
Jessica Hamrick

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I am a research lead with expertise in **planning and reasoning** across multiple domains, including large language models, model-based reinforcement learning, and human cognition. I have led both large (15-20 ICs) and small (2-3 ICs) teams to successful outcomes, including impact on **Gemini** and publications at top-tier ML venues. I have published **over 35 papers** which have collectively received **>12k citations** (h-index of 24). I am also a skilled Python engineer, with experience using machine learning technologies (Jax, Tensorflow), scientific computing libraries (pandas, matplotlib, Jupyter), and contributing to open source.

Research & Work Experience

NOVEMBER 2017 - PRESENT

Google DeepMind, London | *Senior Staff Research Scientist*

- Led work on **planning and reasoning in Gemini** and contributed to [Gemini 2.0 Flash Thinking](#).
- Led research on **model-based RL** with a focus on understanding **MCTS**-based systems like MuZero, resulting in multiple papers published at ICLR and ICML.
- Showed how **GNNs** could be used in RL and co-authored a highly-cited position paper titled "*Relational inductive biases, deep learning, and graph networks*" (>4k citations).
- Championed interdisciplinary work in **cognitive science and ML**.

SEPTEMBER 2012 - OCTOBER 2017

University of California, Berkeley | *Ph.D. Student in Psychology*

- Developed computational models of how humans use mental simulation to make decisions, including how they learn from simulation and how they choose which simulations to run (and how many).
- Published >15 papers on topics including metareasoning, physical understanding, mental simulation, human-robot collaboration, model-based RL, and open-source tools.

JANUARY 2010 - JUNE 2012

Massachusetts Institute of Technology | *Research Assistant & Master's Student*

- Developed a simulation-based model of physical scene understanding in humans, resulting in a highly-cited paper titled "*Simulation as an engine of physical scene understanding*" (>1k citations).

SEPTEMBER 2013 - DECEMBER 2022

Project Jupyter | *Steering Council Member & Contributor*

- Created [nbgrader](#) (1.3k stars on GitHub), which provides tooling for creating and grading homework assignments using the Jupyter Notebook, and [pioneered the use of JupyterHub](#) in educational contexts.
- Served as a member of the **Project Jupyter Steering Council** from 2015-2022.
- Received the [ACM Software System Award](#) in 2017.

Education

AUGUST 2012 - OCTOBER 2017

University of California, Berkeley | *Ph.D. in Psychology*

Thesis: *Metareasoning and Mental Simulation* [[pdf](#)] Advisor: Tom Griffiths

SEPTEMBER 2007 - JUNE 2012

Massachusetts Institute of Technology | *M.Eng. & B.S. in Computer Science*

Thesis: *Physical Reasoning in Complex Scenes is Sensitive to Mass* [[pdf](#)] M.Eng. advisor: Josh Tenenbaum

Selected Publications

See my [Google Scholar](#) for a full list of publications.

Model-Based Reinforcement Learning

- Walker, Vértés, Li, Dulac-Arnold, Anand, Weber & **Hamrick**. (2023). Investigating the role of model-based learning in exploration and transfer. *ICML*. [\[pdf\]](#)
- Anand, Walker, Li, Vértés, Schrittwieser, Ozair, Weber & **Hamrick** (2022). Procedural generalization by planning with self-supervised world models. *ICLR*. [\[pdf\]](#)
- **Hamrick**, Friesen, Behbahani, Guez, Viola, Witherspoon, Anthony, Buesing, Veličković & Weber (2021). On the role of planning in model-based deep RL. *ICLR*. [\[pdf\]](#)
- **Hamrick**, Bapst, Sanchez-Gonzalez, Pfaff, Weber, Buesing & Battaglia (2020). Combining Q-Learning and Search with Amortized Value Estimates. *ICLR*. [\[pdf\]](#)

Graph Neural Networks

- Bapst, Sanchez-Gonzalez, Doersch, Stachenfeld, Kohli, Battaglia & **Hamrick** (2019). Structured agents for physical construction. *ICML*. [\[pdf\]](#)
- Battaglia, **Hamrick**, Bapst, Sanchez-Gonzalez, Zambaldi, Malinowski, et al. (2018). Relational inductive biases, deep learning, and graph networks. arXiv preprint arXiv:1806.01261. [\[pdf\]](#)

Cognitive Science

- **Hamrick** (2019). Analogues of mental simulation and imagination in deep learning. *Current Opinion in Behavioral Sciences*, 29, 8–16. [\[pdf\]](#)
- Battaglia, **Hamrick** & Tenenbaum (2013). Simulation as an engine of physical scene understanding. *Proceedings of the National Academy of Sciences*, 110(45), 18327–18332. [\[pdf\]](#)

Awards & Grants

- [ACM Software System Award](#) (2017) for work on Project Jupyter.
- NSF Graduate Research Fellowship (2014–2017), tuition and stipend. *One of the most competitive graduate fellowships in the US, with an acceptance rate of 14%.*
- Berkeley Fellowship (2012–2014), tuition and stipend. *UC Berkeley's most prestigious fellowship awarded to incoming graduate students, based on merit.*