SAM SCHEELE

sam.scheele@yahoo.com | sscheele.github.io | sam-scheele | sscheele

Computer scientist specializing in robotics and machine learning with a proven track record of building AI systems for disaster relief. Broad technical experience including LLMs, computer vision, robotics, and DevOps and MLOps.

Skills

- **Programming Languages:** Python, Rust, C/C++, Javascript, Java, Julia, Zig
- **Data Science & Machine Learning:** Pytorch, MLFlow, Huggingface, Pandas, scikit-learn, LLMs, RAG, Computer Vision, data processing/discovery, model deployment, knowledge graphs
- **Robotics:** Motion planning, dexterous manipulation, close-proximity human-robot collaboration, controls (PID, LQR, MPC), perception, state estimation, deep RL for controls
- **DevOps & Version Control:** Git, Docker, CI/CD (GitHub Workflows), Agile
- **Mathematical & Statistical Tools:** pyomo, numpy/cupy, optimization algorithms, Markov processes, Kalman filters, Koopman operators
- **Research Skills:** Mathematical derivations, algorithm development, technical blogging, experimental design, data visualization, literature review, problem-solving, teaching and communication

Experience

- **MIT Lincoln Laboratory [🌐]** *Feb. 2024 - Present*
  Associate Member of Technical Staff Lexington, MA
  - Conceived and pitched a new program combining RAG with LLM-based code generation for **drone-based disaster response** use cases within first ten weeks of employment, **receiving $200k in initial funding**. Currently acting as **Principal Investigator** on the program, managing both technical and logistical aspects.
  - Demonstrated aptitude for transforming research into real-world impact by serving as primary technical contributor in three projects and reports **successfully deployed to FEMA, HHS, and USAF**.
  - **Boosted development speed by 25%** group-wide by spearheading effort to host internal code completion models.
  - **Modernized group workflows** by initiating DevOps and MLOps efforts, deploying first Grafana dashboards, first experiment tracker, first CI/CD pipeline, custom logging solutions, first model server, first ML observability platform, and many other services, deployed with Docker.
  - Trained and released open-source models and dataset for classification of aerial disaster imagery. Models reached **more than 5k downloads**.
  - Developed machine learning model to **predict earthquakes using ionospheric data with 87.7% accuracy**. Accelerated iteration time by **more than 100x** by implementing **multi-node distributed training** and improving data coherency to reduce frequency of disk accesses.
  - RAG projects: developed, deployed, and **iterated based on user interviews** for several projects utilizing Retrieval-Augmented Generation (RAG) and agentic RAG for sponsored and internal "blue sky" projects.
  - Served as Lead Instructor of MIT Beaver Works Summer Institute class in Remote Sensing for Disaster Relief, teaching elements of GIS analysis, remote sensing, machine learning, logistics, and more. **Led a team of two co-instructors and five TAs** to create course material and instruct a class of high school students.
  - Presented findings at conferences, including CVPR EarthVision, and directly to existing and prospective sponsors.
- **Internships** *Summer 2018, 2019*
  Intern
  - **The Aerospace Corporation [🌐]**: Generated challenging synthetic datasets using Unreal Engine for training computer vision algorithms on RGB-D data.
  - **Georgia Tech Research Institute [🌐]**: Implemented simulated compliance by independently deriving nonsingular compliant control code on 6dof robotic arm. Final product was able to faithfully recreate vector graphics by drawing them on a whiteboard.
- **(TA) Robotics and Perception Class, Georgia Institute of Technology** *Fall 2021*
  Head TA Atlanta, GA
  - Led a team of 10 TAs to teach the principles of robotics software to a class of 150 students at Georgia Tech.
  - Designed course content, coordinated TA efforts, and modified both internal and student-facing course policies to maximize course legibility and minimize administrative overhead.
  - Performed at the highest possible tier on all 12 student evaluation metrics on end-of-semester survey.

Education

- **Georgia Institute of Technology** *August 2021 - July 2023*
  MS Computer Science, specialization in Robotics and Computational Perception Atlanta, GA
  - GPA: 4.0/4.0 (Highest Honors)
  - Thesis: "Anticipatory and Reactive Motion Planning"

  BS Computer Science, minor in Robotics *August 2017 - July 2021*
  - GPA: 3.8/4.0 (Highest Honors)

Projects and Volunteer Work

- **Open Source Contributor: Helix Editor** *Spring 2023*
  Tools: Rust [GitHub]
  - Contributed to code and documentation of Helix, a modal text editor and IDE used by tens of thousands of people. Learned the systems programming language Rust in order to make meaningful contributions.
  - Extended editor functionality by adding feature to respect gitignore files, enabling greater project flexibility.
  - Optimized performance by skipping rendering for graphemes not in editor viewport.
- **Prototyping Instructor, Georgia Tech Invention Studio** *2021-2023*
  Tools: waterjet, FDM and resin 3D printers, laser cutters, manual mill, wood shop, metal shop, electronics bench
  - Assisted students and faculty on a volunteer basis with designing and building prototypes and proofs-of-concept at the Georgia Tech Invention Studio, the largest student-run prototyping facility in the US.
  - Provided training on many of the tools available in the Studio with the goal of empowering users.
- **LLM Poker Tutor** *2025-Present*
  Tools: FastAPI [Web]
  - Developed a browser-based web application to teach poker skills by integrating an LLM-based tutor into a virtual poker game. The tutor can give specific guidance based on the current hand and is guided by the results of a poker solver, so it can reliably find and explain the best play on each street

Publications

Abhinav Jain, Daphne Chen, Dhruva Bansal, **Sam Scheele**, Mayank Kishore, Hritik Sapra, David Kent, Harish Ravichandar, and Sonia Chernova (2020). *Anticipatory Human-Robot Collaboration via Multi-Objective Trajectory Optimization*. arXiv: 2006.03614 [cs.RO]. URL: https://arxiv.org/abs/2006.03614.

Jessica Reid, Jeffrey Liu, **Sam Scheele**, Bhavani Ananthabhotla, Matthew Weiss, and Dieter Schuldt (Dec. 2021). "QuakeCast: Forecasting Earthquakes from Preseismic Ionospheric Signals Using Machine Learning Refinements and Advances". In: *AGU Fall Meeting Abstracts*. Vol. 2021, NH35D-0494, NH35D–0494.

Sam Scheele (2023). "Anticipatory and Reactive Motion Planning". MS Thesis. Georgia Institute of Technology.

Sam Scheele, Pierce Howell, and Harish Ravichandar (2023). *Fast Anticipatory Motion Planning for Close-Proximity Human-Robot Interaction*. arXiv: 2305.11978 [cs.RO]. URL: https://arxiv.org/abs/2305.11978.

Emma McDaniel, **Sam Scheele**, and Jeff Liu (2024). *Zero-Shot Classification of Crisis Tweets Using Instruction-Finetuned Large Language Models*. arXiv: 2410.00182 [cs.CL]. URL: https://arxiv.org/abs/2410.00182.

Sam Scheele, Katherine Picchione, and Jeffrey Liu (2024). *LADI v2: Multi-label Dataset and Classifiers for Low-Altitude Disaster Imagery*. arXiv: 2406.02780 [cs.CV]. URL: https://arxiv.org/abs/2406.02780.

Additional Information

Languages: Spanish (Conversational), Italian (Beginner)
Interests: Blog [Web], mathematical puzzles, meditation, language learning, cooking