

# Tomer D. Ullman

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CONTACT INFORMATION	Harvard University Department of Psychology Northwest Building Room 190.02 52 Oxford St., Cambridge, MA 02138 USA	tullman@fas.harvard.edu <a href="http://www.tomerullman.org">http://www.tomerullman.org</a>
POSITION	Morris Kahn Associate Professor of Psychology, Harvard Department of Psychology. Member of the Center for Brains, Minds, and Machines. Affiliate of the Kempner Institute for the Study of Natural and Artificial Intelligence.	
RESEARCH INTERESTS	Computational cognitive modeling, intuitive theories, cognitive development, probabilistic programming, intuitive physics, intuitive psychology, imagination, common sense, machine learning, theory-of-self	
EDUCATION	<b>Massachusetts Institute of Technology and Harvard University</b> Postdoctoral associate at the Center for Brains, Minds & Machines (2016-2019)  <b>Massachusetts Institute of Technology</b> Ph.D. in Brain and Cognitive Sciences (2008-2015) • Dissertation Topic: On the Nature and Origin of Intuitive Theories  <b>Hebrew University of Jerusalem</b> B.S. in Physics and Cognitive Science (double major, 2004-2008) • <i>Magna Cum Laude</i>	
Grants and Funding	<hr/> <p>Dean's Competitive Fund for Promising Scholarship, Spring 2024, \$43,088, "Visual Pretense in People and Machines".</p> <p>Radcliffe Exploratory Seminar, Spring 2024, \$20,000, "Loopholes: Spirit-vs-Letter of the Law at the Dawn of AI".</p> <p>Jacobs Foundation Research Fellowship – September 2022 – September 2024, \$177,273.</p> <p>NSF Science of Learning, September 2021 – September 2023, \$662,693, "Collaborative Research: Loopholes as a window into the learning of meaning", joint project with Harvard and MIT, Harvard component \$372,241.</p> <p>DARPA MCS (Machine Common Sense), June 2019 – July 2023, \$12,100,000, "Building machine common sense the human way", Co-PI with six other investigators from IBM, MIT, Stanford, and Harvard. Harvard component, supporting Ullman, Spelke, and several RAs and postdoctoral researchers, is \$1,079,976.</p> <p>Dean's Competitive Fund for Promising Scholarship, Spring 2021, \$39,449, "Learning from People Who Aren't There".</p> <p>John Templeton Foundation, February 2020 – October 2022, \$234,000, "Play, a computational perspective".</p>	

Director of Science Education Lab Kit Funding, Spring 2021, Competitive proposal to fund novel at-home experiment kits as part of Harvard Class on Decision Making (PSY1322).

Templeton Experience Project, June 2015 – June 2017, \$90,000, “Computational models of the intuitive theory of transformative experiences”, with Josh Tenenbaum (PI).

(Trainee grant) NSF STEM Education Fellowship, September 2023 – August 2025, \$338,170, postdoctoral fellowship studying pedagogy, learning, and detecting automatic behavior, Dr. Ilona Bass, Post-doctoral Fellow advised by Ullman and Bonawitz (Harvard Graduate School of Education).

(Trainee grant) Simons Center for the Social Brain, October 2020 – October 2022, \$134,912, postdoctoral fellowship studying loopholes and ASD awarded to Dr. Sophie Bridgers, Post-doctoral Fellow advised by Ullman and Schulz (MIT).

(Trainee grant) MBB Fellowship, July 2021 – July 2023, \$150,600, postdoctoral fellowship studying pedagogy, learning, and detecting automatic behavior, Dr. Ilona Bass, Post-doctoral Fellow advised by Ullman and Bonawitz (Harvard Graduate School of Education).

## Publications

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### MANUSCRIPTS IN PREP AND UNDER REVIEW

- Paul, De Freitas, Ullman, and Tenenbaum. Reverse engineering the self  
Parece, Schulz, and Ullman. Sacred Values: Moral Reasoning Upends Loopholes.  
Li and Ullman. Non-commitment in the imagination differs from inattention.  
Hu, Sosa, and Ullman. Continuous Category Errors.

