
# 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.

## Industry Experience

- **Intermediate Scientist @ Frontier Technology Inc. (FTI) Sensors & Data Services** *Boston MA, '18 - present*
  - Supported several unclassified and classified space domain awareness programs, presenting study results to government customers during technical exchange meetings.
  - Evaluated and developed image processing, image calibration, and distributed sensor scheduling algorithms while interfacing with software devs and cloud architecture engineers.
  - Internal Research & Development
    - 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. Implemented by intern due to funding constraints with close supervision by me.
    - 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 utility in Python for pre-rendering and 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. Attempting to get involved in space robotics via the Space Resources program at Mines.
- **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. Heavy focus on developing a modular image chain for my own sandboxing and hackery. Work in progress.
- **ImagePypelines: Graph-based Python data processing pipelines w/ dashboard**
  - Fun project some friends and I created for remote execution and monitoring of data processing pipelines in Python.
- **scanimate: Tiny static animation generator**
  - Fun little (stable!) python package available on PyPi. Used for creating static Moire pattern (aka barrier grid, aka kinegram) animations of GIFs or image stacks.

## 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#
- **Web/Cloud**
  JS/Typescript
  Docker
  Kubernetes
  OpenFaaS
- **Frameworks/Tools**
  Ansys STK,
  PyTorch, CuPy,
  Dask, RAPIDS,
  MODTRAN
- **Data Storage**
  SQL (MySQL, Postgres),
  MongoDB
  S3
  Redis