Manvi Jha

manvij2@illinois.edu | manvijha1.web.illinois.edu | manvi-jha-2784711a7/

PhD Student | AI for Verified Computing Systems | LLMs | Reinforcement Learning | Optimization

Ph.D. Researcher applying machine learning, optimization, and statistical methods to complex computational problems

EDUCATION

University of Illinois Urbana-Champaign *Illinois, USA*

PhD, Electrical and Computer Engineering *2023 - 2028*

- Ongoing - GPA - 3.88/4
- Selected Graduate Coursework: Statistical Learning Theory, Advanced Topics in Natural Language Processing, LLM Reasoning for Engineering, and Computational Complexity (Fall 2026)

National Institute of Technology Patna *Bihar, India*

B-Tech Electronics and Communication Engineering *2019 - 2023*

- CGPA - 8.88/10

SKILLS

Technical skills

Programming Languages: Python, C/C++, Bash/Zsh, SQL (MySQL), MATLAB, Verilog

RL & Theory: Reinforcement Learning, MDPs, Optimization, Statistics for ML

ML/GenAI (Frameworks & Methods): Transformers, ViT, RAG, Pretraining & Fine-tuning, Prompt Refinement, Speculative Decoding

Systems, Hardware & Tooling: Dafny; Vivado & HLS; ROS; ReactJS, AngularJS; Git/GitHub, Jira

Soft skills

Analytical & Logical Thinking, Problem Solving, Efficient Communication, Problem Identification, Attention to Detail, Research Skills

PUBLICATIONS

M. Jha, L.J. Wan, D. Chen. 2025. Proof2Silicon: Prompt Repair for Verified Code and Hardware Generation via Reinforcement Learning. *ArXiv*

M. Jha, L. J. Wan and D. Chen. 2025. Invited: PREFACE-A Reinforcement Learning Framework for Code Verification via LLM Prompt Repair. *In Proceedings of the Great Lakes Symposium on VLSI 2025 (GLSVLSI '25)*

J. Wang, L. J. Wan, S. Pingali, S. Smith, **M. Jha**, S. Sivakumar, X. Zhao, K. Cao, D. Chen, 2025. OpenRTLSet: A Fully Open-Source Dataset for Large Language Model-based Verilog Module Design. *IEEE International Conference on LLM-Aided Design (ICLAD).*

Y. Huang*, L. J. Wan*, H. Ye*, **M. Jha***, J. Wang*, Y. Li*, X. Zhang* and D. Chen. 2024. Invited: New Solutions on LLM Acceleration, Optimization, and Application. *2023 61st ACM/IEEE Design Automation Conference (DAC). (*equal contribution)*

L. J. Wan, H. Ye, J. Wang, **M. Jha** and D. Chen. 2024. An Iteratively-refined Dataset for High-Level Synthesis Functional Verification through LLM-Aided Bug Injection, *2024 IEEE LLM Aided Design Workshop (LAD).*

Y. Huang*, L. J. Wan*, H. Ye*, **M. Jha***, J. Wang*, Y. Li*, X. Zhang and D. Chen. 2024. New Solutions on LLM Acceleration, Optimization, and Application. *arXiv. (*equal contribution)*

M. Jha and A. K. Bhandari. 2024. CBLA: Color-Balanced Locally Adjustable Underwater Image Enhancement. *IEEE Transactions on Instrumentation and Measurement.*

M. Jha and A. K. Bhandari. 2024. NSDIE: Noise Suppressing Dark Image Enhancement Using Multiscale Retinex and Low-Rank Minimization. *ACM Trans. Multimedia Comput. Commun. Appl.*

M. Kumar, A.K. Bhandari and **M. Jha**, 2023. Unevenly illuminated image distortion correction using brightness perception and chromatic luminance. *Multimed Tools Applications.*

M. Jha and A.K. Bhandari, 2022. Camera Response Based Nighttime Image Enhancement Using Concurrent Reflectance. *IEEE Transactions on Instrumentation and Measurements.*

M. Jha, 2022. Secure SDN based IoT network Through Blockchain for Smart Architectures. *2022 IEEE Region 10 Symposium (TENSYMP).*