### JOURNAL ARTICLES

- Balaban, H. and Ullman, T. D. (2026) Emotion may indirectly link rendering and social reasoning. *Trends in Cognitive Sciences*.
- Chu, J., Rule, J.\*, Goddu, M.\*., Pinter, V., Reagan, E.R., Bonawitz, E., Gopnik, A., and Ullman, T.D. (2025). Fun Isn't Easy: Children Selectively Manipulate Task Difficulty When Playing for Fun Versus Playing to Win. *Developmental Psychology*.
- Qian, P., and Ullman, T. D. (2025). Shape Guides Visual Pretense. *Open Mind*.
- Bigelow, E., and Ullman, T. D. (2025). People evaluate agents based on the algorithms that drive their behavior. *Open Mind*.
- Balaban, H., and Ullman, T. D. (2025). The capacity limits of moving objects in the imagination. *Nature Communications*.
- Balaban, H., and Ullman, T. D. (2025). Physics versus graphics as an organizing dichotomy in cognition. *Trends in Cognitive Sciences*.
- Bridgers, S., Qian, P., Parece, K., Taliaferro, M., Schulz, L., and Ullman, T. D. (2025).

Loopholes: A window into value alignment and the communication of meaning. *Cognition*.

Hu, J., Sosa, F., and Ullman, T.D. (2025). Re-evaluating Theory of Mind Evaluation in Large Language Models. *Philosophical Transactions B*.

Hu, J., Sosa, F., and Ullman, T.D. (2025). Shades of Zero: Distinguishing impossibility from inconceivability. *Journal of Memory and Language*.

Wang, Y., and Ullman, T.D. (2025). Resource bounds on mental simulations: Evidence from a liquid-reasoning task. *JEP: General*.

Bridgers, S.\*, Parece\*, K., Iwasaki, I., Broski, A., Schulz, L., and Ullman, T.D. (2025) Learning Loopholes: The Development of Intentional Misunderstandings in Children. *Child Development*.

Bass, I., Colantonio, J., Aboody, R., Wong, M., Ullman, T., and Bonawitz, E. (2025). Children's sensitivity to automatic behavior relates to pedagogical reasoning and Theory of Mind. *Frontiers in Developmental Psychology*.

Sosa, F., Gershman, S., and Ullman, T.D. (2025), Blending simulation and abstraction for physical reasoning. *Cognition*, 254, 105995.

Balaban, H., Smith, K., Tenenbaum, J, and Ullman, T.D. (2024). Using EEG to uncover the dynamics of physical expectation violation and resolution. *Open Mind*.

Bass and Ullman (2024). The Detection of Automatic Behavior in Other People (2024). *American Psychologist*.

Qian, P., Bridgers, S., Taliaferro, M., Parece, K., and Ullman, T. D. (2024). Ambivalence by design: A computational account of loopholes. *Cognition*, 252, 105914.

Kryven, M., Yu, S., Kleiman-Weiner, M., Ullman, T., and Tenenbaum, J. (2024). Approximate planning in spatial search. *PLOS Computational Biology*, 20(11), e1012582.

Bass, I., Espinoza, C., Bonawitz, E., and Ullman, T. D. (2024). Teaching without thinking: Negative evaluations of rote pedagogy. *Cognitive Science*.

Ullman, T. D., and Bridgers, S. (2024). Genies, lawyers, and smart-asses: Extending proxy failures to intentional misunderstandings. *Behavioral and Brain Sciences*, 47, e86.

Jonusaite, I., and Ullman, T. D. (2024). The invisible hand as an intuitive sociological explanation. *Journal of Experimental Social Psychology*.

De Freitas, J., Uguralp, A. K., Oguz-Uguralp, Z., Paul, L. A., Tenenbaum, J., and Ullman, T. D. (2023). Self-orienting in human and machine learning. *Nature Human Behaviour*.

Li, Y., Wang Y., Boger, T., Smith, K., Gershman S.J., and Ullman T.D. (2023). An approximate representation of objects underlies physical reasoning. *JEP: General*.

Bigelow, E., McCoy, J.P., and Ullman, T.D., (2023). Non-commitment in mental imagery. *Cognition*.

