Ryan Hartzell

MS-Thesis Student
Robotics
Colorado School of Mines
Golden, CO

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Intro

Image scientist with 6 years of experience supporting Space Domain Awareness solutions. Background in remote sensing, computer vision, and software systems engineering. Interested in research opportunities in spacecraft autonomy, rendezvous and proximity operations, target characterization, and simulation & modeling.

Work / Experience

- **RoSE (Robotic Space Exploration) Lab @ Mines - Hourly Research Assistant** *Golden CO, '25 - present*
  - Developing real-time SLAM algorithm for Lunar rover research in traversability mapping. Managing team of undergraduates under Dr. Frances Zhu.
- **Intermediate Scientist @ Frontier Technology Inc. (FTI) Sensors & Data Services** *Boston MA, '18 - '25*
  - Supported several space domain awareness programs. Presented study results to government customers during technical exchange meetings and supported on-site test events.
  - Evaluated and developed image processing, image calibration, and distributed sensor scheduling algorithms while interfacing with software devs and cloud architecture engineers.
  - Internal Research & Development (IR&D)
    - Developed scripting APIs, web interfaces, and database backends for FTI's simulation stack
    - Proposed and designed GPU-enabled CUDA backend for the FTI Sensor Model for intern/R&D project.
    - Proposed, designed, and implemented multiple new physics modules and enhancements for the FTI Sensor Model and a cloud-native Docker and OpenFaaS backend for the FTI simulation stack.
- **Image Science Intern @ Harris Corp. Space & Intelligence Systems** *Rochester NY, Summers '16 & '17*
  - Worked on automation of the group's DIRSIG simulation pipeline using Python and Blender. Contributed to a dynamic scene visualization app in Python for debugging DIRSIG scenes prior to full-fidelity render execution.

Education

- **MS-Thesis Student, Robotics @ Colorado School of Mines** *Golden CO, '24 - present*
  - Specializing in robotic perception and distributed systems. Also interested in robot path planning and autonomy.
- **BS Imaging Science @ Rochester Institute of Technology (RIT)** *Rochester NY, '14 - '18*
  - Program focused on the physics of the imaging chain, remote sensing, imaging system characterization and calibration, and computer vision.
  - Exposed me to sUAS research and earth observation remote sensing for a variety of applications.

Projects

- **Bildkedde: Python-based astronomical image simulation package**
  - Simulates staring arrays targeting far-field point sources and poorly resolved objects. Heavy focus on developing a modular image chain for my own sandboxing and hacking. Work in progress.
- **ConSeQuor: CONsistent, SEquential, and QUORum-based resource replication app**
  - Project for Distributed Systems demonstrating multiple types of resource replication strategies using a simple Streamlit web-app and backend Python code for networking, replica management, and leader-election when relevant.
- **OculiCaeli: Density-Based Tasking of Arbitrary Space-Telescope Networks for Space Situational Awareness**
  - This project plays with astrodynamics and space-telescope tasking and planning concepts, with both a functional greedy scheduler and semi-functional RL scheduler implemented so far.

Domain Skills

- Systems engineering support
- Sensor and image simulation
- Distributed sensor tasking and planning
- Data science and trade-study formulation
- Performant algorithm design and evaluation
- Imaging system characterization and calibration
- Fourier analysis (MTF)

Software Skills

- **Computing**
  Advanced: Python
  Intermed.: C++, Matlab
  Novice: CUDA
  Read-Only: Java, C#
- **Frameworks/Tools**
  Ansys STK,
  PyTorch, CuPy,
  Dask, RAPIDS,
  MODTRAN
- **Web/Cloud**
  JS/Typescript
  Docker
  Kubernetes
  OpenFaaS
- **Data Storage**
  SQL (MySQL, Postgres),
  MongoDB
  S3
  Redis