

Ritesh Chowdhry

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EDUCATION

Ph.D. in Electrical and Computer Engineering

Aug. 2021 - Present

University of Florida, GPA: 3.73/4.0

Thesis topic: Beyond Band Masking: Decomposition-Guided Self-Supervised Learning for Hyperspectral Images

M.S. in Electrical and Computer Engineering

Aug. 2019 - Aug. 2021

University of Florida, GPA: 3.8/4.0

SKILLS

- **Programming Languages and Libraries:** Python, C/C++, Pandas, SQL, Latex, Shell, SciPy, OpenCV
- **Frameworks and Tools:** PyTorch, Lightning, Tensorflow, Slurm, Linux, ROS, Git, SLAM, AWS, GCP
- **Domain Skills:** Computer Vision, Machine Learning, Self-Supervised Learning, Remote Sensing, Transformers

WORK EXPERIENCE

Amazon, *Applied Scientist Intern, Seattle, WA*

June 2026 - Aug. 2026

- Built **LLM** routing benchmark labeling correctness, dollar cost, and served latency in the same query-model cell (402,510 cells, 15 models, 11 vendors, 18 datasets, including closed commercial flagships); cheapest-correct and fastest-correct models disagree on 34.1% of solvable queries.
- Developed query-level router pairing a **kNN** capability estimate with a learned head under a joint cost-latency penalty, matching the best single model's accuracy while saving 20.5% cost and 7.9% latency on all 20 seeds; ported six published routers for like-for-like comparison.
- Added **calibrated** confidence gating (calibration error 0.017) lifting accuracy from 77.9% to 89.1% at 80% coverage.

Amazon, *Applied Scientist Intern, Seattle, WA*

June 2025 - Aug. 2025

- Developed agentic system using **VLMs** via **AWS** Bedrock to automate financial report analysis over plots, tables, and markdown, cutting manual work by 20-30 min/report across hundreds of daily scenarios.

NumFOCUS Organization, *Google Summer of Code Contributor*

June 2025 - Aug. 2025

- Developed open-source package **NeonCrops** with end-to-end NEON data pipeline, multimodal dataset (234 species, 41,738 crowns, 38 sites, RGB/hyperspectral/LiDAR), and [classification pipelines](#) for ecology research.

RESEARCH EXPERIENCE

University of Florida, Machine Learning and Sensing Lab

Aug. 2021 - Present

Doctoral Student Researcher

Gainesville, FL

Self-Supervised Representation Learning for Hyperspectral Imagery (HSI)

- Developing novel **MAE** framework using **ViT** for HSI with component-level masking in decomposed representation spaces, addressing fundamental limitations of band-level masking in **self-supervised** learning.
- Achieved 15% F1 score improvement over supervised baselines on tree species classification using self-supervised and semi-supervised learning with 2M unlabeled samples from NEON sites.

Pixel-Level Soil Water Content Prediction Using Deep Learning

- Developed first approach for pixel-level soil moisture mapping in rhizosphere systems using DenseNet-inspired CNN and hyperspectral imaging ($R^2=0.89$ at $\sim 0.5\text{mm}$ resolution), with **UNet** segmentation for root-soil separation; led creation of the [HyperPRI dataset](#).

PUBLICATIONS

- Graves, S. J., **Chowdhry, R.**, ... & Bohlman, S. A. (2025). Facilitating macrosystem biology with organismal-scale airborne remote sensing: Challenges and opportunities. *Functional Ecology*.
- Chang, S. J., **Chowdhry, R.**, Song, Y., ... & Zare, A. (2024). HyperPRI: A dataset of hyperspectral images for underground plant root study. *Computers and Electronics in Agriculture*, 225, 109307.