

# Md Zahid Hasan

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## OBJECTIVE

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To leverage expertise in AI and conduct collaborative research to advance AI-driven innovative solutions for transportation, public safety, healthcare and agriculture leveraging foundational AI models & Machine Learning

## CREDENTIAL SUMMARY

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- Enrolled in a PhD program and working as a Graduate Research Assistant, focusing on Machine Learning and Computer Vision at the Self-aware Complex System Lab at Iowa State University since Spring 2021
- Obtained Master's degree in Electrical Engineering at Iowa State University in Fall 2024 semester
- Completed and co-authored seven manuscripts for USDA-NIFA, NSF, NIH and FHWA-funded research projects
- Co-led the development of the largest biodiversity dataset to advance AI in biodiversity, agriculture and environment which was featured on the USDA-NIFA website for advancing AI in resilient agriculture and food security research
- Published research work in the Top-ranked Transportation journal (*IEEE Transaction on Intelligent Transportation Systems*) and the most leading flagship journal of Alzheimer's research (*Alzheimer's & Dementia*)
- Presented and co-authored in Top-tier AI and Autonomous Vehicle conferences (*NeurIPS, IEEE IAVVC, ICCPS*)
- Served as a reviewer in a highly reputed AI in Engineering journal (*Engineering Applications of Artificial Intelligence*)

## EDUCATION

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**Doctor of Philosophy (Ph.D.)** January 2021 - Present  
Iowa State University, Major: Electrical Engineering, Minor: Computer Science Ames, IA  
GPA: 3.8/4.0, Focus Area: ML & AI, Advisor: Soumik Sarkar & Baskar Ganapathysubramanian

**Master of Engineering (M.Eng)** January 2023 - August 2024  
Iowa State University, Major: Electrical Engineering Ames, IA  
GPA: 3.8/4.0, Focus Area: ML & AI, Advisor: Soumik Sarkar & Baskar Ganapathysubramanian

**Bachelor of Science (B.S.)** July 2014 - October 2018  
Bangladesh University of Engineering and Technology Dhaka, Bangladesh  
Major: Electrical and Electronic Engineering, GPA: 3.5/4.0

## RESEARCH EXPERIENCE & EMPLOYMENT

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**Machine Learning Graduate Research Assistant** June 2021 – Present  
*Self-aware Complex System Lab, REACTOR Lab, Iowa State University* Ames, IA

- Developed the largest biodiversity dataset with 163 million image samples of different species to advance AI research in biodiversity and agriculture, addressing the global challenges of food security (NSF & USDA project)
- Created a digital biomarker tool to analyze driving patterns in diverse roadways for cognitive health monitoring and dementia risk assessment, paving the way for using vehicles as diagnostic tools (NIH & NIA project)
- Expanded an AI framework to analyze distracted driving activity from naturalistic driving video while reducing reliance on extensive data and training compute (FHWA project at Exploratory Advanced Research Program)
- Developed skills in Machine Learning, Convolutional Neural Networks, Transformer, Computer Vision and so on.
- Collaborated with interdepartmental and interdisciplinary teams of students, scientists and faculties from the University of Nebraska Medical Center, Syracuse University, University of Arizona and New York University
- Served as a journal reviewer for IEEE Transaction on Intelligent Transportation Systems, Engineering Applications of Artificial Intelligence, Computers and Electrical Engineering and Digital Health

**Signal Processing Graduate Teaching Assistant** January 2021 – May 2021  
*Department of Electrical and Computer Engineering, Iowa State University* Ames, IA

- Graded homework assignments, final exams and projects in Signal Processing class for 15 undergraduate students
- Conducted Lab on MATLAB Simulink to build models and develop analog and digital communication circuits

**Semiconductor Devices Graduate Teaching Assistant** January 2021 – May 2021  
*Department of Electrical and Computer Engineering, Iowa State University* Ames, IA

- Graded homework, final exams and project reports in Semiconductor Devices class for 40 undergraduate students
- Led weekly recitation sessions on fundamental electronic and optical properties of semiconductors and applications

## RESEARCH INTEREST

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- Machine Learning (ML) and Artificial Intelligence (AI)
- Computer Vision & Multimodal Learning
- Optimized finetuning of foundational AI models
- Robustness & Edge-case generation for foundational AI models

