Maya Pal Gambhir
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EDUCATION

University of Pennsylvania | School of Engineering Philadelphia, PA
Rachleff Scholar *Expected May 2026*

- BSE in Artificial Intelligence
- *Cumulative* GPA: 3.86/4
- *Coursework:* Theory of Machine Learning, Learning with Conditional Guarantees, Modern Convex Optimization, Applied Machine Learning, Mathematics of Machine Learning, Natural Language Processing, Ethical Algorithm Design

RESEARCH EXPERIENCE

Privacy-preserving Synthetic Data Generation for Sortition Algorithms | *In Progress*
Undergraduate Thesis With Prof. Surbhi Goel (UPenn) and Prof. Bailey Flanigan (MIT)

Near-Optimal Dropout-Robust Sortition| *In review*
Maya Gambhir, Bailey Flanigan (MIT), Aaron Roth (UPenn)
https://arxiv.org/abs/2511.16897

- Proposed a minimax optimization algorithm for selecting representative panels robust to dropouts.
- Proved low-regret convergence to the optimal value with high probability for sampled panels.
- Implemented and evaluated algorithmic model with real world data

Conformal Language Model Reasoning with Coherent Factuality | *ICLR 2025*
Maxon Rubin-Toles (Harvard), Maya Gambhir*, Keshav Ramji (IBM), Aaron Roth (UPenn), Surbhi Goel (UPenn)*
https://arxiv.org/abs/2505.17126
*denotes equal contribution

- Developed a novel scoring mechanism accounting for inter-claim dependencies, optimizing correctness and coherence.
- Proved theoretical guarantees of correctness on outputs from a novel post processing algorithms
- Achieved 90% factuality while retaining 80% or more of the original model outputs
- **NeurIPS 2024 Workshop** in Statistics for LLMs; **ICLR 2025**.

Emotion Prediction for News Data | *2023*
UPenn Computational Social Science Lab

- Used the ChatGPT API and other machine learning models to evaluate sentiment on news data
- Iteratively adjusted API calls for effective quote extraction and plotted various error rates.
- Provided weekly code updates, collaborated to debug and improve model performance.

WORK EXPERIENCE

Teaching Assistant**, CIS 3333: Mathematics of Machine Learning** | *August 2025 - December 2025*

- Held regular office hours to provide conceptual clarification and guidance on homework problems and promote meaningful engagement with course material

Teaching Assistant**, CIS 1600: Mathematical Foundations of CS** | *June 2025 - August 2025*

- Delivered recitation sessions, breaking down course concepts and leading students through practical example problems.
- Conducted regular office hours to provide individualized assistance, resolving student questions on assignments and deepening their understanding of course material.

Data Engineering Intern, Munich Re | June 2023 – August 2023 | New York City, NY

- Built a new React-based frontend for an insurance estimation API.
- Created comprehensive technical documentation and implemented testing for production readiness.

PROJECTS

Reinforcement Learning with Human Feedback Literature Review | *2025*

- Surveyed recent advances in preference aggregation (axiomatic, diversity-aware, etc.) for RLHF.
- Proposed structured frameworks for robust and fairness-aware subpopulation reward modeling.

Noise Level Guarantees in MCPT via Conformal Prediction Methods | 2024

- Conducted a comprehensive literature review on Monte Carlo Path Tracing, the Rendering Equation, and conformal prediction techniques
- Synthesized findings and the proposed algorithm into a ten-page research paper.
- Proposed an algorithm to guarantee low noise levels in Monte Carlo Path Tracing simulations, optimizing sample efficiency to address computational constraints.

Movie Review Sentiment Analysis | *2023*

- Preprocessed IMDb review data using PCA, TfidfVectorizer, and WordNet lemmatization.
- Trained AdaBoost models with logistic regression and decision trees; built and tuned PyTorch neural networks.
- Visualized training performance across architectures and hyperparameters..

LEADERSHIP

President, Penn Six Comedy Acapella | *May 2023 – Present*

- Designed and implemented a novel collaborative structure for recruitment, rehearsal, and show production tailored to the group's no-audition model.
- Fostered a creative, feedback-driven environment to improve music performance, comedy writing, and group cohesion.

FELLOWSHIPS/AWARDS

Rachleff Scholars Program, University of Pennsylvania

- Selected as one of a small cohort of Penn Engineering undergraduates
- 10-week paid summer research fellowship under Penn faculty mentorship
- Two honors/graduate-level courses in engineering research and inquiry

TECHNICAL SKILLS

Libraries/Tools: PyTorch, cvxpy, JAX, scikit-learn, ChatGPT API,
Programming Languages: Python, Java,, SQL, Javascript/Typescript, Ocaml
Statistics/Theory: PAC Learning/Convergence, Boosting, Gradient Descent, Mean/Quantile Calibration/Multicalibration, Conformal Prediction