- Boger, T. and Ullman, T.D., (2023) What is ‘Where’? Physics and Attention Modulate Object Representations. *Open Mind*.
- Gershman, S. and Ullman, T.D., (2023). Causal Implicatures from Correlational Statements. *PLOS ONE*.
- Burnell, R., Schellaert, W., Burden, J., Ullman, T.D., Martinez-Plumed, F., Tenenbaum, J.B., Rutar, D., Cheke, L.G., Sohl-Dickstein, J., Mitchell, M. and Kiela, D. (2023). Rethink reporting of evaluation results in AI. *Science*.
- Gjata, N. N., Ullman, T. D., Spelke, E. S., and Liu, S. (2022). What could go wrong: adults and children calibrate predictions and explanations of others’ actions based on relative reward and danger. *Cognitive science*.
- Bass, I., Smith, K. A., Bonawitz, E., and Ullman, T. D. (2022). Partial mental simulation explains fallacies in physical reasoning. *Cognitive Neuropsychology*.
- Gjata, N. N., Ullman, T. D., Spelke, E. S., and Liu, S. (2022). What could go wrong: adults and children calibrate predictions and explanations of others’ actions based on relative reward and danger. *Cognitive Science*.
- Liu, S., Ullman T.D., Tenenbaum, J., and Spelke, E. (2022). Dangerous ground: Thirteen-month-old infants are sensitive to peril in other people’s actions. *Open Mind*.
- Kryven, M., Ullman, T.D., Cowan, W., and Tenenbaum, J.B., (2021) Plans or Outcomes: How do we attribute intelligence to others? *Cognitive Science*
- Sosa, F. A., T. D. Ullman, J. B. Tenenbaum, S. J. Gershman, and T. Gerstenberg (2021), Moral dynamics: Grounding moral judgment in intuitive physics and intuitive psychology. *Cognition*.
- Ullman, T.D. (2021). What are you talking about. *Nature Human Behaviour*.
- Ullman, T.D. and Tenenenbaum, J.B. (2020), Bayesian models of conceptual development: Learning as building models of the world. *Annual Review of Developmental Psychology*.
- Ullman, T.D. (2020) Heroes of our own story: Self-image and rationalizing in thought experiments. *Behavioral and Brain Sciences* 43.
- McCoy, J. and Ullman, T. (2019) Transformative Decisions and Their Discontents. Part of a symposium on L.A. Paul’s “Transformative Experience”. *Rivista Internazionale di Filosofia e Psicologia*, 10(3), 339 - 345.
- Bonawitz E., Ullman, T.D., Gopnik, A., and Tenenbaum, J.B. (2019), Sticking to the evidence? A Computational and behavioral case Study of micro-theory change in the domain of magnetism, *Cognitive Science*, 43(8), e12765.
- Ullman, T.D. and McCoy, J.P. (2019), Judgments of effort for magical violations of intuitive physics. (2019) *PLOS One*, 14(5), e0217513.
- McCoy, J.P., and Ullman, T.D., A Minimal Turing Test. (2018). A Minimal Turing Test. *Journal of Experimental Social Psychology*, 79, 1-8.

Gerstenberg, T., Ullman, T.D., Nagel, J., Kleiman-Weiner, M., Lagnado, D., and Tenenbaum, J.B. (2018), Lucky or clever? From changed expectations to attributions of responsibility. *Cognition*.

Liu, S., Ullman, T.D., Tenenbaum J.B., and Spelke, E. (In press) 10-month-olds infer the value of goals from the costs of actions. *Science*, 358(6366), 1038-1041.

Ullman, T. D., Spelke, E. S., Battaglia, P., and Tenenbaum, J. B. (2017), Mind Games: Game Engines as an Architecture for Intuitive Physics. *Trends in Cognitive Science*, 21(9), 649–665.

Ullman, T. D., Stuhlmüller, A., Goodman, N.D., and Tenenbaum, J. B. (2017), Learning physical parameters from dynamic scenes. *Cognitive Psychology*.

Lake, B. M., Ullman, T. D., Tenenbaum, J. B., and Gershman, S. J. (2017), Building machines that learn and think like people. *Behavioral and Brain Sciences*, 1–101.

Hamlin, J. K., Ullman, T. D., Tenenbaum, J. B., Goodman, N. D., and Baker, C. L. (2013), The mentalistic basis of core social cognition: Experiments in preverbal infants and a computational model. *Developmental Science* 16(2), 209-226.

Ullman, T. D., Goodman, N. D., and Tenenbaum, J. B. (2012), Theory learning as stochastic search in the language of thought. *Cognitive Development* 27(4), 455–480.

Goodman, N. D., Ullman, T. D., and Tenenbaum, J. B. (2012), Learning a theory of causality. *Psychological Review*, 118(1), 110.

