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Education

PhD, Electrical and Computer Engineering, Michigan State University

Key Interests

Autonomous Systems | Control Systems | Robotics | Underwater Vehicles | Environmental Monitoring | Subsea Infrastructure Monitoring | Robotic Fish

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SELECT PUBLICATIONS

- › Cook, G. and Zhang, F. (2020). Mobile robots: navigation, control and sensing, surface robots and AUVs. *Wiley-IEEE Press*.
- › Dang, F. and Zhang, F. (2019). Distributed flow estimation for autonomous underwater robots using POD-based model reduction. *Journal of Dynamic Systems, Measurement, and Control, Special issue on Unmanned Mobile Systems* 141.7, 071010.
- › Zhang, F., et al. (2016). Autonomous sampling of water columns using gliding robotic fish: algorithms and harmful algae-sampling experiments. *IEEE Systems Journal, Special issue on Cyber-innovated Environmental Sensing, Monitoring and Modeling for Sustainability* 10(3), 1271-1281.

Research Focus

My research group aims to develop advanced autonomous (underwater) vehicles that can serve as mobile sensing platform for aquatic environmental monitoring using novel sensing, actuation, and control mechanisms.

Current Projects

- The flow sensing project aims to apply reduced-order modeling, fluid mechanics, and estimation theory to create a systematic background flow estimation approach for autonomous underwater vehicles to navigate through unknown and dynamic environments.
- The heterogeneous lighter-than-air vehicle project aims to apply engineering dynamics, control and estimation theory, sensors and actuators, and artificial intelligence to develop smart robotic blimps that interact with each other for studying emerging swarm behaviors.
- The learning and control project aims to apply control theory, engineering dynamics and machine learning (in particular deep reinforcement learning) to develop a real-time learning and control approach for autonomous dynamical systems with a focus on bioinspired and biomimetic robots.