Meghana Aparna Sistla

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Research Interests

- **Primary Interests:** Formal Methods, Programming Languages, AI for code/formal methods
- **Other Interests:** Network Verification, Quantum Computing

Education

Ph.D., The University of Texas at Austin — Aug 21 - May 26 (Expected)
Computer Science, *Advisor: Swarat Chaudhuri* — GPA: 4.0/4.0

B.Tech + M.Tech, Indian Institute of Technology Madras — Aug 14 - May 19
Computer Science and Engineering, *Advisor: V. Krishna Nandivada* — GPA: 9.41/10

Publications

- **Meghana A. Sistla**, Gogul Balakrishnan, Pat Rondon, José Cambronero, Michele Tufano, and Satish Chandra. Towards Verified Code Reasoning by LLMs. **Under Submission, 2025**
- **Meghana A. Sistla**, Swarat Chaudhuri, and Thomas Reps. Weighted Context-Free-Language Ordered Binary Decision Diagrams. Object-Oriented Programming, Systems, Languages, and Applications **(OOPSLA), 2024**
- **Meghana A. Sistla**, Swarat Chaudhuri, and Thomas Reps. CFLOBDDs: Context-Free-Language Ordered Binary Decision Diagrams. ACM Trans. on Program. Langs. and Systems **(TOPLAS), 2024**. Jour.-first at **PLDI 2024**
- **Meghana A. Sistla**, Swarat Chaudhuri, and Thomas Reps. Symbolic Quantum Simulation with Quasimodo. International Conference on Computer-Aided Verification **(CAV), 2023**
- A. Thakur, J. Lee, G. Tsoukalas, **M. Sistla**, M. Zhao, S. Zetzsche, G. Durrett, Y. Yue, and S. Chaudhuri. CLEVER: A Curated Benchmark for Formally Verified Code Generation. Neural Information Processing Sys., **NeurIPS 2025**
- **Meghana A. Sistla** and V Krishna Nandivada. Graph Coloring Using GPUs. European Conference on Parallel Processing **Euro-Par, 2019**

Professional Experience

Google, DevAI Research Team — **May 25 - Aug 25**
PhD Intern, Host: Satish Chandra, Co-host: Gogul Balakrishnan (Google DeepMind) — *Sunnyvale, USA*

- Worked on **verifying the code-reasoning output by LLMs using formal analysis**.
- Formalized the agent's explanation for program equivalence problems and validated it in Souffle.
- Using this technique, we were able to catch 6 out of 15 examples where the agent hallucinated.

Google, NetInfra Team, P4-Based Automated Reasoning Group — **May 24 - Aug 24**
PhD Intern, Host: Ali Kheradmand, Co-host: Steffen Smolka — *Sunnyvale, USA*

- Improved the performance of P4-Symbolic, a tool for generating test packets for switch testing.
- Developed optimizations for the symbolic execution pipeline, leveraging Z3, resulting in up to **800x speedup** and significantly improving developer productivity on ongoing projects.
- Ideated and built a prototype for extensive switch testing using path coverage.
- Selected to present the work at P4 Workshop 2024.

Google India — **Oct 20 - Aug 21**
Software Engineer II, Manager: Ankur Lahoti — *Bangalore, India*

- Modeled untracked conversions for the Google Ads team and recovered lost revenue.

Microsoft, India Development Center — **Jul 19 - Oct 20**
Software Engineer, Manager: Saibaba Konduru — *Hyderabad, India*

- Enhanced performance and reliability of IaaS VM deployments in the Azure Compute team.

Research Projects and Experience

AI for Code/Math Projects

Verified Autoformalization using LLMs **Oct 25 - Present**
Research (Project Co-Lead), Prof. Swarat Chaudhuri *UT Austin*

- Working on verified autoformalization for theorem-proving using LLMs.
- Working on building a good evaluation pipeline and dataset for benchmarking and strategies for fine-tuning a model.

CLEVER: A Curated Benchmark for Formally Verified Code Generation **Mar 25 - May 25**
Research (Project Contributor), Prof. Swarat Chaudhuri *UT Austin*

- CLEVER is a curated benchmark of problems for end-to-end verified code generation in Lean.
- CLEVER has two tasks: NL-to-specification generation, and NL and specification to code generation with proofs.
- Worked on creating high-quality specifications for the benchmark in LEAN.

LLMs for automated theorem proving **Mar 25 - Present**
Research (Project Contributor), Prof. Swarat Chaudhuri *UT Austin*

- Using Large Language Models (LLMs) as agents, with formal proof assistants, for automated theorem proving.
- The aim is to leverage LLMs for proof synthesis with Lean/Coq as validation engines.

Generating CNN code in Tensorflow from Natural Language **Jan 22 - May 22**
Course Project, Program Synthesis: Prof. Swarat Chaudhuri *UT Austin*

- Developed a methodology and an evaluation dataset to convert NL to CNN code using LSTMs.
- Achieved a model accuracy of 0.96, significantly outperforming baseline models (0.62) without abstraction.

Formal Methods, PL projects

Succinct function representations for formal simulation and verification **Aug 21 - Present**
Research (Project Lead), Prof. Swarat Chaudhuri, Thomas Reps *UT Austin*

- Working on using automata for efficient representations of Boolean functions.
- Worked on designing and developing algorithms for CFLOBDDs, Weighted CFLOBDDs – data-structures that provide exponential compression over BDDs, in the best case.
- Developed Quasimodo, quantum simulation tool that supports different backend automata-based simulators.

Election Voting System **Aug 21 - Dec 21**
Course Project, Specify, Verify and Implement Distributed Systems: Prof. Ken McMillan *UT Austin*

- Built a distributed voting system ensuring linearizability for user votes and eventual consistency for total votes.
- Developed a formal specification for this system using IVy and verified it.

Scholastic Achievements

- Awarded two peer bonuses for an impactful internship work at Google in summer 2024.
- Awarded **Chair's Strategic Excellence Fellowship** at UT Austin for competitive admits for academic year 2021-2022
- Awarded **B.Lakshmi Ravi Best Dual Degree Project Award** for the best thesis in the Computer Science department.
- Awarded S.N. Bose Scholarship by the Govt. of India to undertake a research internship for the summer of 2018.
- Secured an All India Rank of 219 in Jee Advanced 2014 among 2,00,000 students.

Course Work & Skills

- **Relevant Coursework** - Model Checking, Program Synthesis, Verification of Distributed Systems, Program Analysis. Machine Learning, Deep Learning, Artificial Intelligence, Natural Language Processing, Computer Networks.
- **Skills** - C, C++, Java, Python, PyTorch, Numpy, JavaScript, Django, Git, LaTeX, Eclipse, SQL.

Workshops and Volunteering

- PC Member for Artifact Evaluation for OOPSLA 2025, POPL 2025, PLDI 2024, POPL 2024.
- Selected for GHC 2024, VMW 2023, PLMW 2022, CRA 2022, Student Volunteer POPL 2023.
- Participated in Student Research Competition at PLDI 2023.