

Joshua S. Rule

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Research Interests

Computational cognitive science, conceptual development, mathematical development, probabilistic modeling, program induction, programming language theory, foundations of computation

Academic Positions

- 2020–PRES. University of California, Berkeley
Postdoctoral Scholar
Advisors: Alison Gopnik, Steven T. Piantadosi
- 2013–2020 Massachusetts Institute of Technology
Graduate Student
Advisor: Joshua B. Tenenbaum
- 2010–2013 Georgetown University
Research Assistant & Lab Manager
Advisor: Maximilian Riesenhuber
- 2009 University of Illinois, Urbana-Champaign
Research Assistant
Advisor: Dan Roth

Education

- 2020 Massachusetts Institute of Technology
PhD, Brain & Cognitive Sciences, *Thesis Advisor: Joshua B. Tenenbaum*
- 2009 University of Illinois Urbana-Champaign
BS, Computer Science, *Summa cum Laude*
BA, Philosophy, *Magna cum Laude*

Awards & Honors

- 2016 Angus MacDonald Award for Excellence in Undergraduate Teaching, MIT
- 2015 Glushko Student Travel Award, Cognitive Science Society
- 2014 Graduate Research Fellowship, National Science Foundation
Eugene Stark Graduate Fellowship, MIT
- 2013 Leventhal Graduate Fellowship, MIT
- 2010 University Honors, UIUC, *top 3% of graduating class*

Journal Articles

- Rule, J. S.**, & Riesenhuber, M. (2021). *Leveraging prior concept learning improves ability to generalize from few examples in computational models of human object recognition*. *Frontiers in Computational Neuroscience*.
- Rule, J. S.**, Piantadosi, S. T., & Tenenbaum, J. B. (2020). *The child as hacker*. *Trends in Cognitive Sciences*.
- Glezer, L. S., Kim, J., **Rule, J.**, Jiang, X., & Riesenhuber, M. (2015). *Adding words to the brain's visual dictionary: Novel word learning selectively sharpens orthographic representations in the VWFA*. *Journal of Neuroscience*, 35(12).

Conference Papers

- Rule, J. S.**, Piantadosi, S. T., & Tenenbaum, J. B. (under review). *Learning as programming: Efficient search in models of human concept learning*.
- Rule, J.**, Schulz, E., Piantadosi, S. T., & Tenenbaum, J. B. (2018). *Learning list concepts through program induction*. *Proceedings of the Cognitive Science Society*.
- Rule, J.**, Dechter, E., & Tenenbaum, J. B. (2015). *Representing and learning a large system of number concepts with Latent Predicate Networks*. *Proceedings of the Cognitive Science Society*.
- Sammons, M., Vydiswaran, V. G. V., Vieira, T., Johri, N., Chang, M.-W., Goldwasser, D., Sriku-mar, V., Kundu, G., Tu, Y., Small, K., **Rule, J.**, Do, Q., & Roth, D. (2009). *Relation alignment for textual entailment recognition*. *Proceedings of the Textual Alignment Conference*.

Abstracts & Posters

- Goddu, M. K., **Rule, J. S.**, Bonawitz, E., Gonik, A., & Ullman, T. (2022a). *Fun isn't easy: Children optimize for difficulty when "playing for fun" vs. "playing to win" in a game design task* [Talk and abstract]. *Budapest CEU Conference on Cognitive Development Programs and Abstracts*.
- Goddu, M. K., **Rule, J. S.**, Bonawitz, E., Gonik, A., & Ullman, T. (2022b). *Fun isn't easy: Children optimize for difficulty when "playing for fun" vs. "playing to win" in a game design task* [Poster and abstract]. *Cognitive Development Society Abstract Book*.
- Goddu, M. K., **Rule, J. S.**, Bonawitz, E., Gonik, A., & Ullman, T. (2022c). *Fun isn't easy: Children optimize for difficulty when "playing for fun" vs. "playing to win" in a game design task* [Poster and abstract]. *Society for Research in Child Development's Learning through Play and Imagination: Expanding Perspectives*.
- Rule, J. S.**, Piantadosi, S. T., & Tenenbaum, J. B. (2019). *Learning a novel rule-based conceptual system* [Poster and abstract]. *Proceedings of the Cognitive Science Society*.
- Dechter, E., **Rule, J.**, & Tenenbaum, J. B. (2015). *Latent Predicate Networks: Concept learning with probabilistic context-sensitive grammars* [Poster and abstract]. *Proceedings of the AAAI Spring Symposium Series*.
- Dechter, E., **Rule, J.**, & Tenenbaum, J. B. (2014). *Unsupervised learning of probabilistic programs with Latent Predicate Networks* [Poster and abstract]. *Proceedings of the NIPS Workshop on Probabilistic Programming*.
- Glezer, L. S., Kim, J. S., **Rule, J.**, Jiang, X., & Riesenhuber, M. (2013). *Novel word learning selectively sharpens orthographic representations in the VWFA* [Poster and abstract]. *Neuroscience 2013 Abstracts*.

Dissertation

- 2020 *The child as hacker: Building more human-like models of learning*
Committee: Susan Carey, Steven T. Piantadosi, Laura Schulz (chair), Joshua B. Tenenbaum

Invited Talks

- Apr. 2022 *The child as hacker*, UC Berkeley, CogSci C131 guest lecture
Oct. 2021 *The child as hacker*, UC Berkeley, Computational Cognitive Neuroscience Lab
Mar. 2021 *Learning as hacking*, NSF Expeditions: Understanding the world through code, Cognitive science working group
Jan. 2021 *The child as hacker*, MPI Tübingen, Computational Principles of Intelligence Lab
Oct. 2020 *The child as hacker*, UC Berkeley, Institute for Human Development & Developmental Psychology Colloquium
Feb. 2019 *Learning in a flexible language of thought*, UC Berkeley, Computation and Cognition Lab
Jul. 2018 *Learning list concepts through program induction*, Cognitive Science Society, Learning as Program Induction Workshop
May 2018 *Learning structured concepts through program induction*, MIT, Brain and Cognitive Sciences CogLunch
Jul. 2015 *Representing and learning a large system of number concepts with Latent Predicate Networks*, Cognitive Science Society

Reviewing

CogSci, Trends in Cognitive Sciences

Mentoring

- 2020 – 2021 Shardul Chiplunkar (BS)
2018 – 2019 Nicholas Alvarado (BS), Software Engineering Intern, Uptycs
2017 Benjamin Kaplan (BS), Analytics, Gloss Genius

Teaching

- Fall 2015 9.660 - Computational Cognitive Science
Teaching Assistant with Joshua Tenenbaum, MIT
Fall 2014 9.660 - Computational Cognitive Science
Teaching Assistant with Joshua Tenenbaum, MIT
Spring 2009 CS225 - Data Structures
Teaching Assistant with Cinda Heeren, UIUC
Fall 2008 CS225 - Data Structures
Teaching Assistant with Cinda Heeren, UIUC
Spring 2008 CS225 - Data Structures
Teaching Assistant with Cinda Heeren, UIUC