BOOK CHAPTERS Bonawitz, E., and Ullman, T. D. (2024) Bayesian models of cognitive development. In Bayesian Models of Cognition: Reverse Engineering the Mind.

Smith, K. A., Hamrick, J. B., Sanborn, Adam N., Battaglia, P. W., Gerstenberg, T., Ullman, T. D. and Tenenbaum, J. B. (2024) Intuitive physics as probabilistic inference. In Bayesian Models of Cognition: Reverse Engineering the Mind.

Jara-Ettinger, J., Baker, C., Ullman, T. D. and Tenenbaum, J. B. (2024) Theory of mind and inverse decision-making. In Bayesian Models of Cognition: Reverse Engineering the Mind.

Ullman, T.D. and Zimmerman, S., Models of transformative decision making, (2020) in Becoming Someone New: Essays on Transformative Experience, Choice, and Change, eds. Enoch Lambert and John Schwenkler, Oxford University Press.

Ullman, T. D., McCoy, J. P., and Paul, L. A., (2019), Modal Prospection. Metaphysics and Cognitive Science, eds. Alvin Goldman and Brian McLaughlin. Oxford University Press (US).

CONFERENCE PROCEEDINGS AND PREPRINTS Murthy, S. K., Zhao, R., Hu, J., Kakade, S., Wulfmeier, M., Qian, P., and Ullman, T. (2026). Using cognitive models to interpret value trade-offs in LLMs. *ICLR*.

Bhattacharya, A., Hu, J., and Ullman, T. D. (2025) The Uncanny Valley meets the Humorous Hill: Things are funny when they match a pattern but fall short on quality. *Proceedings of the Annual Meeting of the Cognitive Science Society*.

- Wang, Y., Bigelow, E., Li, B., and Ullman, T. (2025). Chain of Time: In-Context Physical Simulation with Image Generation Models. *arxiv*.
- Bigelow, E., Wurgaft, D., Wang, Y., Goodman, N., Ullman, T., Tanaka, H., and Lubana, E. S. (2025). Belief dynamics reveal the dual nature of in-context learning and activation steering. *arxiv*.
- Hu, J., Sosa, F., and Ullman, T.D. (2025). Making Sense of Nonsense. *Proceedings of the Annual Meeting of the Cognitive Science Society*.
- Chu, J., O'Keeffe, M., Liu, S., Bonawitz, E., and Ullman, T.D. (2025). Stumped! Learning to think outside the box in 3-7 year old children. *Proceedings of the Annual Meeting of the Cognitive Science Society*.
- Bigelow, E., Holtzman, A., Tanaka, H., and Ullman, T. (2025). Forking Paths in Neural Text Generation. *International Conference on Learning Representations (ICLR)*.
- Parece, K., Ullman, T. D., and Schulz, L., (2025) Intuitions about prosocial backfiring: Four to seven-year olds' understanding of when helping might cause offense. *Proceedings of the Annual Meeting of the Cognitive Science Society*.
- Xiang, Y., Bigelow, E., Gerstenberg, T., Ullman, T. D., and Gershman, S. (2025) Language models assign responsibility based on actual rather than counterfactual contributions. *Proceedings of the 47th Annual Meeting of the Cognitive Science Society*.
- Ullman, T. (2024). The Illusion-Illusion: Vision Language Models See Illusions Where There are None. *arXiv preprint*
- Jin, C., Wu, Y., Cao, J., Xiang, J., Kuo, Y. L., Hu, Z., Ullman, T.D., and Shu, T. (2024). Mmtom-qa: Multimodal theory of mind question answering. *ACL conference, Outstanding Paper Award*.
- Murthy, S. K., Ullman, T., and Hu, J. (2024). One fish, two fish, but not the whole sea: Alignment reduces language models' conceptual diversity. *NAACL*
- Conwell, C., Tawiah-Quashie, R., and Ullman, T. (2024). Relations, Negations, and Numbers: Looking for Logic in Generative Text-to-Image Models. *arXiv preprint arXiv:2411.17066*.
- Hu, J., Sosa, F. A., and Ullman, T. D. (2024). Shades of Zero: Distinguishing impossibility from inconceivability. In *Proceedings of the Annual Meeting of the Cognitive Science Society*.
- Chu, J., Hu, J., and Ullman, T. D. (2024). The Task Task: Creative problem generation in humans and language models. In *Proceedings of the Annual Meeting of the Cognitive Science Society*.
- Parece, K., Bridgers, S., Ullman, T. D., and Schulz, L. (2024). Exploring Loophole Behavior: A Comparative Study of Autistic and Non-Autistic Populations. In *Proceedings of the Annual Meeting of the Cognitive Science Society*.
- Bigelow, E. J., Lubana, E. S., Dick, R. P., Tanaka, H., and Ullman, T. D. (2023). In-context learning dynamics with random binary sequences. *arXiv preprint*.

