Khai Yi **Chin**

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RESEARCH EXPERIENCE

Graduate Research Assistant (Multi-Robot Sensor Degradation Estimation) Sep 2021 – May 2025
NEST Lab at the Worcester Polytechnic Institute, Worcester, MA

- Created an extended Kalman filter-based recursive degradation estimation algorithm for flawed robot swarms.
- Designed a minimalistic collective perception algorithm for robotic swarms with flawed sensors.
- Integrated the ARGoS multi-robot simulator with an EMANE network emulator to enhance simulation fidelity.
- Developed drivers and controllers for the Khepera IV and AWS DeepRacer robots as testing platforms.
- Received an Honorable Mention for the 2025 WPI Three Minute Thesis Competition.
- Achieved 2nd Place in the 2023 WPI Graduate Research & Innovation Exchange.

Graduate Research Assistant (Carbon Nanotube Modeling) May 2016 – Apr 2018
The University of Texas at Austin, TX

- Published work on the electronic properties of doped carbon nanotubes for high-current applications.
- Interpreted scientific literature for past research efforts and state-of-the-art carbon-based materials/devices.
- Explored the physical significance of simulation data via band structure analyses and transmission functions.

Undergraduate Research Assistant (Soft Robotic Muscles) Nov 2014 – Jun 2016
Robotics and Motion Laboratory at the University of Michigan, Ann Arbor, MI

- Won the 2015 Prize for Contributions in Soft Robotics Research competition.
- Facilitated experimentation with automation using LabVIEW, a data acquisition device, and a NI I2C bus.
- Designed and built a testbed using pressure sensors, solenoid valves, and electrical circuitry for sensor testing.

INDUSTRY EXPERIENCE

Robotics Engineer Nov 2020 – Aug 2021
Coast Autonomous at Largo, FL

- Spearheaded development of a 3-D particle filter localization algorithm, with an octree-based likelihood field.
- Achieved real-time localization along a >1,800 ft. outdoor trajectory in a >2 million sq. ft. map.
- Created deployment-ready, multi-platform (Windows and Linux) localization software libraries.
- Established and managed the company's robotics documentation and knowledge base.

Autonomous Robotics Engineer (Autonomy and Simulation Lead) Mar 2019 – Oct 2020
SIERA.AI at Austin, TX

- Led R&D project of an industrial autonomous mobile robot (AMR) with 10,000 lbs tugging capacity.
- Designed software and workflow for AMR deployment involving SLAM, localization, and autonomous navigation.
- Achieved ±30 cm repeatability in infrastructure-free autonomous navigation of a >60,000 sq. ft. warehouse.
- Prevented AMR collisions during autonomous navigation through the integration of LiDARs and 3-D cameras.
- Created software for performance benchmarking of different localization algorithms implemented on AMR.
- Enhanced AMR user experience by designing UI applications to provide robot and workflow management.
- Established a complete simulation stack to streamline robotics software testing using AWS RoboMaker and ROS.
- Provided new team members and interns with advice and mentorship.

Mechanical Engineer (Product Development) Apr 2018 – Feb 2019
DunAn Precision, Inc. – R&D Division at Austin, TX

- Spearheaded mechanical design of 1st generation visual inertial measurement units (VIMUs) and test fixtures.
- Achieved in-house product assembly by implementing robotic and pneumatic systems.
- Improved VIMU accuracy by designing a sensor calibration program in MATLAB.
- Investigated MEMS gyroscope designs using dynamical modeling in Simulink.

EDUCATION

Worcester Polytechnic Institute - *Ph.D. in Robotics Engineering* 2025
The University of Texas at Austin - *M.S. in Mechanical Engineering (Dynamic Systems & Controls)* 2018
University of Michigan, Ann Arbor - *B.S. in Engineering (Mechanical Engineering)* 2016

Resume updated 03/31/25

PUBLICATIONS

Chin, K. Y. and Pinciroli, C., 2025. *"BayesCPF: Enabling Collective Perception in Robot Swarms with Degrading Sensors,"* (In-preparation)

Chin, K. Y. and Pinciroli, C., 2024. *"Adaptive Self-Calibration for Minimalistic Collective Perception by Imperfect Robot Swarms,"* (In-review); Preprint available on: arXiv:2410.21546

Chin, K. Y., Khaluf, Y. and Pinciroli, C., 2023. "Minimalistic Collective Perception with Imperfect Sensors," *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS),* Detroit, MI.

