

# Namitha Guruprasad

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## Research Interests

My research focuses on 3D and 2D computer vision for real-world autonomy, centered on camera-agnostic 3D reconstruction, registration, visual localization, and structure-from-motion that stay robust across diverse camera models, lens distortions, and varying altitude, alongside real-time tracking and identification. A growing direction explores agentic AI for perception pipelines. This work is supported by the IARPA WRIVA and VideoLINCS programs, with applications in aerial perception, autonomy, surveillance, and robotics.

## Education

**Johns Hopkins University**, Baltimore, USA 2024 – Present

- Ph.D. in Electrical and Computer Engineering (M.S.E. awarded en route), AIEM Lab; advised by Dr. Rama Chellappa (Bloomberg Distinguished Professor)

**University of Alberta**, Edmonton, Canada 2021 – 2023

- M.Sc. in Computing Science; advised by Dr. Nilanjan Ray and Dr. Gilbert Bigras (Cross Cancer Institute)
- Thesis: [A Closer Look at Weak Supervision's Limitations in WSI Recurrence Score Prediction](#)

**Visvesvaraya Technological University (BNMIT)**, Bengaluru, India 2016 – 2020

- B.E. in Computer Science and Engineering; advised by Dr. Sejal Nimbhorkar

## Selected Projects and Research Experience

**CAM3R: Camera-Agnostic 3D Reconstruction** Sept 2025 – Feb 2026

*Mentors: Dr. Cheng Peng, Dr. Abhay Yadav, Dr. Rama Chellappa (IARPA WRIVA)*

- Developed CAM3R, a camera-agnostic, feed-forward model that recovers dense 3D geometry from unposed images across heterogeneous cameras (pinhole, fisheye, panoramic).
- Eliminated the pinhole assumption baked into feed-forward foundation models such as DUS3R, MAST3R, and VGGT, enabling robust reconstruction under lens distortion and diverse optics.
- Demonstrated strong two-view and multi-view reconstruction on unseen real-world scenes (e.g., the 360Loc dataset), improving generalization across camera types.

**Pose-Graph Reconstruction of Unordered Aerial Imagery** Apr 2026 – Present

*Mentors: Chandrakanth Gudavalli, Dr. Abhay Yadav, Dr. Rama Chellappa (IARPA WRIVA, with Mayachitra)*

- Developing pose-graph and scene-graph methods to register large collections of unordered, unregistered images captured at varying altitude.
- Tackling doppelgänger scenes (visually similar but geographically distinct places) that break standard structure-from-motion, in collaboration with Mayachitra (industry partner).

**Occlusion-Robust Embeddings for Real-Time Tracking** Jun 2026 – Present

*Collaborators: Johns Hopkins University and STR (industry partner) (IARPA VideoLINCS)*

- Developing occlusion-robust embeddings for real-time multi-object tracking and re-identification under heavy occlusion, crowding, and viewpoint change in unconstrained video.

**Large-Scale Reconstruction and Rendering at Varying Altitude** Jul 2024 – Present

*Mentors: Dr. Cheng Peng, Dr. Abhay Yadav, Dr. Rama Chellappa (IARPA WRIVA)*

- Integrated feature extraction, matching, and image registration into a large-scale 3D reconstruction pipeline for varying-altitude imagery, supporting WRIVA challenge and phase deliverables.
- Engineered scalable software and evaluation infrastructure (AWS, Docker, Kubernetes, Airflow) for multi-institution benchmarking and deployment.

**Weak Supervision for Whole-Slide Image Recurrence Prediction** Jul 2021 – Aug 2023

*Mentors: Dr. Nilanjan Ray, Dr. Gilbert Bigras*

- Predicted the Oncotype DX recurrence score for breast cancer from whole-slide images using weakly supervised attention-based multiple-instance learning (CLAM, TransMIL).
- Exposed a key failure mode: on gigapixel recurrence slides, attention models fixate on non-malignant tissue and miss tumoral regions, unlike on standard metastasis benchmarks.
- Built an interactive, pathologist-in-the-loop GUI (OpenSeadragon, OpenSlide) that corrects attention heatmaps and feeds the corrections back into training to improve recurrence prediction.

**Video Summarization and Activity Recognition for Surveillance** 2019 – 2020

*Mentor: Dr. Sejal Nimbhorkar*

- Built a two-step action-based video summarization pipeline: content-based key-frame selection followed by redundancy

removal to produce compact summaries.

