



Summary

I am a **6th-year Ph.D. candidate** in Computer Science and Engineering at The Ohio State University, specializing in **AI-integrated Cyberinfrastructure**. With over **7 years of academic research** and **4 years of professional software engineering experience**, my work focuses on developing **adaptive, resource-efficient, and agentic scientific workflows** across the edge-to-center continuum.

As a Graduate Research Assistant on the NSF ICICLE AI Institute and EAGER projects, I design and deploy innovative AI-driven systems, including the **HARP Framework** for HPC resource prediction and the **Smart Scheduler** for dynamic workload orchestration. I actively contribute to applied AI, developing solutions like the **ML Field Planner** for optimizing model deployment on edge devices in computational ecology.

My current research explores the integration of **Large Language Models (LLMs)** and **agentic AI systems** into cyberinfrastructure to create self-adaptive orchestration layers capable of autonomous workflow coordination and domain-aware decision-making. I combine expertise in **full-stack software development** (C#, Java, Python, .NET), **Agile/CI/CD practices**, and **NLP/Knowledge Systems** to drive research innovation. Furthermore, I have advised and mentored over **20** graduate and undergraduate students, and led K–12 AI literacy and outreach initiatives as the **ICICLE NextGen Student Group Manager**.

Education History

Doctor of Philosophy (Computer Science and Engineering)	Aug, 2019 - Present
The Ohio State University (Computer Science and Engineering), Columbus, OH	GPA: 3.93/4.0
Master of Science (Computer Science and Engineering)	Aug, 2016 - Jul, 2018
The University of Minnesota, Duluth, MN	GPA: 3.95/4.0
Bachelor's in Technology (Computer Science and Engineering)	Sept, 2009 - May, 2013
Vallurupalli Nageswara Rao Vignana Jyothi Institute of Engineering & Technology (VNRVJiet)	GPA: 3.90/4.0
Affiliated to <i>Jawaharlal Nehru Technological University, Hyderabad (JNTU-Hyd)</i> , Hyderabad, Telangana, India	

Work History

Graduate Research Assistant	Aug, 2019 – Present
The Ohio State University, Columbus, OH	
SGX3 Summer Fellow	SU'23, SU'24, SU'25
Texas Advanced Computing Center (TACC), University of Texas at Austin, Austin, TX	
Teaching Research Fellow (Summer India)	May, 2022 – July, 2022
Vallurupalli Nageswara Rao Vignana Jyothi Institute of Engineering & Technology (VNRVJiet), Hyderabad, Telangana, India	
Research Intern	June, 2021 – Aug, 2021
Oak Ridge National Laboratory (remote), Columbus, Ohio	
Web Application Developer	Aug, 2018 – July, 2019
Spherexx.com, Tulsa, OK	
IT Intern	May, 2017 – July, 2017
CHART Industries, Tulsa, OK	
Software Engineer	June, 2013 – July, 2016
CA Technologies (or Computer Associates International, Inc.), Hyderabad, Telangana, India	

Thesis Work

- **Ph.D. Thesis (In Progress): AI-Driven Resource Optimization for High-Performance Computing: A Comprehensive Framework**
 - *Focus:* Developing adaptive, user-centric frameworks that utilize AI to intelligently predict and allocate HPC resources, significantly reducing "time-to-science."
- **M.S. Thesis: Hypernym Discovery over WordNet and English Corpora - using Hearst Patterns and Word Embeddings**
 - *Focus:* Foundational research in **Natural Language Processing (NLP)**, applying Word Embeddings and pattern matching for semantic relation extraction (Hypernym Discovery).

