

OISHEE BINTEY HOQUE

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EDUCATION

University of Virginia

Ph.D. in Computer Science; M.S. in Computer Science (2025)

Aug 2021 – Early Spring 2027 (Expected)

Charlottesville, VA

- UVA SEAS Endowed Fellowship (2025), awarded to 20–25 top doctoral students across SEAS.

Ahsanullah University of Science and Technology

B.Sc. in Computer Science and Engineering; Dean's List of Honor (Top 5)

May 2015 – Aug 2019

Dhaka, Bangladesh

RESEARCH INTERESTS

VLMs, Multimodal Learning, Foundation-Model Adaptation, Detection & Segmentation, Agentic AI, GeoAI

WORK EXPERIENCE

Amazon (GRAISE)

Applied Scientist Intern

Sep 2026 – Present

Seattle, WA

- Building **multimodal AI for retail smart glasses**: real-time on-device vision (detection, segmentation, tracking), **cloud vision–language and multimodal foundation models (VLMs, LLMs, SAM)**, and hands-free AR and voice workflows.

Oak Ridge National Laboratory (GeoAI Group)

Graduate Research Intern (GRO Program)

May 2026 – Aug 2026

Oak Ridge, TN

- Led **CWDBench** (WACV 2027, first author) on post-disaster forest damage: **instance segmentation and oriented detection** of fallen logs in centimeter-resolution UAV imagery; adapted **SAM** and **Mask2Former**, benchmarked ten oriented detectors and explored gated **RGB–LiDAR fusion**.
- Co-developed **ARFA**, a hybrid **agentic system** pairing LLM agents with deterministic geospatial tools for flood response; team finalist, ACM SIGSPATIAL OASIS 2026.

University of Virginia, Biocomplexity Institute

Graduate Research Assistant

Aug 2021 – Present

Charlottesville, VA

- Exploring **multimodal agentic architectures that unify multi-spectral imagery with heterogeneous environmental metadata** for knowledge-grounded reasoning and decision-making in geospatial workflows.
- Conducted research in VLMs, multimodal and representation learning, designing data-centric pipelines and knowledge-guided vision frameworks for segmentation, classification and geospatial understanding.

USDA-ARS SCINet & USDA/NSF AIFS

Research Intern (SCINet/AI-COE Graduate Student Internship; AI Institute for Next Generation Food Systems)

Jun 2023 – Aug 2023

- Identified the most informative Landsat bands and spectral indices for irrigation mapping.
- Implemented incremental patch-size training, with ~20% F1 gains over strong baselines; presented at CVPR 2024 (Vision for Agriculture workshop, oral).

Enosis Solutions

Software Engineer

Aug 2020 – Jul 2021

Dhaka, Bangladesh

- Developed and maintained a production-grade incident management tool, and built a full-stack web platform for training and testing ML models (React.js, Node.js/Express, MongoDB, SQL Server, REST APIs).

PUBLICATIONS *(selected, first author)* [[View Full List](#)]

- [[WACV'27](#)] **CWDBench: A Benchmark for Instance-Level Characterization of Coarse Woody Debris in Aerial Imagery** (Datasets Track, accepted)
 - Built the first public benchmark for fallen-log detection in centimeter-resolution UAV orthomosaics: 10,399 verified instances with **oriented boxes and masks**, paired **LiDAR/photogrammetric height models** and a **centerline-based metric**.
- [[EarthVision @ CVPR'26](#)] **CAFOSat: A Strongly Annotated Dataset for Infrastructure-Aware CAFO Mapping Using High-Resolution Imagery** [[PDF](#)] [[GitHub](#)]