M. Jha and A.K. Bhandari, 2021. Provoking Medication Adherence With Automated IoT System. *2021 IEEE Region 10 Symposium (TENSYMP).*

PROFESSIONAL EXPERIENCES

Teaching Experience

Fall'24, Spring'26 **Teaching Assistant - ECE 445: Senior Design**, UIUC

Internship Experience

May'26-Aug'26 **Applied Scientist Intern**, Amazon
May'25-Aug'25 **Development Engineering intern (R&D)**, Foxconn Interconnect Technology
Jan'23-May'23 **Intern Tech II (R&D)**, KEYSIGHT, INDIA
May'22-July'22 **Student Trainee**, Center of Artificial Intelligence and Robotics (CAIR), DRDO

Research Experience

Aug'23-Present **Research Assistant**, ECE, UIUC
Oct'20-Oct'22 **Undergraduate Research Assistant**, National Institute of Technology Patna

PROJECTS

Large Language Model and Reinforcement Learning

Verification-Aware Reinforcement Learning Framework for Autonomous System Reliability

Python, Reinforcement Learning, LLM Agents, Distributed Systems *ongoing*

- Developing an AI-driven framework for automated diagnosis and mitigation of reliability issues in complex computing systems.
- Combines reinforcement learning agents with large language models to analyze telemetry data, identify system anomalies, and recommend corrective actions.
- Introduces verification-aware reasoning to ensure proposed mitigation strategies maintain system safety and reliability constraints.
- Exploring hardware–software co-design strategies and specialized accelerators generation via RL-LLM pipeline.

Reinforcement Learning–Driven Prompt Repair for Verified Dafny Code Generation *2025*

Aims to improve Large Language Models' ability to generate verified Dafny code *Dafny, Reinforcement Learning*

- Presents a novel RL framework with MDP and RL to design prompts for efficient Dafny code generation by LLMs and error prediction.
- Utilizes Focused Error correction with the Meta prompts strategy.
- Successfully integrated generated Dafny code with the Dafny verifier, automating the confirmation of code correctness and improving the reliability of verified software.

HWBUILDER: A Multi-Agent Framework for Modular Hardware Design with Open-Source Datasets and Data-Driven Enhancement *2025*

Aims to build a diverse Verilog code dataset with descriptions to develop a multi-agent LLM framework for processor code generation *Python, Verilog, Multi-Agent LLM*

- Presents a labeled dataset with 95k+ verified verilog codes
- A novel multi-agent LLM framework that leverages fine-tuned LLMs on the proposed dataset to autonomously generate and optimize functional microprocessor code.

LightKV: Optimizing Memory Efficiency in LLMs for Long-Sequence Inference *2024*

Explores cache retention algorithm and token attention strategies for memory optimization *TensorFlow, Cache Compression*

- Developed a novel algorithm to optimize key-value (KV) cache usage in LLMs, enhancing memory efficiency for long sequences.
- Implemented static masking and information flow strategies to address the "Lost in the Middle" problem in autoregressive decoding.

An Iteratively-refined Dataset for HLS Functional Verification through LLM-Aided Bug Injection *2024*

Exploration of how LLMs can aid in High-Level Synthesis (HLS) functional verification *Python, RAG, CoT, ICL*

- Curated a novel dataset of over 1,500 HLS designs with injected logic bugs and non-ideal pragmas
- Demonstrated the application of GPT-4 Turbo in automating HLS functional verification
- achieved an 84.8% valid bug injection rate and improved debugging automation by over 50%

Computer Vision

SEE: Transformer-Based Haze Removal through Segment-Enhance-Ensemble *2024*

Ensemble Single Image Dehazing Using Segmentation with deep-Transformers *Python, Transformers*

- Exploits the concepts of Deep Learning, CNNs, and Transformers to design the model
- Segments the highly hazed regions for separate dehazing
- Achieved an improvement of upto 45% over other state-of-the-art methods

