Max David Gupta

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EDUCATION

Princeton University — Princeton, NJ
M.S.E., Computer Science | Overall GPA: 3.71 | Program GPA: 3.89 — August 2024 - May 2026 [Expected]
Working in the Princeton Laboratory for Artificial Intelligence and the Computational Cognitive Science Lab
Graduate Coursework: Machine Learning and Pattern Recognition, Probabilistic Modeling, AI Safety, Information Theory, Cognitive Psychology, Computational Cognitive Modeling
Honors: Graduate Fellowship (Full Tuition Scholarship and Teaching Salary)

Columbia University — New York, NY
B.A, Applied Mathematics | Overall GPA: 3.51 | Program GPA: 3.71/4.0 — September 2017 - May 2021
Relevant Coursework: Natural Language Processing, Applied Deep Learning, Data Structures, Linear Algebra, Intro to Statistics, Discrete Math, Complex Variables, Analysis and Optimization, Calculus III & IV
Honors: Dean's List; Heinrich Research Fellowship ($2,500); Spritz Family Research Grant ($3,000)

PROFESSIONAL EXPERIENCE

Princeton Computational Cognitive Science Lab — Princeton, NJ
Graduate Researcher – *Supervisor: Tom Griffiths* — August 2024 - Present
- Conduct thesis research on meta-learning, few-shot learning, cognitive modeling with neural networks.
- Present work at machine learning and cognitive science conferences.
- Lead weekly precepts teaching 5-15 Princeton undergraduates, host office hours, and manage all grading for classes spanning programming, cognitive science, and machine learning topics.

Max Planck Institute for Human Development (Center For Humans and Machines) — Berlin, Germany
AI Behaviorist — May - August 2024
- Built full-stack web experiments for human–AI interaction experiments. Developed end-to-end infrastructure (JS + Python + PostgreSQL) for managing both real-time human data collection and LLM APIs.

CompTIA — New York, NY
Head Data Science Instructor — Nov 2022 - Feb 2024
- Served as head instructor for an online data science and coding boot-camp using Python and SQL and as an assistant teacher for web development with React JS: providing comprehensive grading, coding, and career support to students.
- Hand-designed and delivered all technical curriculum, focused on libraries like Pandas, NumPy and Matplotlib.

Weill Cornell Medicine — New York, NY
Research Software Engineer — May 2022 - Nov 2022
- Optimized hospital-scale ETL and NLP pipelines, securely parsing and caching patient files and doctor notes.
- Implemented new geo-caching procedure that improved retrieval accuracy +15% and reduced look-up times by 1.6×.

Infosys Consulting — New York, NY
Analyst – AI & Automation — August 2021 - May 2022
- Designed and deployed NLP workflows for credit risk and document processing at two Top 3 US banks, automating 85% of credit risk process work. Advised clients' executive-suites on-site and virtually on AI tool use and adoption.

PRESENTATIONS & PAPERS

- **Gupta M**., Rane S., McCoy T., Griffiths T. Convolutional Neural Networks Can (Meta)-Learn the Same-Different Relation*: In the Proceedings of the 47th Annual Conference of the Cognitive Science Society (2025);*
  - *Poster: Frontiers in NeuroAI Symposium, Kempner Institute, Harvard University (2025)*
- Bencomo G., **Gupta M**., Marinescu I., McCoy T., Griffiths T. Teasing Apart Architecture and Initial Weights as Sources of Inductive Bias in Neural Networks*: In the Proceedings of the 47th Annual Conference of the Cognitive Science Society (2025)*
- **Gupta M.** Navigating High Dimensional Concept Space with Metalearning*: ICML 2025, Workshop on High-*

Dimensional Learning Dynamics

- Hawkins, R.D., **Gupta M.**, Fang K., Wu, C.M., Franke, M. Networks with Pragmatic Listeners are Less Vulnerable to Misinformation. *Society of Personality and Social Psychology Annual Convention 2025*
- Azizi E., Azad T., **Gupta M.**, Nazaret A. *Ensembling in Variational Autoencoder Architectures for Effective Posterior Distribution of Cell State Estimation*. Azizi Lab talk, Columbia University

RESEARCH EXPERIENCE

University of Tübingen   Tübingen, Germany
Research Intern – *Supervisors: Michael Franke, Robert Hawkins, Charley Wu*   Feb 2024 - July 2024
- Implemented and studied multi-agent extension of the Rational Speech Act (RSA) modeling Bayesian belief updating and persuasion in social networks. Led modeling, data generation, and experimentation. Presented at SPSP 2025.
- TA'd for *Reinforcement Learning for Language Model Training*, completed coursework in *Understanding LLMs*.

Columbia University Medical Center   New York, NY
Research Assistant - *Supervisor: Elham Azizi*   Jan - August 2021
- Analyzed the effects of aggregating neural network outputs to form posterior distributions (ensembling). Compared deep ensembling and batch ensembling on variational autoencoders (VAEs) performing differential gene expression.
- Trained Bayesian neural networks and VAEs on single-cell data in PyTorch; analyzed posteriors across random initializations. Presented methods and findings to the computational cancer biology lab.

IRCAM, Centre Pompidou   Paris, France
Research Fellow – *Supervisors: Mikhail Malt, Jérôme Nika*   Jan - Sep 2020
- Built language models (RNNs, LSTMs) trained in PyTorch on musical data from live jazz for human-AI improvisations.
- Authored, presented a report on generative music with language models at Columbia's 2020 research symposium.

EXTERNAL ENGAGEMENTS

National Deep Inference Fabric (NDIF) Pilot   Virtual, Feb 2025
Pilot testing mechanistic interpretability tutorials on Llama 405-B with NN-sight, an NDIF-run library for mech-interp.

Journal Clubs: Meta-Learning and Mechanistic Interpretability   Princeton, New Jersey
Organized journal clubs for post-doc and graduate students to come together bi-weekly to discuss topics in meta-learning and mechanistic interpretability (with support of the Natural and Artificial Minds initiative at Princeton).

IICCSSS 2023 (Interdisciplinary Computational Cognitive Science Summer School)   Tübingen, Germany
1st Place: Hackathon for Cognitive Modeling   September 2023
Coursework: Comparing language models to humans; Computational modeling for learning; Human language models

ESSLLI 2023 (European Summer School in Language, Logic & Information)   Ljubljana, Slovenia
Coursework: Probabilistic Language of Thought; Formal Language Theory and Neural Networks   August 2023
Deep Language Learning from Raw Speech; Logic, Data, Examples, and Learning

Center for AI Safety   Berkeley, CA **(**Remote**)**
Intro to AI Safety Fellow   June – August 2023
Grant-funded student. Coursework covering mechanistic interpretability, machine ethics, systemic AI safety, adversarial robustness, and preventing existential risk from future AI systems.

SKILLS, LANGUAGES & INTERESTS

Programming Languages: Python, Java, R, SQL, JavaScript, HTML, Bash, MATLAB
Technical Skills: PyTorch, Jax, NumPy, HuggingFace, slurm/high performance computing, NNsight, Bayesian cognitive modeling, LLM prompt design and evaluation, machine learning experimental design, human behavioral experiment design
Spoken Languages: English (fluent); French (intermediate)
Interests: Cognitive science, Film, Literature, Tennis