

Congyan (Cruise) Song

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EDUCATION

Georgia Institute of Technology, Atlanta, GA Aug 2024 - Present

Ph.D. in Computer Science. Advisor: Dr. Vijay Ganesh.

- Selected Coursework: SAT and SMT Solvers, Software Analysis and Test, Programming Languages

University of Michigan, Ann Arbor, MI Jul. 2021 - May 2024

B.S. in Mathematics and Computer Science.

SKILLS

- Programming:** Python, C++, Ocaml
- Verification Tools:** Lean4, Rocq, Dafny, ACL2
- Languages:** Mandarin(native), English (proficient)

WORK EXPERIENCE

Applied Scientist Intern, **Amazon Inc.**, Santa Clara, CA May. 2026 - Current

- Verified extension parser of the Cedar Language in Lean with the automated reasoning group.

Functional Software Intern, **Imandra Inc.**, Austin, TX May. 2025 - Aug. 2025

- Gained proficiency in OCaml, ACL2, and the Imandra theorem prover.
- Extended Imandra-Geo, a solver for non-linear real arithmetic, to generate proof certificates compatible with Lean.
- Developed custom Lean tactics using metaprogramming to normalize non-linear real arithmetic expressions and translate Lean syntax into Imandra-Geo input format.
- GitHub repository: [GitHub - cruisesong7/Imandra-Lean](https://github.com/cruisesong7/Imandra-Lean).

RESEARCH EXPERIENCE

Georgia Institute of Technology, Atlanta, GA Aug 2024 - Present

- Explored the combinations of Lean4 with SAT solvers and computer algebra system for combinatorial problems.
- Contributed to auto-formalization efforts, building systems that translate natural language theorems & proofs into Lean.

The Polymath Jr Program (Online) Jun. 2022 - Aug. 2024

- Acquired proficiency with interactive theorem proving using Lean 3 & Lean 4.
- Formalized Graph theory problems using interactive and automated theorem proving with SAT solvers.
- Developed a graph widget in Lean that interactively visualizes the graphs used in proofs.
- GitHub repository: [GitHub - cruisesong7/formal_proof](https://github.com/cruisesong7/formal_proof).

University of Michigan, Ann Arbor, MI Sep. 2022 - May. 2024

- Studied formal verification on iterative methods and floating point arithmetic in Rocq.
- Worked on proof minimization and refactoring by developing Ltac tactics in Rocq.
- Completed thesis: *An Attempt to Verify the Correctness, Accuracy and Convergence of Block Jacobi Method*.

PUBLICATIONS

P. Jana, K. Kale, E. Tanriverdi, **C. Song**, S. Vishwanath, V. Ganesh. "ProofBridge: Auto-Formalization of Natural Language Proofs in Lean via Joint Embeddings". (ICLR 2026).

D. Narváez, **C. Song**, N. Zhang. "Formalizing Finite Ramsey Theory in Lean 4". In Conference on Intelligent Computer Mathematics (CICM 2024).