## PUBLICATIONS

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- **Hasan, M. Z.**, Chen, J., Wang, J., Rahman, M. S., Joshi, A., Velipasalar, S., Hegde, C., Sharma, A., Sarkar, S. “Vision-Language Models Can Identify Distracted Driver Behavior From Naturalistic Videos,” *IEEE Transactions on Intelligent Transportation Systems*, vol. 25, no. 9, pp. 11602-11616, Sept. 2024. DOI: 10.1109/TITS.2024.3381175.
- **Hasan, M. Z.**, Basulto-Elias, G., Tan, R. K. L., Chang, J. H., Sarkar, S., Sharma, A., Hallmark, S., Rizzo, M., Merickel, J. “Roadway Weather Challenges Illuminate Real-World Driving Biomarkers of Dementia Risk,” *Alzheimer’s & Dementia*, 19, e075742. DOI: 10.1002/alz.075742.
- **Hasan, M. Z.**, Joshi, A., Rahman, M., Venkatachalapathy, A., Sharma, A., Hegde, C., Sarkar, S., “DriveCLIP: Zero-shot transfer for distracted driving activity understanding using CLIP,” *36th Conference on Neural Information Processing Systems (NeurIPS 2022) Machine Learning for Autonomous Driving Workshop*, New Orleans, LA, 2022.
- **Hasan, M. Z.**, Basulto-Elias, G., Hallmark, S., Chang, J., Sharma, A., Dawson, J., Sarkar, S. and Rizzo, M. “Classifying Cognitive Decline in Older Drivers from Behavior on Adverse Roads Detected Using Computer Vision,” *Journal of Transportation Technologies*, 15, 135-154, 2025. DOI: 10.4236/jtts.2025.151008.
- Yang, C., Feuer, B., Jubery, Z., Deng, Z. K., Nakkab, A., **Hasan, M. Z.**, Chiranjeevi, S., Marshall, K., Baishnab, N., Singh, A. K., Singh, A., Sarkar, S., Merchant, N., Hegde, C., Ganapathysubramanian, B., “BioTrove: A Large Curated Image Dataset Enabling AI for Biodiversity,” *38th Conference on Neural Information Processing Systems (NeurIPS 2024) Datasets and Benchmarks Track*, Vancouver, BC, Canada, 2024. (**Top-3% Spotlight paper**)
- Yang, H. J., Beck, J., **Hasan, M. Z.**, Beyazit, E., Chakraborty, S., Wongpiromsarn, T., Sarkar, S., “GENESIS-RL: Generating Natural Edge-Cases with Systematic Integration of Safety Considerations and Reinforcement Learning,” *2024 IEEE International Automated Vehicle Validation Conference (IAVVC 2024)*, Pittsburgh, PA, 2024.
- Waite, J. R., **Hasan, M. Z.**, Liu, Q., Jiang, Z., Hegde, C., Sarkar, S., “RLS3: RL-Based Synthetic Sample Selection to Enhance Spatial Reasoning in Vision-Language Models for Indoor Autonomous Perception,” *16th ACM/IEEE International Conference on Cyber-Physical Systems (ICCPs 2025)*, Irvine, CA, May 6-9, 2025.
- Jiang, Z., **Hasan, M. Z.**, Balu, A., Waite, J. R., Huang, G., Sarkar, S. “FUSE: First-Order and Second-Order Unified SynthEsis in Stochastic Optimization,” *IEEE Conference on Artificial Intelligence*, Santa Clara, CA, May 5-7, 2025.

## GRANTS & FUNDING SOURCES

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- **U.S. Department of Agriculture (USDA)** - Award No. 2021-67021-35329
- **National Science Foundation (NSF)** - CPS Frontier Grant CNS-1954556, CNS-1845969 and CNS-2141153
- **National Institutes of Health (NIH) & National Institute on Aging (NIA)** - Award No. 5R01AG017177
- **Federal Highway Administration (FHWA)** - EAR Program Award No. 693JJ31950022

## REVIEW EXPERIENCE

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- Served as a journal reviewer at IEEE Transactions on Intelligent Transportation Systems (Impact factor 7.9)
- Served as a journal reviewer at Engineering Applications of Artificial Intelligence (Impact factor 7.5)
- Served as a journal reviewer at Transportation Research Part D: Transport and Environment (Impact factor 7.4)
- Served as a journal reviewer at Computers and Electrical Engineering (Impact factor 4.0)
- Served as a journal reviewer at Digital Health (Impact factor 2.9)

## CONFERENCE EXPERIENCE

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- **Co-authored in Spotlight paper (Top-3%)** at 38th Conference on Neural Information Processing Systems (NeurIPS), Vancouver, BC, Canada, (2024)
- **Oral Presentation** at 2025 IEEE Conference on Artificial Intelligence (IEEE CAI), Santa Clara, CA (2025)
- **Poster Presentation** at 36th Conference on Neural Information Processing Systems, New Orleans, LA (2022)
- **Poster Presentation** at 2019 International Conference on Electrical, Computer & Communication Engineering (ECCE), Cox’s Bazar, Bangladesh (2019)

