

# Ruochu Yang

(404)-271-5820  
ruochuyang@gmail.com

## Summary

personal website  
LinkedIn

I am a Ph.D. student in the School of ECE at Georgia Tech. My research interests revolve around AI planning, underwater robotics, and visual SLAM, with a particular focus on integrating AI models with task and motion planning in autonomous robotic systems.

## EDUCATION

<b>Ph.D. in Electrical and Computer Engineering, minor in Computer Science</b> , Georgia Institute of Technology	<b>Jan 2022 - Present</b>
<b>M.S. in Electrical and Computer Engineering</b> , Georgia Institute of Technology	<b>Jan 2020 - Dec 2021</b>
<b>B.Eng. in Artificial Intelligence</b> , Nankai University	<b>Sep 2015 - Jun 2019</b>

## PUBLICATIONS

1. **Yang, R. et al.** *OceanChat: Piloting Autonomous Underwater Vehicles in Natural Language* in *IEEE ICRA* (2024), submitted.
2. **Yang, R. et al.** *Real-time Autonomous Glider Navigation Software* in *MTS/IEEE OCEANS Limerick* (2023), 1–4.
3. **Yang, R. et al.** *General Anomaly Detection of Underwater Gliders Validated by Large-scale Deployment Datasets* in *MTS/IEEE OCEANS Gulf Coast* (2023), accepted.
4. **Yang, R. et al.** *Anomaly Detection of Underwater Gliders Verified by Deployment Data* in *IEEE Underwater Technology* (2023), 1–10.
5. **Yang, R. et al.** *A flexible rope crane experiment system in Applications of Modelling and Simulation* (2019), 11–17.

## AWARDS & HONORS

<b>Gong Neng Scholarship</b> , Nankai University	<b>Jun 2019</b>
<b>Excellent Undergraduate of the College of Artificial Intelligence</b> , Nankai University	<b>Jun 2019</b>
<b>Annual Outstanding Volunteer of the Communist Youth League</b> , Nankai University	<b>Jun 2017</b>

## EXPERIENCE

<b>Graduate Research Assistant</b> School of Electrical and Computer Engineering, Georgia Tech, US	<b>Aug 2021 - Present</b> Advisor: Prof. Fumin Zhang
<ul style="list-style-type: none"><li>• Developed a closed-loop LLM-guided robotic planning algorithm to pilot autonomous underwater vehicles in natural language.</li><li>• Applied LSTM to learning piece-wise constant ocean flow dynamics partitioned by K-means.</li><li>• Developed a real-time glider autonomous navigation Python software for the underwater robotics community.</li><li>• Utilized a CLLE-based anomaly detection algorithm to monitor gliders in the ocean in real time.</li></ul>	
<b>Autonomous Vehicle Engineering Intern</b> Cruise LLC, San Francisco, US	<b>Feb 2021 - Aug 2021</b> Managers: Chenglin Xu, Devin Looney
<ul style="list-style-type: none"><li>• Developed a unified Python API to remotely control multiple power supplies on component test benches.</li><li>• Composed test cases of A100/A110 autonomous vehicle product-level requirements and analyzed test results.</li><li>• Researched power mode interaction workflow between vehicle computing system and power distribution board.</li></ul>	
<b>Undergraduate Research Assistant</b> College of Artificial Intelligence, Nankai University, China	<b>Aug 2018 - Nov 2019</b> Advisor: Prof. Jing Yuan
<ul style="list-style-type: none"><li>• Improved the ORB-SLAM algorithm to run robustly in challenging indoor scenes such as texture loss and motion blur.</li><li>• Combined the LSD-SLAM algorithm with the ORB-SLAM algorithm to promote accuracy of localization and mapping.</li><li>• Developed a C++ module to extract multiple principal planes from 3D dense point clouds.</li></ul>	

## PROJECTS

<b>Super <math>U^2</math>-Net</b> , Georgia Tech	<b>Jan 2023 - May 2023</b>
<ul style="list-style-type: none"><li>• Developed an efficient Salient Object Detection (SOD) model Super <math>U^2</math>-Net based on the backbone <math>U^2</math>-Net.</li><li>• Evaluated three SOD models Spectral Residual Saliency Detection, <math>U^2</math>-Net, and Super <math>U^2</math>-Net on the DUTS Image Dataset.</li></ul>	
<b>3D Pac-Man Game</b> , Georgia Tech	<b>Nov 2020 - Dec 2020</b>
<ul style="list-style-type: none"><li>• Developed an interactive 3D pac-man game in C++ with four ghosts, one square maze, fifty coins, three powerups and one pac-man.</li><li>• Tested the game in real time on local machine and PACE-ICE server with 93% passing rate.</li></ul>	
<b>Iterative Methods of Linear and Nonlinear Systems</b> , Georgia Tech	<b>Apr 2020 - May 2020</b>
<ul style="list-style-type: none"><li>• Based on CG and PCG iterative methods, designed an FFT algorithm to accelerate floating-point operation in solving high-dimensional linear equations, and reduced overall computation runtime complexity from <math>O(n^3)</math> to <math>O(n \log n)</math>.</li><li>• Applied Newton and Quasi-Newton methods to solve high-dimensional dense matrices, and combined them with linear iterative methods to search possible solutions in 3D Euclidean space.</li></ul>	
<b>Design of Image Retrieval System</b> , Institute of Computing Technology, Chinese Academy of Sciences	<b>Jul 2018 - Aug 2018</b>
<ul style="list-style-type: none"><li>• Given a target image, implemented a global-local feature detection algorithm to retrieve top 10 most similar images from database of 1000 samples in 3 seconds.</li><li>• Designed an interactive user interface to select the target image, retrieved images, and processing time for quantitative evaluation.</li></ul>	
<b>TRS Robot Competition (2nd place)</b> , Institute of Automation, Chinese Academy of Sciences	<b>Feb 2018 - Mar 2018</b>
<ul style="list-style-type: none"><li>• Set up the simulation environment in V-rep, and implemented path planning to navigate around the house while avoiding obstacles.</li><li>• Based on visual recognition, implemented motion planning to pick up specified objects and put them into specified trash cans.</li></ul>	