Selected Publications *(Total: 11 Papers | 2 BEST PAPER Awards)*

- **[BEST PAPER] Insights from the HARP Framework: Using an AI-Driven Approach for Efficient Resource Allocation in HPC Scientific Workflows** (PEARC 2023)

- **[BEST PAPER] ML Field Planner: Analyzing and Optimizing ML Pipelines for Field Research** (PEARC 2024)
- **Reference Implementation of Smart Scheduler: A CI-Aware, AI-Driven Scheduling Framework for HPC Workloads** (PEARC 2024)
- **Towards Practical, Generalizable Machine-Learning Training Pipelines to build Regression Models for Predicting Application Resource Needs on HPC Systems** (PEARC 2022)

Presentations, Posters, & Academic Leadership

- **Presented 19 posters/extended abstracts** focused on the practical implementation and evaluation of **AI-driven tools** for workflow, resource, and lifecycle management in HPC/CI.
- **Guided over 10 Bachelor's and Master's students** on research projects related to AI-Driven Cyberinfrastructure and HPC Optimization.

Professional & Research Experience Summary

AI and Cyberinfrastructure Research & Development

Key Frameworks Developed & Contributed To (Highlights)

- **HARP Framework:** Predictive modeling system for estimating HPC resource requirements and improving FAIR-compliant generalization.
- **Smart Scheduler:** Intelligent resource allocation framework integrating SLURM for runtime estimation and performance enhancement for Deep Learning workloads.
- **Agentic LLM Wrappers (In Progress):** Extending core systems into LLM-powered conversational agents that allow natural language-driven workflow creation and adaptation.

Detailed Contributions

- Developed **AI-driven frameworks** for optimizing resource allocation, scheduling, and workflow orchestration in high-performance computing (HPC) and deep learning environments.
- Created the **HARP Framework** for HPC resource prediction and the **Smart Scheduler** for DNN workloads, integrating SLURM to estimate runtimes, wait times, and memory utilization.
- Designed AI-powered tools for researchers (under TAPIS integration) that streamline preprocessing, model selection, and workflow automation, improving reproducibility and cross-domain usability.
- Implemented **rules-based engines** to autonomously trigger model retraining and fine-tuning, dynamically adapting to workload and resource feedback across the computing continuum.
- Currently exploring **agentic AI systems with LLM-powered interfaces**, enabling natural language-driven workflow creation, resource estimation, and self-adaptive orchestration for scientific computing.

Edge Computing, Applied AI & Domain Adaptation

- **Contributed to the AI-Driven Model Adaptation Framework** for Computational Ecology, enabling field researchers to benchmark and deploy models on edge devices for camera-trap imagery tasks (e.g., intrusion detection).
- **Built the ML Field Planner (TAPIS UI) and CKN Dashboard** to guide users in selecting and visualizing model performance metrics (runtime, memory, precision, recall) under edge constraints.
- **Developed the ML Edge Server and CT-Controller** to manage and validate modular workflows on edge systems, supporting real-time, energy-efficient operation and domain scalability.

AI / NLP and Knowledge Systems

- **Researched** automatic WordNet expansion **using** Hearst Patterns **and** word2vec **for detecting hypernym–hyponym relationships, contributing to** SemEval 2016 Task 14 **and** SemEval 2018 Task 9.
- **Published in** SemEval@NAACL-HLT 2018, **demonstrating state-of-the-art improvements in** lexical hierarchy insertion **for NLP pipelines.**
- **Acquired deep understanding of** text parsing, dependency analysis, and statistical modeling **for semantic relationship extraction in multilingual datasets.**

Software Engineering, Automation & Full-Stack Development

- **Designed and implemented** full-stack software solutions **for enterprise and research workflows using** C#, Java, Python, and .NET MVC Frameworks, **combining back-end scalability with intelligent front-end design.**
- **Built an** AI-powered voice bot **for** tenant engagement and lead management, **integrating ML classifiers for** intent recognition and response optimization **in customer communication systems.**
- **Led end-to-end development including** requirements analysis, API integration, testing automation (Selenium, TestNG), and performance profiling (LoadRunner, TAU, NVIDIA-SMI).
- **Strengthened expertise in** Agile–Scrum methodologies, **CI/CD pipelines, and** cross-platform deployments **across Windows, UNIX, and AIX systems.**

Teaching, Mentorship & Academic Leadership

- Served as a Teaching Assistant for courses in software programming, ethical computing, and natural language processing, conducting labs, evaluations, and hands-on learning sessions.
- Mentored over 200 undergraduate and master's students through AI research capstones, workshops, and summer teaching fellowships.
- As ICICLE NextGen Student Group Manager, led a national network of 280+ members, organizing tutorials, K–12 outreach, and AI literacy programs promoting workforce preparedness and responsible computing.