Accelerating Intelligence: FPGA-Driven YOLO for Rapid Object Detection *2023*

A Team Research project developed for a related course *Python, Vivado, HLS*

- https://github.com/Severus-Matthew/ECE527Project
- FPGA-based Accelerator for YOLO object detection and cloud integration for real-time application
- Hardware integration tested on ZU702, ZCU102 and PYNQ boards
- A proficient use of PyTorch, HLS and Cloud and Web interface

Object Detection in Satellite Images *2022*

Module Developed for cloud segmentation in Satellite Images. *Python*

- Using texture, color and intensity features, cloud region segmented out in satellite images.
- Tested on various satellite images, even the ones in the presence of snow

Road Segmentation Based on Deep Learning Approaches *2022*

Module Developed under the project Systems and Technologies for Advanced Robotics (STAR). *Python*

- Developed during an internship at Defence Research and Development Organisation (DRDO) for autonomous robot navigation
- Uses deep learning modules like YOLOP and SNE-Roadseg with grab-cut methods to detect paths for robots.
- Tested on KITTY, CAIR DRDO and ATR Chitradurga dataset.

PRESENTATIONS, TALKS & ORGANISED EVENTS

August 2026. ***Seeing Through Nature's Distortions: The Evolution of Image Restoration from Physical Models to Multimodal AI*** Faculty Development Program, Electronics & ICT Academy, NIT Patna

Sept 2025. ***Proof2Silicon: Prompt Repair for Verified Code and Hardware Generation via Reinforcement Learning.*** SRC TechCON'25

Feb 2025. ***Dafny Dynamo: Empowering Large Language Models for Verified Code Generation*** Invited Speaker ECE 584 Sp'25 UIUC

March 2022. ***A Quick Walk Through of Angular 13*** Invited Speaker at Geekle Angular Global Summit (1000+ participants)

June 2021. ***GUIDE TO GITHUB 102*** Speaker & Organiser, as MS Learn Student Ambassador

June 2021. ***TinkerCAD & GitHub*** Invited Guest Speaker at annual tech-fest of GEC Banka.

Jan 2021. ***HACKNITP*** Organiser & Event Manager of National College Hackathon.

Jan 2021. ***Quantum Computing:Introduction to The Realm Of Particles*** Speaker as MS Learn Student Ambassador.

Oct 2020. ***Open Source Revealed***. Invited Speaker at Event by Hackslash Developer Club NITP.

Sept 2020. ***GUIDE TO GITHUB 101***. Speaker & Organiser, as MS Learn Student Ambassador

LEADERSHIPS, VOLUNTEER & POSITIONS OF RESPONSIBILTY

Nov'2025	**Reviewer**, IEEE International Symposium on Circuits and Systems (ISCAS)
Oct'22	**Reviewer**, IEEE Transactions on Neural Networks and Learning Systems (Volunteer)
May'21- June'22	**Executive Committee**, IEEE SB NITP
May'21-July'21	**Open Source Contributor**, Microsoft (IoT for Beginners) (Volunteer)
Jan'21- Feb'21	**Website Developer**, TEDx NIT Patna
Session 2020-2021	**Hardware Team Lead**, GDSC NITP
Nov'20- Present	**YouTube Channel**, Based on Educating Technology - Channel Name- TechWatch
Aug'20-May'23	**Beta Microsoft Learn Student Ambassador**, Microsoft Learn
Jan'20- Jan'22	**Student Coordinator**, Alumni Cell NITP (Volunteer)

AWARDS & ACHIEVEMENTS

Yi-Min Wang and Pi-Yu Chung Research Award 2026

Joan and Lalit Bahl Fellowship 2025-26

Emerging Contributor Award at DAC 2025

DAC Young Fellow recipient 2025 and 2026

Hacksagon 2020- Secured 8th position among 400+ participating teams for hardware based solution (Team Leader)

Tech-Talks on IoT- secured 1st Position- national level contest organized by IEEE BIT-Mesra (Individual participation)

Sensor Tensor - 2nd Position - College-level hardware hackathon organized by IEEE NITP (Team Leader)

College level Web Development Contest- 1st Position

Three times winner at College Level Debate

International Mathematics Olympiad (conducted by Science Olympiad Foundation) - Gold Medal