## INVITED TALKS

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- “An overview of Vision-Language models.” at Translational AI Center (TrAC), Department of Mechanical Engineering, Iowa State University, Ames, IA (2022).
- “When and why vision-language models behave like bags-of-words, and what to do about it?” at Student Journal Club: Translational AI Center (TrAC), Department of Mechanical Engineering, Iowa State University, Ames, IA (2023)

## LICENSE & CERTIFICATE

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- Collaborative Institutional Training Initiative (CITI) Biomedical Research, University of Nebraska Medical Center
- Collaborative Institutional Training Initiative (CITI) RCR Basic Course, Iowa State University
- Fundamentals of Deep Learning for Multi GPUs (2022), NVIDIA
- Machine Learning and AI Foundations: Recommendations (2020), LinkedIn Learning
- Artificial Intelligence Foundations: Neural Networks (2020), LinkedIn Learning

## ACADEMIC AWARD

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- Iowa State Graduate and Professional Student Senate Leadership Award (Spring 2025)
- IEEE Computational Intelligence Society travel award for the IEEE CAI conference (Spring 2025)
- Iowa State Professional Advancement Grants (PAG) award for conference travel (Spring 2025)
- Iowa State ECpE Professional Development Support program award for conference travel (Spring 2025)
- Iowa State College of Engineering Tuition award for Graduate Assistant (Spring 2021 – Spring 2025)
- Iowa State College of Engineering Technology Award for Graduate Assistant (Spring 2021 – Spring 2025)

## TECHNICAL SKILLS

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<b>Programming Languages</b>	Python, C/C++, MATLAB, R, HTML
<b>AI and ML Frameworks</b>	PyTorch, TensorFlow, Transformers, Multimodal foundation models, VLM, LLM
<b>Data Library</b>	Tableau, PostgreSQL, Matplotlib, Numpy, Seaborn, Pandas, AWS S3, LSS, HPC cluster
<b>Software and Tools</b>	OpenCV, Scikit-learn, Amazon AWS, SageMaker, MPI, CUDA, OpenMP, Numpy,
<b>Platforms</b>	Microsoft Office, Unix/Linux, GitHub, Azure DevOps, LaTeX, VScode, HuggingFace
<b>Others (Learning)</b>	AI model deployment, 3D vision model, Reliability of AI models, Responsible AI

## LEADERSHIP & SERVICE EXPERIENCE

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<b>Assistant Secretary</b>	January 2024 – Present
<i>Graduate Organization of Electrical and Computer Engineering (GOECpE), ISU</i>	Ames, IA
<ul style="list-style-type: none"><li>• Fostered social interactions and assisted in developing professional skillsets of the graduate students</li><li>• Organized a fundraising initiative for a student engagement event hosted by Iowa State Student Engagement</li><li>• Served as one of the program chairs for the IBM Qiskit Fall Fest 2024 event held at Iowa State University</li></ul>	
<b>Ambassador</b>	August 2024 – Present
<i>Cultural Ambassador Program (CAP), ISU</i>	Ames, IA
<ul style="list-style-type: none"><li>• Facilitated cross-cultural exchange by pairing with students from diverse backgrounds and interests</li><li>• Developed interpersonal and communication skills through multicultural activities and discussions</li></ul>	
<b>Senator</b>	August 2024 – Present
<i>Graduate and Professional Student Senate (GPSS), ISU</i>	Ames, IA
<ul style="list-style-type: none"><li>• Represented the graduate and professional student body as a whole on the Student Government</li><li>• Developed and disseminated ideas for the improvement of graduate and professional education at Iowa State</li></ul>	
<b>Graduate Member</b>	January 2021 – December 2021
<i>IEEE-Eta Kappa Nu Honor Society: Nu Chapter (IEEE-HKN), ISU</i>	Ames, IA
<ul style="list-style-type: none"><li>• Conducted helproom sessions to support undergraduate students in their academic challenges</li><li>• Led weekly discussions to foster a collaborative learning environment</li></ul>	
<b>Student Member</b>	January 2021 – Present
<i>Bangladesh Students' Association (BSA), ISU</i>	Ames, IA
<ul style="list-style-type: none"><li>• Mentored incoming Bangladeshi students at Iowa State with onboarding information and procedures</li><li>• Collaborated with student officers to organize on-campus events and programs promoting cultural diversity</li></ul>	

## EXTRA-CURRICULAR INVOLVEMENT

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- Organized and volunteered for the IBM Qiskit Fall Fest 2024 event for GOECpE, ISU
- Assisted in organizing the IEEE-HKN Fall 2021 induction program at Iowa State
- Volunteered in the campus clean-up events at Inter-Residence Hall Association (IRHA), ISU
- Engaged in student outreach and mentoring programs at Bangladesh Students Association (BSA), ISU
- Worked as Cultural Ambassador at the social events of the International Students and Scholars Office (ISSO), ISU
- Involved in blood donation to support local hospitals and emergency response needs for American Red Cross Iowa