Fuchen Chen

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EDUCATION

PhD Candidate (defended), Systems Engineering   January 2021 – December 2025 (expected)
Arizona State University, Mesa, AZ
Dissertation: Toward Informed Optimal Design of Task-Aware Robots

Master of Science, Robotics Engineering   August 2016 - December 2017
Worcester Polytechnic Institute, Worcester, MA

Bachelor of Science, Robotics Engineering   August 2012 - May 2016
Worcester Polytechnic Institute, Worcester, MA

RESEARCH EXPERIENCE

Graduate Research Assistant, IDEA Lab, Arizona State University, Mesa, AZ   January 2021 - Present
Advisor: Professor Daniel M. Aukes

- Designed and built a quadruped robot's hardware and software architecture, integrating sensors, servos, and communications with Arduino and Python.
- Developed and deployed simulation environments and reinforcement learning frameworks with MuJoCo and PyTorch for controlling the quadruped and testing its leg designs.
- Created a planar linkage synthesis tool with PyTorch to generate multi-DoF multi-bar designs in minutes.
- Designed and conducted experiments with a robot arm, a load cell, and a motion capture system to collect data for system identification, performance validation, and model improvement.
- Modeled, optimized, and validated leg designs for 30% faster running and more efficient locomotion.
- Authored multiple published papers in top robotics venues (IJRR, ICRA, IROS).

Research Assistant, Soft Robotics Lab, Worcester Polytechnic Institute, Worcester, MA   May 2013 - May 2016
Advisor: Professor Cagdas Onal

- Developed an origami-inspired fabrication method to design low-cost, lightweight legged and aerial robots.
- Designed and fabricated soft pneumatic actuators with integrated sensors for robotic snake research.
- Coauthored multiple published papers and helped secure further funding.

PROFESSIONAL EXPERIENCE

Robotics Internship, Robotics and AI Institute, Cambridge, MA   June 2024 - September 2024
Advisor: Professor Aaron M. Dollar

- Explored, designed, built, and evaluated various hydraulic transmission systems for robotics applications.
- Constructed and programmed a testing platform to collect displacement and force data to characterize the transmission systems' friction, damping, and stiffness.
- Designed a rolling diaphragm cylinder with over 10 times the stroke length and nearly 5 times less friction than a commercial off-the-shelf option.

Cofounder, Orimagi, Inc., Boston, MA   December 2017 - December 2020

- Commercialized my origami-inspired robot research into an educational robot toy product and sold over 1000 sets to families and schools.
- Developed, playtested, and iterated all technical aspects of the product, including the mechanical parts, PCBs, firmware, Android and iOS apps, and packaging.
- Contacted and worked with manufacturers to mass-produce and certify the product.

SELECTED PUBLICATIONS

- F. Chen and D. M. Aukes, "Informed Repurposing of Quadruped Legs for New Tasks," in *2025 IEEE International Conference on Robotics and Automation (ICRA)*, May 2025, pp. 2584–2590.
- F. Chen and D. M. Aukes, "Curating Tunable, Compliant Legs for Specialized Tasks*," The International Journal of Robotics Research*, May 2025.
- W. Tao, F. Chen, Y. Xu, A. Johnson, and W. Zhang, "Bistable Inflatable Fabric Actuators to Amplify Force and Energy Output for In-Pipe Soft Robots," IEEE/ASME Transactions on Mechatronics, pp. 1–12, 2025.
- F. Chen, W. Tao, and D. M. Aukes, "Development of A Dynamic Quadruped with Tunable, Compliant Legs," in *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Detroit, MI, USA: IEEE, Oct. 2023, pp. 495–502.
- W. Tao, K. Patnaik, F. Chen, Y. Kumar, and W. Zhang, "Design, Characterization and Control of a Whole-body Grasping and Perching (WHOPPEr) Drone," in *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Oct. 2023, pp. 1–7.
- Y. Jiang, F. Chen, and D. M. Aukes, "Tunable Dynamic Walking via Soft Twisted Beam Vibration," *IEEE Robot. Autom. Lett.*, vol. 8, no. 4, pp. 1967–1974, Apr. 2023.
- F. Chen and D. M. Aukes, "Direct Encoding of Tunable Stiffness Into an Origami-Inspired Jumping Robot Leg," *Journal of Mechanisms and Robotics*, vol. 16, no. 3, Mar. 2023.

AWARDS

- Best Paper Award Finalist, IEEE International Conference on Robotics and Automation (ICRA), Informed Repurposing of Quadruped Legs for New Tasks, 2025
- First Place in IEEE Robotics and Automation Society Soft Material Robot Challenge (SMRC) Soft Robot Speed Challenge, IEEE International Conference on Robotics and Automation (ICRA), 2017