- Ullman, T.D. (2023). Large Language Models Fail on Trivial Alterations to Theory-of-Mind Tasks. *arXiv preprint*.
- Murthy, S., Parece, K., Bridgers, S., Qian, P., and Ullman, T. (2023). Comparing the Evaluation and Production of Loophole Behavior in Humans and Large Language Models. In *Findings of the Association for Computational Linguistics: EMNLP*.
- Qian, P., and Ullman, T.D. (2023). Human Visual Pretense is Constrained Primarily by Shape. In *Society for Philosophy and Psychology (SPP)*.
- Bass, I., Bonawitz, E., and Ullman, T. D. (2023). Negative Evaluations of Rote Teaching in Adults and Children. In *Society for Philosophy and Psychology (SPP)*.
- Sosa, F., and Ullman, T.D. (2022). Type theory in human-like learning and inference. *arXiv preprint*.
- Conwell, C., and Ullman, T. D. (2022). Testing Relational Understanding in Text-Guided Image Generation. *arXiv preprint*.
- Bigelow, E. and Ullman, T. D. (2022). Opening the Black Box: People Evaluate Agents Based on the Algorithms that Drive their Behavior. In *Society for Philosophy and Psychology (SPP)*.
- Jonusaite, I. and Ullman, T. D. (2022). The Invisible Hand as an Intuitive Sociological Explanation. In *Society for Philosophy and Psychology (SPP)*.
- Bass, I., Bonawitz, E., and Ullman, T. D. (2022). Adults' Evaluations of Rote and Reflective Teachers. *Proceedings of the Annual Meeting of the Cognitive Science Society*.
- Bass, I., Smith, I., Bonawitz, E., and Ullman, T. (2021). Efficient partial simulation quantitatively explains deviations from optimal physical predictions. *Presentation at refereed workshop as part of the 35th Annual Conference on Neural Information Processing Systems: Physical Reasoning and Inductive Biases for the Real World*.
- Bridgers, S., Glassman, E., Schulz, L.E., and Ullman, T.D. (2021). Loopholes: a Window into Value Alignment and the Learning of Meaning. *Presentation at refereed workshop as part of the 35th Annual Conference on Neural Information Processing Systems: Physical Reasoning and Inductive Biases for the Real World*.
- Xu, K., Srivastava, A., Gutfreund, D., Sosa, F., Ullman, T., Tenenbaum, J. B., abd Sutton, C. (2021). A Bayesian-Symbolic Approach to Learning and Reasoning for Intuitive Physics. In *Advances in Neural Information Processing Systems (NeurIPS)*.
- Bridgers, S., Schulz, L.E., and Ullman, T.D. (2021). Loopholes, a Window into Value Alignment and the Learning of Meaning. *Proceedings of the 42nd Annual Meeting of the Cognitive Science Society*.
- Kim, P., De Freitas, J., and Ullman, T.D. (2021), Lifelines: Summarizing the Pattern of a Meaningful Life. In *Society for Philosophy and Psychology (SPP)*.
- Mao, J., Luo, Z., Gan, C., Tenenbaum, J.B., Wu, J., Kaelbling, J.P., and Ullman, T.D. (2021) Temporal and Object Quantification Networks. In *Thirtieth International Joint Conference on Artificial Intelligence (IJCAI)*.

