

Yutong Zhang

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EDUCATION

University of California San Diego

M.S. in Computer Science; GPA: 4.00/4.00

B.S. in Computer Science and Mathematics; GPA: 3.95/4.00

La Jolla, USA

Sep. 2022 – Expected Jun. 2024

Sep. 2018 – Jun. 2022

RESEARCH EXPERIENCE

Advanced Robotics and Contorls Lab

Student Researcher, advised by Prof. Michael Yip

La Jolla, USA

Mar. 2021 – present

- Developed a visualization program in C++ and OpenGL to visualize threads, ropes and robot arms.
- Implemented modules to synchronize robot joint status from ROS topics to the visualization program.
- Created a differentiable PBD (position based dynamics) simulator for deformable objects in Python & PyTorch.
- Applied the differentiable simulator to cloth manipulation. Formulated the task as a trajectory optimization problem constrained by safety thresholds.
- Collaborated on the real-to-sim problem. Used the differentiable simulator for online optimization of physical parameters to better model soft tissues under actuation.

PUBLICATIONS

[†] equal contribution

[1] **Yutong Zhang**[†], Fei Liu[†], Xiao Liang, and Michael Yip. Achieving Autonomous Cloth Manipulation with Optimal Control via Differentiable Physics-Aware Regularization and Safety Constraints. *IEEE International Conference on Robotics and Automation (ICRA)*, 2024. **Under Review** [\[arXiv\]](#), [\[video\]](#).

[2] Fei Liu[†], Xiao Liang[†], **Yutong Zhang**, Yuelei Li, Shan Lin, and Michael C. Yip. Real-to-Sim Deformable Object Manipulation: Optimizing Physics Models with Residual Mappings for Robotic Surgery. *IEEE International Conference on Robotics and Automation (ICRA)*, 2024. **Under Review** [\[arXiv\]](#).

PROJECTS

The Meoze Runner

Graphics Developer

[🔗 Homepage](#), [🐙 Code](#)

- Developed a multiplayer 3D game in C++ and OpenGL with 6 fellow teammates.
- Worked on graphics modules to manage mesh data and render with texture mapping.
- Implemented an efficient 2D OBB (oriented bounding box) collision checking utility for the game server.
- Wrote Python scripts to export collision data from level designs done in Blender to the game server.

Monte Carlo Path Tracer

Developer

[📄 Report](#)

- Developed a Monte Carlo Path Tracer in C++.
- Wrote vairous BRDFs including Phong model, GGX microfacet model and Disney Principled BRDF.
- Implemented Russian Roulette techniques and MIS (multiple importance sampling) to reduce noises.
- Extended a Photon Mapping pass to produce better caustics for transparent objects.

Ready Set Cook

Project Manager

[📺 Video](#), [🐙 Code](#)

- Led a team of 10 students with different backgrounds and skills.
- Developed a smart recipe mobile application using Fierbase and Flutter SDK.
- Followed agile development practice with weekly meetings, code reviews and detailed design documents.

TUTORING EXPERIENCE

UC San Diego, CSE 167 Computer Graphics

Jan. 2022 – Mar. 2022

UC San Diego, CSE 105 Theory of Computation

Mar. 2021 – Jun. 2021

SKILLS

Programming Languages: *Experienced in* C, C++, Python; *Familiar with* MATLAB, Java, Scheme

Frameworks & Libraries: CUDA, Eigen, OpenGL, ImGui, Warp, NumPy, SciPy, PyTorch, Open3D, PyVista

Software Tools: Git, ROS, Bash, Linux, CMake, Docker, LaTeX, Blender, Houdini