- Refined noisy geolocations with **Grad-CAM-based clustering** and built a strongly annotated dataset through AI-assisted annotation (DINOv2) and **generative augmentation** (GroundingDINO, Stable Diffusion inpainting).
- **[WACV’26] PRISM-CAFO: Prior-conditioned Remote-sensing Infrastructure Segmentation and Mapping for CAFOs** [PDF] [GitHub]
 - Developed an **interpretable, infrastructure-aware** classifier that fuses **object-level representations** (YOLOv8, SAM2, DINOv2) and **domain priors** via **mask-guided spatial attention**; +15% F1 over vision-only baselines.
- **[NeurIPS’25] IRRISIGHT: A Large-Scale Multimodal Dataset and Scalable Pipeline to Address Irrigation and Water Management in Agriculture** [PDF] [Dataset] [GitHub]
 - Built a **multimodal geospatial dataset** (>1.4M image–text patches) and **fine-tuned and benchmarked vision and CLIP-based models** with scalable, reproducible vision–language pipelines.
- **[KDD’25] IrrMap: A Large-Scale Comprehensive Dataset for Irrigation Method Mapping** [PDF] [ACM Kudos] [Dataset] [GitHub]
 - Built an ML-ready geospatial dataset (1.1M patches covering 14M acres) for national-scale irrigation type **classification and field segmentation**.
- **[IJCAI’25] Knowledge-Informed Deep Learning for Irrigation Type Mapping from Remote Sensing** [PDF] [GitHub]
 - Developed a **knowledge-guided multi-stream transformer** that integrates **domain priors with visual features**, achieving a 71% F1 gain on the minority class and +22.9% overall IoU.
- **[IJCAI’25] IGraSS: Learning to Identify Infrastructure Networks from Satellite Imagery by Iterative Graph-constrained Semantic Segmentation** [PDF] [GitHub]
 - Combined **segmentation models** (ViTs, DeepLabv3) with **iterative graph refinement of noisy labels**, cutting unreachable canal segments from 18% to 3%; introduced *r*-neighborhood metrics for thin-structure evaluation.

TECHNICAL SKILLS

Machine Learning: Vision–Language Models, Multimodal Learning, Foundation Models, LLM Agents, Instance/Semantic Segmentation, Oriented Object Detection, Fine-Tuning, Transfer Learning, Prompting/Evaluation, Dataset Engineering

Languages: Python, C++, JavaScript/TypeScript, SQL

Frameworks and Tools: PyTorch, TensorFlow/Keras, Hugging Face Transformers, OpenCV, NumPy, Pandas, PyTorch Lightning, OpenAI GPT/ChatGPT API, Claude Code, Git, Slurm, Weights & Biases, Hydra

Geospatial: Rasterio, GDAL, QGIS, ArcGIS, Google Earth Engine, AlphaEarth Embeddings, GeoPandas

ACHIEVEMENTS

- **Awards/Fellowships:** UVA SEAS Endowed Fellowship (2025, \$12,000); USDA–ARS AI-COE/SCINet Graduate Student Fellowship (2023); Undergraduate Merit Award (Dean’s List of Honor, AUST).
- **Competitions:** Finalist, [ACM SIGSPATIAL OASIS 2026](#) Student Challenge (ARFA); 3rd Place, AgAthon 2023; 11th/120, National Girls Programming Contest 2018; 5th, Intra-AUST Programming Contest 2016.
- **Recognition:** Featured in the [USDA SCINet Newsletter](#) (Jul 2025) for “Advancing Irrigation Mapping Through AI and Remote Sensing”; [ACM Kudos](#) highlight for IrrMap (2025).
- **Travel Grants:** Google DeepMind team grant (SIGSPATIAL 2026); WiCV @ CVPR 2026; Harvest Vision @ WACV 2026; IJCAI 2025; CRA-WP Grad Cohort (2023, 2025); CVPR 2024 DEI; WiCV @ CVPR 2024.

LEADERSHIP, MENTORING AND SERVICE

- **Undergraduate Research Mentor** (Jun 2025 – Spring 2026), Biocomplexity Institute: mentored undergraduates in computer vision for remote sensing; CRA UR2PhD mentor training (Fall 2025).
- **Teaching Assistant**, UVA CS (2021 – 2025): Neural Networks, Machine Learning, DSP, Mobile App Development.
- **Space & Media Chair** (2022) and **Social Chair** (2024), UVA CS Graduate Student Group Council; **Reviewer**, CVPR 2024 Vision for Agriculture Workshop.