021 – 2023
– Justin Yu (Sensor Suite for Mini Cheetah, Proprioceptive State Estimation) Next Position: Ph.D. Student, UC Berkeley	2021 – 2023
– Zareef Safdar (Simultaneous Localization and Mapping) Next Position: MS student, Simon Fraser University	2021
– Dianhao Chen (Model-based Friction Estimation) Next Position: Robotics Engineer, China	2021
– Arthur Zhang (State Estimation for Mini Cheetah) Next Position: PhD student, UT Austin	2021
– Harrison Chen (Contact Estimation for Mini Cheetah) Next Position: Autonomous engineer, PDW	2020
– Yicheng Tao (Contact Estimation for Cassie robot) Next Position: Robotics & Machine Learning Engineer, China	2020

## Professional Service

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### Reviewing Activities

– IEEE Transactions on Robotics (T-RO)	2023 – 2025
– IEEE Robotics and Automation Letters (RA-L)	2021 – 2025
– IEEE/ASME Transactions on Mechatronics (TMech)	2024
– International Conference on Robotics and Automation (ICRA)	2021 – 2023
– International Conference on Intelligent Robots and Systems (IROS)	2020 – 2024
– Conference on Robot Learning (CoRL)	2022 – 2024
– Learning for Dynamics and Control Conference (L4DC)	2025
– Conference on Neural Information Processing Systems (NeurIPS)	2024
– International Conference on Machine Learning (ICML)	2025
– Robotics and Autonomous Systems (RAS)	2023
– Control Systems Letters (L-CSS)	2023
– International Conference on Ubiquitous Robots (UR)	2020

### Outreach

– UM Robotics Mentorship Program – Mentor	2019, 2020, 2023, 2024
– NTUME@US Mentorship Program – Mentor	2021, 2022
– UM Robotics Graduate Student Council – Outreach Chair	2021
– UM Robotics Master’s Research & Prospective PhD Chat – Panelist	Nov. 2020
– UM Discover Engineering – Workshop Organizer and Volunteer	Jul. 2019 – Aug. 2019
– Ann Arbor Summer Festival – KidZone Volunteer	Jul. 2019

- American Society of Mechanical Engineers (ASME) NTU Student Section – Public Relations      Aug. 2016 – Jun. 2017
- NTU Mechanical Engineering Student Association – Director of Academic Division      Jul. 2015 – Jun. 2016
- NTU Mechanical Engineering High School Summer Camp – Deputy Director & Organizer      May 2015 – Jul. 2015
- NTU International Affairs – Student Volunteer      Sep. 2014 – Jun. 2016

### **Professional Membership**

- IEEE RAS Technical Committee on Computer & Robot Vision, Member      2024 – Present
- Institute of Electrical and Electronics Engineers (IEEE), Student Member      2019 – Present
- IEEE Robotics and Automation Society (RAS), Member      2019 – Present
- IEEE Young Professionals, Member      2019 – Present