

Xiaoming Zhao

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Education

Dartmouth College

Fall 2025-

Doctor of Philosophy in Computer Science, Advised by Alberto Quattrini Li

Selected coursework: Robot Design, Parallel Opt for Robotics, Robotics Perception Systems

Lafayette College

May 2025

Bachelor of Science in Computer Science

Selected coursework: Artificial Intelligence, Operating Systems, Programming Languages

Publication

Burgul, C., **Zhao, X.**, Huang, Y., Chatzisprou, M., Quattrini Li, A., & Rekleitis, I. (2026). SVIn+: Multi-modal framework for robust underwater state estimation using 3D sonar, visual-inertial, water-pressure, and DVL. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. (Under Review)

Yu, J., Shao, N., Yang, J., Yang, L., Hong, K., Chen, Y., **Zhao, X.**, Yu, H., Zhang, T., & Dong, J. (2025). Ultrafine garlic powder alleviates non-alcoholic steatohepatitis by inhibiting hepatocyte ferroptosis and modulating ERK-dependent oxidative stress. *Frontiers in Pharmacology*, 16.

Research Projects

Marine Robotics and Multi-Sensor Perception

Oct 2025–Present

Graduate Research, Dartmouth Reality and Robotics Lab, Dartmouth College

- Building ROS-based underwater data acquisition system integrating Spinnaker cameras, 3D sonar, IMU, and depth sensors under the supervision of Dr. Yewei Huang and Professor Alberto Quattrini Li
- Developing novel NeRF-based approach to enhance underwater scene graph construction and mapping
- Preparing for 2026 Marine Robotics Workshop at Barbados Marine Robotics Field Trials

ProcessGPT: Domain-Specific Language Models for CS Education

May 2024–May 2025

Honors Thesis, Department of Computer Science, Lafayette College

- Developed and fine-tuned GPT-Neo architectures (12M-33M parameters) specialized for Processing programming language instruction, achieving 9.2/10 similarity scores on domain-specific benchmarks
- Implemented transformer-based models with custom tokenization strategies, gradient accumulation (16 steps), and cosine annealing learning rate schedules on curated dataset
- Conducted comparative performance analysis across multiple metrics including perplexity, grammar accuracy, and computational efficiency

Computational Biology and Animal Models for NASH Treatment

June 2023–Aug 2025

Research Assistant, School of Medicine, Tianjin University

- Collaborated with Professor Jinrui Dong on computational biology research investigating ferroptosis mechanisms in non-alcoholic steatohepatitis (NASH)
- Performed bioinformatics analysis including RNA-seq data processing, differential expression analysis, and pathway enrichment using DESeq2 and GSEA

Course Projects

CaveSLAM: Underwater Cave Navigation System

Oct 2025–Dec 2025

- Developed sonar-adapted LeGO-LOAM variant for 6-DOF underwater localization; implemented EKF multi-sensor fusion with sonar odometry, IMU, and depth sensors, reduced vertical drift
- Designed TTC-based collision avoidance achieving 100% collision prevention; led system integration for hierarchical architecture

GPU-Accelerated Block Cyclic Reduction for MPC

Oct 2025–Dec 2025

- Implemented Block Thomas algorithm as CPU baseline achieving $O(n)$ complexity; developed Riccati recursion baseline and GPU BCR implementation for KKT system solvers achieving sub-5ms runtime for $N=10,752$ dimensions in trajectory optimization

Skills

Programming: C/C++, Java, ROS, SQL, LaTeX, CUDA, Python, React, Git

Tools: Linux, Docker, Gazebo, RViz, cuBLAS, Eigen

Languages: English, Chinese