Syed Mahir Ahamed

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Education

Union College — Schenectady, NY
B.S. in Mathematics and Computer Science; Minor in Statistics — *Expected May 2028*

- Honors: Scholars Program, Dean's List
- Relevant Coursework: Abstract Algebra, Linear Algebra, Numerical Analysis, Mathematical Statistics & Probability, Data Structures, Object-Oriented Programming, Large Scale Software Design

Research Experience

Research Assistant — Mar 2026 – Present
Union College, Department of Mathematics — *Advisor: Prof. Sean Carney*

- Developing a Scholar's Project on randomized algorithms for low-rank matrix approximation, targeting a manuscript for a SIAM venue.
- Implemented randomized SVD and analyzed its accuracy–efficiency tradeoffs against classical methods (power and QR iteration), grounded in the Eckart–Young theorem.
- Validated low-rank reconstruction error on real image data, confirming the near-optimal approximation predicted by the singular-value spectrum.

Research Assistant — Jul 2026 – Present
Union College, Department of Mathematics — *Advisor: Prof. Leila Khatami*

- Investigating the combinatorial structure of commuting matrix varieties using the Macaulay2 computer-algebra system, and developing packages to automate the relevant algebraic computations.

Research Assistant — Apr 2025 – Present
Union College, Computer and People's Lab (CAPLAB) — *Advisor: Prof. Shruti Mahajan*

- Built and open-sourced a Python/R mixed-effects logistic regression pipeline for a CHI paper on human detection of AI-generated text, applied across four datasets in Python; wraps `lme4::glmer` with a validated `statsmodels` fallback and Holm–Bonferroni-corrected comparisons.
- Found AI-generated creative writing detected at ∼84% accuracy, far above other genres, while factual-correctness framing fell to near-chance.
- Designed and conducted stimulated-recall interviews, including recruitment and debrief protocols, to triangulate statistical results with participants' reasoning.

Researcher — Jan 2026 – Present
SPAR AI (Supervised Program for Alignment Research) — *Mentor: Paul Rapoport*

- Implementing Infra-Bayesian reinforcement learning to study agent decision-making under adversarial and logically uncertain environments.
- Designed Newcomb-type decision problems to test the framework's predictions and built a shared codebase implementing a toy Infra-Bayesian agent.

Hackathon Researcher — Apr 2026
AIxBio Hackathon, Apart Research — *2nd Place, 4-person team*

- Co-developed BioRT-Bench, a red-teaming benchmark testing four attack methods (direct request, PAIR, Crescendo, base64 encoding) against four frontier LLMs across 40 prompts in five biosecurity categories, using a calibrated judge extending StrongREJECT with bio-specific specificity and actionability dimensions.

Publications & Preprints

Co-First Author (equal contribution, alphabetical order). "Infra-Bayesian Reinforcement Learning Agents Outperform Classical RL For Worst-Case Robustness." Preprint, arXiv:2605.23146, 2026. Accepted, *Reinforcement Learning Conference (RLC) 2026 Workshop: Finding the Frame.*

Technical Skills

Programming: Python, Java
Libraries & Frameworks: NumPy, SciPy, statsmodels, PyTorch
Software & Tools: Git, LaTeX, SPSS, Macaulay2

Leadership & Service

Peer Research Mentor, Union College, Schaffer Library (research-methods and inquiry support) *Sep 2025 – Present*