Akhter, A., Bhada, S. V., Golemi, K., Murphy, J., Wyglinski, A., Pinciroli, C. and **Chin, K. Y.**, 2022. "Towards Articulating Failures and Fault Trees and Verification for Building Resilience in Robot Swarms," *2022 IEEE International Symposium on Systems Engineering (ISSE)*, Vienna, Austria.

Chin, K. Y. and Fahrenthold, E. P., 2021. "Mass specific performance of potassium tetrabromoaurate as a carbon nanotube dopant," *Computational Materials Science*, **197**, 110573.

Felt, W., **Chin, K. Y.** and Remy, C. D., 2017. "Smart Braid Feedback for the Closed-Loop Control of Soft Robotic Systems," *Soft Robotics*, **4** (3), pp. 261-273.

Felt, W., **Chin, K. Y.** and Remy, C. D., 2016. "Contraction Sensing with Smart Braid McKibben Artificial Muscles," *IEEE/ASME Transactions on Mechatronics*, **21** (3), pp. 1201-1209.

Felt, W., **Chin, K. Y.** and Remy, C. D., 2016. "Self-Sensing Pneumatic Artificial Muscles for Feedback Control using the Inductance of "Smart Braids"," *Dynamic Walking 2016*, University of Michigan, Ann Arbor, MI.

Felt, W., **Chin, K. Y.** and Remy, C. D., 2015. "Dynamic Tracking of Joint Motion with Antagonized Smart Braids," *Fluid Power Innovation & Research Conference 2015 (FPIRC15)*, Chicago, IL.

TEACHING AND LEADERSHIP

Teaching Assistant
Aug 2021 - May 2022

Worcester Polytechnic Institute Robotics Engineering Department

- Led instruction during office hours and exam review sessions ensuring comprehension of theoretical concepts.
- Collaborated with fellow TAs and the course instructor to ensure consistent delivery of course material.

Programming Instructor
Jan 2017 – May 2017

Graduates Linked with Undergraduate Experience (GLUE) Program

- Guided students in learning and improving their Python programming skills.
- Prepared educational resources to assist students in achieving their programming goals.

Logistics Director; Check-in Co-director for Midwest Games '15
Oct 2014 – Jul 2015

University of Michigan Malaysian Students' Association

- Led a team of students for the largest crowd volume sporting event for Malaysians in the US and Canada.
- Streamlined the check-in process of 1000 participants by systemizing participant information, and spreading crowd volume across different stations.
- Planned large-scale venue reservations for events via coordination and allocating duties to team members.

SKILLS

Languages: C++, Python, MATLAB
Operating Systems: Linux, Windows
Software: ROS (1 & 2), Gazebo, ARGoS, AWS (RoboMaker, S3, Lambda, EC2), Git, Jira, SolidWorks, MS Office

AWARDS

WPI Three Minute Thesis Competition - Honorable Mention	March 2025
WPI Robotics Engineering Graduate Student Travel Award	Jul 2023
WPI Graduate Research & Innovation Exchange (GRIE) - 2nd Place	Feb 2023
SIERA.AI Peer-to-Peer Reward and Recognition	Mar 2020
SIERA.AI Peer-to-Peer Reward and Recognition	May 2019
UT Austin Research Merit Fellowship	2018
Soft Robotics Toolkit 2015 Prize for Contributions in Soft Robotics Research - Winner	2015
University of Michigan Dean's List Award	Dec 2014
University of Michigan Dean's List Award	Apr 2014
University of Michigan Dean's List Award	Dec 2013

AFFILIATIONS

Student Member, IEEE Robotics and Automation Society (RAS)