- Shu, T., Bhandwaldar, A., Gan, C., Smith, K.A., Liu, S., Gutfreund, D., Spelke, E., Tenenbaum, J.B. and Ullman, T.D. (2021). AGENT: A Benchmark for Core Psychological Reasoning. In *Thirty-eighth International Conference on Machine Learning (ICML)*.
- Du, Y., Smith, K., Ullman, T.D., Tenenbaum, J.B., and Wu, J. (2021). Unsupervised Discovery of 3D Physical Objects From Video. In *International Conference on Learning Representations (ICLR)*.
- Smith, K. A., Mei, L., Yao, S., Wu, J., Spelke, E., Tenenbaum, J. B., and Ullman, T. D. (2020). The fine structure of surprise in intuitive physics: when, why, and how much?. In *Proceedings of the 42nd Annual Meeting of the Cognitive Science Society*.
- Gjata, N., Ullman, T. D., Spelke, E. S., and Liu, S. (2020). Look before you leap: Quantitative tradeoffs between peril and reward in action understanding. In *Proceedings of the 42nd Annual Meeting of the Cognitive Science Society*.
- Shu, T., Kryven, M., Ullman, T.D., and Tenenbaum, J.B. (2020). Adventures in Flatland: Perceiving Social Interactions Under Physical Dynamics In *Proceedings of the 42nd Annual Meeting of the Cognitive Science Society*.
- Smith, K.\*, Mei, L.\*, Yao, S., Wu, J., Spelke, E., Tenenbaum, J.B., and Ullman, T.D., (2019) Modeling expectation violation in intuitive physics with coarse probabilistic object representations. *Advances in Neural Information Processing Systems*.
- Ullman, T. D., Kosoy, E., Yildrim, I., Soltani, A., Siegel, X., Tenenbaum J.B., and Spelke, E.,(2019), *Draping an Elephant: Uncovering Children's Reasoning About Cloth-Covered Objects* *Proceedings of the 41st Annual Conference of the Cognitive Science Society*.
- Ullman, T. D., Alonso-Diaz, S., Ferringo, S., Zahid, S., and Kidd, C. (2017), Weight matters: The role of physical weight in non-physical language across age and culture. *Proceedings of the 39<sup>th</sup> Annual Conference of the Cognitive Science Society*.
- Liu, S., Ullman, T.d., and McCoy, J.P., (2019), People's perception of others' risk preferences. *Proceedings of the 41st Annual Conference of the Cognitive Science Society*.
- Liu, S., Ullman, T. D., Tenenbaum, J. B., and Spelke, E. S. (2017), What's worth the effort: Ten-month-old infants infer the value of goals from the costs of actions. *Proceedings of the 39<sup>th</sup> Annual Conference of the Cognitive Science Society*.
- Kryven, M., Ullman, T. D., Cowan, W., and Tenenbaum, J. B. (2017), Thinking and guessing: Bayesian and empirical models of how humans search. *Proceedings of the 39<sup>th</sup> Annual Conference of the Cognitive Science Society*.
- Chang, M. B., Ullman, T. D., Torralba, A., and Tenenbaum, J. B. (2017), A compositional object-based approach to learning physical dynamics. *International Conference on Learning Representations (ICLR)*.
- Ullman, T.D., Xu, Y. & Goodman, N.D. (2016), The Pragmatics of spatial language. *Proceedings of the 38<sup>th</sup> Annual Conference of the Cognitive Science Society*.
- Ullman, T.D., Siegel, M., Tenenbaum, J.B. & Gershman, S.J. (2016), Coalescing the vapors of human experience into a viable and meaningful comprehension. *Proceedings*

*of the 38<sup>th</sup> Annual Conference of the Cognitive Science Society.*

Kryven, M., Ullman, T.D., Cowan, W. & Tenenbaum, J.B. (2016), Outcome or strategy? A Bayesian model of intelligence attribution. *Proceedings of the 38<sup>th</sup> Annual Conference of the Cognitive Science Society.*

Gerstenberg, T., Ullman, T. D., Kleiman-Weiner, M., Lagnado, D. A. & Tenenbaum, J. B. (2014), Wins above Replacement: Responsibility attributions as counterfactual replacements. *Proceedings of the 36<sup>th</sup> Annual Conference of the Cognitive Science society.*

Ullman, T.D., Stuhlmüller A., Goodman, N.D. & Tenenbaum, J.B. (2014), Learning physics from dynamical scenes. *Proceedings of the 36<sup>th</sup> Annual Conference of the Cognitive Science society.*

Bonawitz E., Ullman, T.D., Gopnik, A. & Tenenbaum, J.B. (2012), Sticking to the evidence? A Computational and behavioral case Study of micro-theory change in the domain of magnetism, *International Conference Developmental Learning and Epigenetic Robotics; best paper award: experiment combined with computational model.*