- Combined PCA/LDA feature extraction, a CNN frame classifier, and K-Means and Bayesian summary generation to retain the most informative frames.
- Evaluated on the SumMe benchmark and applied to CCTV surveillance footage for rapid activity review.

## Selected Publications

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1. **Namitha Guruprasad**, Abhay Yadav, Cheng Peng, Rama Chellappa. [CAM3R: Camera-Agnostic Model for 3D Reconstruction](#), *ECCV*, 2026.
2. **Namitha Guruprasad**, Amir Akbarnejad, Gilbert Bigras, Penny J. Barnes, Nilanjan Ray. [A Closer Look at Weak Supervision's Limitations in WSI Recurrence Score Prediction](#), *IEEE BIBM*, 2023.
3. Ricardo G. Suarez, **Namitha Guruprasad**, Ganesh Tata, Zhengxiao Zhang, Gili Focht, Daniel McClement, Víctor Manuel Navas-López, Sibylle Koletzko, Anne M. Griffiths, Oren Ledder, Lissy De Ridder, David Wishart, Ben Nichols, Konstantinos Gerasimidis, Dan Turner, Eytan Wine. [Serum metabolites relate to mucosal and transmural inflammation in paediatric Crohn disease](#), *Journal of Crohn's and Colitis*, 2024.
4. Ricardo G. Suarez, **Namitha Guruprasad**, Ganesh Tata, Zhengxiao Zhang, Gili Focht, Víctor Manuel Navas-López, Sibylle Koletzko, Anne M. Griffiths, David Wishart, Eytan Wine. [Identifying the Most Important Predictors to Correlate Serum Metabolites with MRE Changes in Pediatric Crohn Disease](#), *J. Canadian Assoc. of Gastroenterology*, 2023.
5. Raksha Harish\*, **Namitha Guruprasad\***, Sejal Nimbhorkar. [Action-based Video Summarization](#), *IEEE TENCON*, 2019. (\* equal contribution)

## Patents

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Ankitha Sudarshan\*, **Namitha Guruprasad\***, Raksha Harish\*, Sejal Nimbhorkar. [System and Method for Image Analysis and Summarization](#), Indian Patent No. 201941033734, granted 2025. (\* equal contribution)

## Professional Experience

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<b>Graduate Research Assistant</b> , Johns Hopkins University (AIEM Lab), Baltimore, USA	Jan 2024 – Present
<b>Graduate Research Assistant</b> , University of Alberta, Edmonton, Canada	May 2021 – Oct 2023
<b>Data Science Intern</b> , Vision Digital India, Bengaluru, India	Jun 2019 – Aug 2019

## Technical Skills

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**Expertise:** 3D reconstruction, multi-view geometry, structure-from-motion, camera calibration, image registration, visual localization, pose estimation, deep learning, real-time tracking and identification

**Programming:** Python, C++, C, Java, JavaScript, MATLAB, R, Bash

**ML & Vision:** PyTorch, TensorFlow, OpenCV, COLMAP, scikit-learn, NumPy, Hugging Face

**Infrastructure & MLOps:** AWS, Docker, Kubernetes, Airflow, SLURM, Linux, Git, CI/CD

## Teaching Experience

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Teaching Assistant, <i>Machine Intelligence</i> (EN.520.650), Johns Hopkins University	Spring 2025, 2026
Teaching Assistant, University of Alberta	2021 – 2023

- Introduction to Machine Learning (CMPUT 466/566); Intelligent Systems (CMPUT 366); Human-Computer Interaction (CMPUT 302)

## Honors and Awards

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- ECE Departmental Fellowship, Johns Hopkins University (2024)
- Thesis-based tuition waiver and stipend, University of Alberta (2021)
- VTU Gold Medal, Class of 2020
- FKCCI Manthan business-plan finalist, top 5% (2020)
- IEDC, Government of India research grants (INR 2,00,000 each, two projects) (2019)
- Smart India Hackathon (Hardware Edition) finalist; team lead, “The Neural Soldiers” (2019)

## Academic Service and Mentoring

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- Reviewer: IEEE BIBM (conference); International Journal of Computer Vision (IJCV)
- Mentoring: Alethea Nagahara (Undergraduate, University of Southern California)