

# Hafeez Khan

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## EDUCATION

- Florida Institute of Technology** Florida, USA  
*Masters & Ph.D. in Computer Science (Thesis Advisor: Prof. Siddhartha Bhattacharyya)* Aug. 2023 - Present
- Birla Institute of Technology and Science, Pilani** Dubai, UAE  
*Bachelors of Engineering in Computer Science (Thesis Advisor: Prof. Raja Muthalaghu)* Aug. 2019 – July. 2023

## RECENT PUBLICATIONS

\* equal contribution

### Test-time Prompt Refinement for Text-to-Image Models [\[PDF\]](#)

[M.A. Hafeez Khan\\*](#), Yash Jain\*, Siddhartha Bhattacharyya, Vibhav Vineet

[\[Oral Presentation\]](#) Workshop on Multimodal Reasoning and Slow Thinking in Large Model Era at **ICCV**, 2025

### Adapt, But Don't Forget: Fine-Tuning and Contrastive Routing for Lane Detection under Distribution Shift [\[PDF\]](#)

[M.A. Hafeez Khan](#), Parth Ganeriwala, Sarah M. Lehman, Siddhartha Bhattacharyya, Amy Alvarez, Natasha Neogi

Workshop on Out Of Label Hazard Detection in Autonomous Driving at **ICCV**, 2025

### Few-Shot Classification and Anatomical Localization of Tissues in SPECT Imaging [\[PDF\]](#)

[M.A. Hafeez Khan](#), Samuel M. Boddepalli, Siddhartha Bhattacharyya, Debasis Mitra

[\[Oral Presentation\]](#) Medical Imaging Conference (**MIC**), 2025

### ALINA: Advanced Line Identification and Notation Algorithm [\[PDF\]](#)

[M.A. Hafeez Khan](#), Parth Ganeriwala, Siddhartha Bhattacharyya, Natasha Neogi, Raja Muthalagu

Workshop on Vision Datasets Understanding at **CVPR**, 2024

### A Hybrid BiLSTM-CNN Approach for Intrusion Detection for IoT Applications [\[PDF\]](#)

[M.A. Hafeez Khan](#), Sapna Sadhwani, Raja Muthalagu, Pranav Pawar, K. Suresh

**Scientific Reports**, Springer, 2024

## RESEARCH AND WORK EXPERIENCE

### Research Assistant at ASSIST Lab (Florida Tech)

Fall 2023 – Present

#### • NASA-Funded Research

Fall 2024 – Present

*Guide: Natasha Neogi, Sarah M. Lehman*

*NASA Langley Research Center, USA*

- Topics: Few Shot Learning, Contrastive Learning, Self-Supervised Learning, Multi-modal learning (Text and Vision)
- Developed 2D/3D vision algorithms for automated labeling and segmentation of lanes and taxiways datasets.
- Designed continual learning methods for lane adaptation across distributions to mitigate catastrophic forgetting.
- Created test-time architecture for few-shot segmentation of lanes using models pretrained on COCO/PASCAL.

#### • Microsoft-Volunteer Research

Spring 2025

*Guide: Yash Jain*

*Microsoft Research, USA*

- Topics: Multi-modal Reasoning (Text and Vision), Diffusion Models, Test-time Adaptation, Prompt Optimization
- Developed a closed-loop test-time prompt refinement framework using multimodal LLMs, improving text-to-image generation by **+20.34%** on DALL-E 3, **+22.75%** on Flux, and upto **+39.36%** on Stable Diffusion models.

#### • DARPA-Funded Research

Summer 2025

*Guide: Junaid Babar, Isaac Amundson*

*Collins Aerospace, USA*

- Topics: Formal Verification, Model Checking, Language Translation
- Built an automated Soar-to-PRISM translator in ANTLR/Java to enable formal verification of cognitive models.

#### • AHA-Funded Research

Summer 2024

*Guide: Venkat Keshav Chivukula*

*UTHealth Houston, USA*

- Topics: Self-Supervised Learning, Representation Learning, 3D Reconstruction, Computational Fluid Dynamics

- Designed LVADNet3D, an autoencoder for intraventricular velocity reconstruction across x, y, and z directions, outperforming UNet3D with **34.13%** lower error and **10.55%** higher fidelity.
- Generated and labeled CFD hemodynamic data from LVAD patients to train and validate 3D deep learning models.

