



AI+Math Research Assistant for the Legacy Survey of Space and Time (LSST)

Equipped with the world's largest 3.2-gigapixel camera, the Vera Rubin Observatory will capture the unseen cosmos: dark matter, dark energy, and millions of exploding stars. The observatory is conducting the Legacy Survey of Space and Time of the southern hemisphere sky and will yield 30 petabytes of raw images. Our understanding of cosmic origins and planetary evolution will be advanced by cataloging millions of asteroids, comets, and transient events.

This project will ensure the correctness of Rubin's scientific workflows, being accelerated by AI but also challenged by hardware instability, algorithmic uncertainty, and agentic (in)security. Led by Dr. Phuong Cao at the National Center for Supercomputing Applications (NCSA), a qualified Math+AI student will work closely with the Stanford Linear Accelerator Center (SLAC) to provide mathematical proof of correctness.

Role: Collect metadata of AI,ML scientific workflows on the DeltaAI supercomputer, identify correctness invariants, and derive end-to-end mathematical guarantees.

Skills: Knowledge of inductive construction is needed. Knowledge of proof assistants such as Lean, Dafny, and SAT/SMT solvers such as Z3 is preferred. Astrophysics knowledge is not required but highly valued.

Benefits: Course credit via Undergraduate Research in Scientific Advancement; publications in top-tier journals; travel opportunities to the observatory; priority access to trillion-scale LLMs.

Apply:

go.illinois.edu/job-rubin

About the observatory & team:

rubinobservatory.org | [Phuong Cao](#) | pcao3@illinois.edu