Software Proficiency

Programming / Testing:	C, C++, C#, Core Java, J2EE, Python, Perl, Shell, Batch, TestNG, Selenium
Web Development:	HTML5, CSS, JavaScript, ASP.NET, ReactJS, VueJS, Node.js, REST APIs, Docker / Singularity Images, Kafka
Servers and Frameworks:	Tomcat, JBOSS, TAPIS API Framework, Product Automation Framework (CA Internal), Flask, FastAPI, Selenium WebDriver
Operating Systems:	Windows Server, UNIX, AIX, Linux (Ubuntu / CentOS)
Profilers & HPC Tools:	NVIDIA-SMI, Nsight Systems, SLURM, TensorBoard, TAU
Tools and IDEs:	InstallAnywhere, HP ALM, HP LoadRunner & Performance Center (PC), Rally, VersionOne, Eclipse, Maven, Visual Studio Code, Microsoft Office, Harvest, Embedded Entitlement Manager (CA), Rational Rose, REST Client, Selenium IDE with Firebug
Databases:	MySQL, Oracle 11g/12c, DB2 LUW, DB2 z/OS, MS-SQL, MongoDB, PostgreSQL
Application Lifecycle Management:	Agile Scrum, Scrumban, Waterfall, CI/CD (GitHub Actions, Jenkins), MLOps (MLflow, Weights & Biases)
AI / ML Frameworks and Libraries:	TensorFlow, PyTorch, Keras, Distributed Training with Horovod, Hugging Face Transformers, Scikit-learn, Pandas, NumPy, OpenCV, NetworkX

Awards, Certifications & Workshops

Titles	:	ICICLE NextGen (Student Group) Manager (June 2023–present) – Collaborated with more than 280 students from various universities, hosted tutorials for broader impact and project integrations and participated in outreach programs showcasing AI's power on the cloud and edge to K-12 and undergraduate students as part of HACK/IO series
Professional Awards	:	- Above & Beyond September 2014 @ CA Technologies (Broadcom) - Above & Beyond March 2016 @ CA Technologies (Broadcom)
Academic Awards	:	- PEARC25 Best Paper: Systems & Applications Software Track and Phil Andrews Award for Best Paper Overall; - PEARC23 Best Paper: Systems & Systems Software Track (Overall & Student Categories) and Phil Andrews Award for Best Paper Overall, - Honorable mention for Best Research at The OSU College of Engineering 2024; - Honorable mention for Best Research CSE Annual Research Poster Exhibit. - Undergraduate Third-best Academic Project (CSE),
Soft Skill Certifications	:	Leaders at All Levels @ CA Technologies, JAWS
Travel Awards	:	- PEARC 2024 & 2025 Student Volunteer Travel Awards – Provided support to attend PEARC as a dedicated student volunteer, facilitating active involvement in workshops and panel organization. - Science Gateways 2023, 2024 & 2025 Travel Grants – Enabled participation at the Science Gateways conferences, supporting presentation and engagement with scientific gateway communities focused on research computing and education. - Supercomputing (SC) 2025 SCinet Travel Grant – Awarded to participate in SCinet, the high-performance networking infrastructure team for the annual Supercomputing Conference, providing technical experience in building critical systems for the SC event. - International High Performance Computing Summer School (IHPCCS) Grant (Lisbon, Portugal). - Summit of AI Institute Leadership (SAIL) GSR Travel Grant, 2025
Invited Talks	:	- Summit of AI Institute Leadership (SAIL) Graduate Student Researcher Keynote Speaker
Fundings	:	Fully Funded Master's Program , University of Minnesota – Awarded full tuition and stipend support for both years of M.S. program (Graduate Teaching Assistant).