

Tony Qin

LinkedIn | Google Scholar

Email: tonyqin@cs.unc.edu

Mobile: (724) 733-1365

EDUCATION

- **The University of North Carolina at Chapel Hill** Chapel Hill, NC
PhD in Computer Science (Robotics)
○ Advisor: Ron Alterovitz
○ Research Interests: Motion Planning, Design Optimization, Surgical Robots
- **Carnegie Mellon University** Pittsburgh, PA
B.S. in Artificial Intelligence, GPA: 4.0/4.0
Aug. 2018 – May 2022

EXPERIENCE

- **UNC Computational Robotics Lab** Chapel Hill, NC
PhD Candidate
○ **Reinforcement Learning:** Trained a GNN-based PPO agent for sampling-based motion planning, utilizing cost-effective remote training pipelines on RunPod cloud GPUs.
○ **Planning & Kinematic Modeling:** Engineered a high-performance C++ motion planner for a 6-DoF continuum robot, achieving 3k collision-free nodes/second per CPU core for complex anatomical environments.
○ **Design Optimization:** Optimized robot design to maximize end effector dexterity using multi-objective Bayesian optimization, achieving 36% higher dexterity compared with a generic design.
○ **Medical Image Pipeline:** Transformed colon CT scans using computationally efficient image processing algorithms to guide surgical robot design and motion planning across multiple patient anatomies.
- **CMU CyLab Biometrics Center** Pittsburgh, PA
Undergraduate Research Assistant
○ **Object Detection:** Trained computer vision models including Faster R-CNN, RetinaNet, and ATSS to detect people and objects from satellite images as part of a DARPA project.
- **CMU Introduction to Deep Learning** Pittsburgh, PA
Teaching Assistant
○ **LLM Finetuning:** Finetuned GPT-2 on a dataset of 90,000 limericks to generate poems as part of a course project and published the poems as an ebook on Amazon.
○ **Backpropagation Implementation:** Created a homework assignment for over 200 students to implement a graph-based operation backpropagation algorithm, similar to ones used in deep learning libraries such as PyTorch.
- **U.S. Army Reserve** Various Locations
Military Intelligence Officer
○ **Company Executive Officer:** Led an organizational turnaround of a 75-person company through data analytics and strategic planning, improving company standing from 17th/21st to 1st/21st within the brigade.
○ **Basic Officer Leader Course:** Graduated on the Commandant's List, top 20% of attending officers.
○ **French Linguist:** Third place (officer category) in the 2025 DoD Best Linguist competition; winning team in the 2024 competition.

SELECTED PUBLICATIONS

- **International Conference on Robotics and Automation (ICRA) 2026 (submitted): Qin, T. et al.**
“Anatomy-Aware Dexterity-Driven Design Optimization of Surgical Continuum Robots.”
- **International Conference on Robotics and Automation (ICRA) 2025:** Connor, P., Hatch, C., Dang, K., Qin, T. et al. “A System for Endoscopic Submucosal Dissection Featuring Concentric Push-Pull Manipulators.”
- **International Symposium on Medical Robotics (ISMR) 2024:** Dang, K., Qiu, S., Hatch, C., Connor, P., Qin, T. et al. “Design of Transmission Tubes for Surgical Concentric Push-Pull Robots.”
- **Hamlyn Symposium on Medical Robotics (HSMR) 2023:** Qin, T. et al. “Computational Analysis of Design Parameters for a Bimanual Concentric Push-Pull Robot.”

TECHNICAL SKILLS

- **Languages:** C++, Python, C, JavaScript
- **Libraries:** PyTorch, Stable Baselines3, PyG, BoTorch, NumPy, Matplotlib, Eigen, VTK, ITK, ROS 2, OMPL
- **Tools:** Git, Docker, RunPod, CMake, Weights & Biases, Blender
- **Security Clearance:** Active DoD TS/SCI