## Software Engineer at Sentient Labs

Guide: Anshul Singhal

Summer 2023

Sentient Labs, UAE

- Built fleet management and health monitoring solutions for commercial drones and leveraged AWS IoT Services.

## AWARDS

- Awarded for **Outstanding Academic Achievement** at Florida Tech 2025
- **Outstanding Undergraduate Thesis Award** for excellent undergraduate thesis at BITS Pilani Dubai 2023
- **Winners in IEEE UAE Computing and Robotics Competition**, for project **Robotics for Road Safety** 2022

## SKILLS

**Programming Languages:** Python, C/C++, Java, R, SQL

**ML Frameworks & Libraries:** PyTorch, TensorFlow, Hugging Face Transformers, OpenCV, MMDetection, diffusers

**Cloud Platforms & Services:** Azure (ML Studio, Blob Storage, Functions, DevOps), AWS (S3, EC2, Lambda, SageMaker, Elastic Beanstalk), GCP (Vertex AI, Compute Engine, Kubernetes Engine, Cloud Storage),

## OTHER PUBLICATIONS

### Modular Test-time Input-Space Refinement for Few-Shot Segmentation

M.A. Hafeez Khan, Parth Ganeriwala, Amy Alvarez, Siddhartha Bhattacharyya

Under submission at NeurIPS conference 2025

### LVADNet3D: A Deep Autoencoder for Reconstructing 3D Intraventricular Flow from Sparse Data

M.A. Hafeez Khan, Marcello Mattei, Ben Diaz, Ruth White, Siddhartha Bhattacharyya, Venkat Keshav Chivukula

Under submission at International Conference on Machine Learning and Applications (ICMLA), 2025

### NORA: A Nephrology-Oriented Representation Learning Approach Towards CKD Classification

M.A. Hafeez Khan, T. Bhattacharyya, O. Khan, Noorah Khan, Alina Khan, M.Q. Khan, Sujoy Hajra

Under submission at International Conference on Machine Learning and Applications (ICMLA), 2025

### Runway vs. Taxiway: Challenges in Automated Line Identification and Notation Approaches [\[PDF\]](#)

Parth Ganeriwala, Amy Alvarez, Abdullah AlQahtani, Siddhartha Bhattacharyya, M.A. Hafeez Khan, Natasha Neogi

IEEE International Systems Conference (SysCon), 2025

### AssistTaxi: A Comprehensive Dataset for Taxiway Analysis and Autonomous Operations [\[PDF\]](#)

Parth Ganeriwala, Siddhartha Bhattacharyya, S. Gunther, Brian Kish, M.A. Hafeez Khan, Aknur Dhadoti, Natasha Neogi

International Conference on Machine Learning and Applications (ICMLA), 2023

### Classification of Microstructure Images of Metals Using Transfer Learning [\[PDF\]](#)

M.A. Hafeez Khan, Hrishikesh Sabnis, J. Angel Arul Jothi, J. Kanishkha, A.D. Prasad

International Conference on Modelling and Development of Intelligent Systems (MDIS), 2022

### Detection of Cavities from Oral Images using Convolutional Neural Networks [\[PDF\]](#)

M.A. Hafeez Khan, Giri Prasad S., J. Angel Arul Jothi

[\[Best Paper Award\]](#) IEEE International Conference on Electrical, Computer and Energy Technologies (ICECET), 2022

### Detection of Bicep Form Using Myoware and Machine Learning [\[PDF\]](#)

M.A. Hafeez Khan, Rohan V. Rudraraju, R. Swarnalatha

International Conference on Advances in Data-driven Computing and Intelligent Systems (ADCIS), 2022

## TEACHING EXPERIENCE

### Graduate Teaching Assistant

Florida Tech

Primary Instructor: Prof. Philip Chan (FLTech)

Aug '23 – May '24

- Course: CSE2010 Algorithms & Data Structures; My Rating: 4.9/5.