

Aspiring PI Info:

- Wenxi Wang
- Assistant Professor
- The University of Virginia



Research interests:

In the intersection of Formal Methods (FM), Software Engineering (SE) and Machine Learning (ML).

- Improving the efficiency and scalability of automated logical reasoning using ML techniques.
- Improving the quality (e.g., reliability and security) of software systems, including AI systems, using FM and ML techniques.

Current Project(s)

- **Combining Deep Learning with Automated Reasoning:** how LLMs, GNNs, and RL can enhance automated reasoning tools such as SAT and SMT solvers.
- **Enhancing the Expressiveness of GNNs:** make GNNs more powerful in both expression and reasoning by integrating FM and software engineering techniques.
- **Strengthening the Reasoning Capabilities of LLMs:** push the boundaries of what LLMs can achieve in terms of reasoning.
- **Boosting the Reliability of ML Models and Frameworks:** improving the robustness and reliability of ML frameworks like PyTorch through software testing and verification techniques.

Project Idea

- **Idea:** Enhancing LLMs for code generation using formal reasoning and verification.
- **Impact on society:** High-quality software leads to a better, safer society since software is everywhere in our daily lives.
- **Who will benefit:** software companies and developers.
- **Possible transition to practice:** integration into software development cycle in both industry and academia.
- **Education and Outreach:** More effective teaching tools for students to learn high-quality coding practices.
- **Quantify impacts:**
 - Improved code generation accuracy
 - Adoption by both industry and academia

Collaborator

- Field: Lingming Zhang (UIUC)
 - Expert in LLM for code generation.

