Renggeng (Reng) Zheng

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Education

Massachusetts Institute of Technology *Cambridge, MA*
M.Eng. in Computer Science: May 2027
Double BSc. in Artificial Intelligence and Philosophy: May 2026 | GPA: 5.0

- Current Courses: Statistics | Infant and Early Childhood Cognition | Philosophy of Science
- Prior Courses: Hardware Architecture for Deep Learning | Digital Systems Laboratory | Computer Vision | Robotics Systems and Sciences | Optimization Methods | Computational Cognitive Science | Intro to Inference

Stuyvesant High School: June 2022 | GPA: 96.93 | SAT: 800 Math + 780 English *New York, NY*

Professional Experience

MIT Energy-Efficient Multimedia Systems Group Researcher **(Oct '22 - Present)** *Cambridge, MA*
Supervisor: Michael Gilbert | Principal Investigators: Joel Emer and Vivienne Sze

- Extended NVIDIA Timeloop with 50+ Python bindings enabling a 40+ student-class to use in their capstone.
- Created a novel ISL model for simulating data distribution in distributed-buffer architectures in Timeloop.
- Integrating distributed buffer analysis with a new mapping tool currently under development.

Hardware Architecture for Deep Learning Teaching Assistant **(Dec '24 - Jun '25)** *Cambridge, MA*

- Revised 5 labs for the course to clarify wording, correct content errors, and suggest problem modifications.
- Taught over 40 students how deep learning implementations like tiling and loop nests manifest in hardware.
- Assisted 24 project teams with their capstone design project exploring hardware-software co-optimization.

Digital Systems Laboratory Lab Assistant **(Sep '25 - Present)** *Cambridge, MA*

- Scrutinized SystemVerilog for 10 hours per week in a class of 150+ students for code quality and errors.
- Reviewed methods of generating synthetic testbenches and debugging waveforms in cocotb to test buffer timings.

MIT Motorsports Perception Lead **(Sep '24 - Present)** *Cambridge, MA*
Software Engineer **(Sep '22 - Sep '24)**

- Determined minimum design requirements for the sensors, including FOV, monocular overlap, and resolution.
- Integrating cameras and LiDAR with BEVFusion in ROS 2 and producing a 10+-hour training dataset.
- Led 4-person perception subteam, coordinating across a 18-member autonomous-vehicle sub-team.

Science of Intelligence Cluster Research Intern **(Jun '24 - Aug '24)** *Berlin, Germany*
Supervisor: Yating Zheng | Principal Investigator: Pawel Romanczuk

- Developed 3 point-to-point collective shepherding methods using convex hulls to estimate global information.
- Verified simulation results across 1,000 runs, showing 98%+ task completion for all 3 methodologies.
- Demonstrated that multi-agent coordination is possible with limited local information on shepherding tasks.

Projects

Midas: A One-Shot Greedy Architecture Optimizer **(Apr '24 - May '24)** *Cambridge, MA*

- Developed an accelerator optimization algorithm with 60% greater loss reduction than coordinate descent.
- Showed that an additional 16% reduction in loss can be achieved by combining coordinate descent and Midas.
- Demonstrated such methods are only 10% worse on average than a full grid search, using ~30% of the runtime.

AudioNet: Generating Images from Audio with ControlNet **(Mar '24 - May '24)** *Cambridge, MA*

- Replicated ControlNet results on the Fill50k dataset to verify model viability on the compute cluster.
- Extended ControlNet to produce 1,000+ images from audio on the Sound2Scene dataset and evaluated quality.
- Found preliminary viability for diffusion models for audio-to-image as ~5% of samples were reasonable inferences.

Skills

- Languages: Python 3, C++, C, Julia, SystemVerilog, RISC-V assembly, R, Java, JavaScript
- Frameworks/Libraries: Integer Set Library, cocotb, Numba, pybind11, PyTorch, ROS 2, FreeRTOS, Gurobi
- Developer Tools: Unix, Git, GitHub, CMake, Shell scripting, Docker, SSH, JTAG, GDB, Oscilloscope