RACHEL M. PAPIRMEISTER

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Education

COLUMBIA UNIVERSITY, NY | *B.A. in Cognitive Science, Minor in English* (GPA 3.88)

Distinctions: Honor Society, Service Awards (x5 recipient), Award for *Distinction in Senior Thesis*, Award for *Distinction in Interdisciplinary* Research

Coursework: *Artificial Intelligence, Intermediate Computing in Python, AI & Social Science, Computing in Context, Statistics for Behavioral Science, Social Neuroscience, Cognitive Neuroscience, Psycholinguistics*

MONTGOMERY COLLEGE, MD | *A.A. in Psychology* (GPA 3.73)

Distinctions: Renaissance Scholars Honors Program, Phi Theta Kappa $\Phi\Theta K$, Psychology Academic Perseverance Award

Work Experience

RESEARCH SCIENTIST, Formal Methods & Reasoning Group (FoRG) Sept. 2025 - Present

- Designed and deployed reasoning-enabled LLM evaluation framework, combining prompt engineering with custom Python development to translate research objectives into web-based puzzle benchmarks
- Implemented end-to-end NLP feature extraction pipeline with multi-pass algorithms for analysis of multi-modal data at scale (keystrokes, timestamps, game states, and reasoning traces across N=100)
- Engineered neurosymbolic agentic architecture integrating a multi-state DFA controller, Bayesian causal modeling, and LLM reasoning to improve sample efficiency in sparse-reward environments

RESEARCH ASSISTANT, Columbia Center for Early Relational Health Sept. 2022 - Jan. 2026

- Independently designed emotion-recognition and Theory of Mind task for human behavioral assessment, currently used with the 36-month cohort in *COVID-19 Mother Baby Outcomes* (COMBO) national initiative
- Led team for development of behavioral coding procedure in auditory stimulus task (N=~350), and mealtime observation task (N=~800) using BORIS event-logging software
- Advanced COMBO research through systematic literature review, structured data collection protocols, and comprehensive methodology documentation

POLICY RESEARCHER, GLOBES Practicum, University of Cambridge June 2023 - Aug. 2023

- Contributed to a global study in collaboration with 45 international researchers to measure the effects of consensus messaging on climate change perceptions across 10,000+ participants from 27 countries
- Implemented survey translation into Rioplatense Castilian (Spanish dialect spoken in Argentina), online survey distribution, and data collection throughout Argentina via Qualtrics XM

RESEARCH ANIMAL TECHNICIAN, Axel Laboratory, Columbia University Nov. 2021 - Apr. 2022

Cuttlefish husbandry, including feedings, tank maintenance, laboratory systems check, handling of live animals (cuttlefish, grass shrimp, mysids, and artemia), and detailed record-keeping.

Presentations

Human Causal Reasoning as Finite-State Dynamics: Implications for Neurosymbolic AI Jul. 2026
WiML Symposium, International Conference on Machine Learning (ICML) — Seoul, Korea
https://icml.cc/virtual/2026/76462

Human Causal Reasoning as Evidence for Neurosymbolic Structure in AI Apr. 2026
Basis Research Institute, New York Academy of Sciences — New York, USA

Behavioral and Hormonal Habituation to Acoustic Frequency in Cephalopods Aug. 2023
Junior Researcher Programme Conference, University of Cambridge — Cambridge, England

Publications

Papirmeister, R. (2026). "Human Causal Reasoning Demonstrates Neurosymbolic Structure in Exploration-Driven Benchmarks." *To appear as a poster presentation at the Conference on Cognitive Computational Neuroscience (CCN), August 2026.*

Većkalov, B., et al. (2024) "A 27-country test of communicating the scientific consensus on climate change." *Nature Human Behavior* 8, 1892–1905, https://www.nature.com/articles/s41562-024-01928-2.

Papirmeister, R. (2023) “Miriam Karpilove: A Feminist Analysis.” *Mapping Yiddish New York*, https://jewishstudiescolumbia.com/myny/arts/miriam-karpilove-a-jewish-feminist-analysis/.

Skills

Languages: Python, JavaScript/TypeScript, HTML/CSS, LaTeX, Tidal/Strudel (DSL), R, SQL, C/C++

Frameworks/Tools: PyTorch/Pyro, scikit-learn, NumPy, statsmodels, Git, Matplotlib, pandas, AWS Lambda

AI/ML: LLMs, agentic architectures, fullstack & prompt engineering, NLP, learning algorithms (RLHF, SFT, DPO)