Ullman, T.D.\* McCoy, J.P.\* Stuhlmuller, A., Gerstenberg, T. & Tenenbaum J.B. (2012), Why blame Bob? Probabilistic generative models, counterfactual reasoning, and blame attribution. *Proceedings of the 33rd Annual Conference of the Cognitive Science Society.*

Ullman, T.D., Goodman, N.D. & J. B. Tenenbaum (2010), Theory acquisition as stochastic search. *Proceedings of the 32nd Annual Conference of the Cognitive Science Society.*

Ullman, T.D., Baker, C.L., Macindoe, O., Evans, O., Goodman, N.D. & Tenenbaum, J.B. (2010), Help or hinder: Bayesian models of social goal inference. *Advances in Neural Information Processing Systems* (Vol. 22, pp. 1874-1882).

Goodman, N.D., Ullman, T.D. & Tenenbaum, J.B. (2009), Learning a theory of causality *Proceedings of the 31st Annual Conference of the Cognitive Science Society.*

## Invited Talks and Presentations

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New Views on the Imagination.

SPP Invited Symposium, USA, 2026 (upcoming).

Approximations in the Imagination

VSS Invited Symposium, USA, 2026 (upcoming).

Theory of Mind(lessness)

Dagstuhl Seminar on Social Intelligence in AI Systems, Germany, 2026 (upcoming)

Approximations in the Imagination

Unfolding World workshop, UK, 2026 (upcoming).

New Directions in Theory of Mind

AHOI Collouquium, UT Austin, USA, 2025.

Good Enough, Approximations in Intuitive Physics,  
Tel Aviv University Colloquium, Israel, 2025.

Genies and Broomsticks.  
Theory of Mind Workshop, IJCAI, Montreal, 2025.

Good Enough, Approximations in Mental Simulation.  
Colloquium, NICO, Northwestern, 2025.

Good Enough, A Commentary on Aina and Schneider.  
Learning and Memory Conference, Chicago, 2025.

Genies, Robots, Kids, and Other Smart-Asses.  
LEVANTE Jacobs conference, Germany, 2025.

Close Enough, Approximations in Mental Simulation.  
Union College Colloquium, NY 2025.

Good Enough, Approximations in Mental Simulation.  
CNS Conference, Boston, 2025.

Good Enough, Approximations in Mental Simulation.  
Invited Nature of Intelligence Workshop, Santa Fe, 2025

Loopholes, a Theory.  
Radcliffe Institute for Advanced Studies, MA, 2024.

Through a Glass, Darkly.  
Invited Simons Workshop, Berkeley, 2024.

Through a Glass, Darkly.  
Invited ICDL Workshop, Texas, 2024.

The Physical Basis of Imagery and Imagination.  
Departmental Colloquium, University of Maryland, 2023.

The Physical Basis of Imagery and Imagination.  
Departmental Seminar, Central European University (online), 2023.

The Physical Basis of Imagery and Imagination.  
Special Workshop on The Puzzle of Imagistic Cognition, Salzburg, 2023.

Opening the Black Box: People Evaluate Agents Based on the Algorithms that Drive their Behavior.  
Society for Philosophy and Psychology (SPP), Milan, 2022.

Cognitive Evaluation with the Animal AI Environment  
AI Evaluation Beyond Metrics workshop, IJCAI, Vienna, 2022.

Approximations in physical simulators as hypotheses for intuitive physics.  
Neurotheory Center Kickoff, Harvard, 2022.

Models of Core Common Sense  
CBMM Summer Lecture Series, MIT, 2022.

Models of Core Common Sense  
CBS URM summer student workshop, Harvard, 2022.

Through a Glass Darkly: Approximations in physical simulators as working hypotheses for intuitive physics.

NeurIPS 2021 workshop on Physical Reasoning and Inductive Biases for the Real World, 2021.

Interdisciplinary Approaches to Transformative Experience,  
Yale University, 2021.

(Keynote), Models of Core Common Sense in Infancy,  
USC AI Symposium on AI with Common Sense, 2021.

Models of Core Knowledge (Physics, Really)  
Special Seminar, Department of Neurobiology, Weizmann Institute, 2021.

Computational Models of Core Physics  
Colloquium, Center for Cognitive Science, TU Darmstadt, 2021.

Reverse Engineering a Self,  
First Person Discussion Group, Columbia University (online), 2021.

Quantitative Methods Workshop,  
CBMM, MIT 2020

Models of Core Knowledge  
Cognitive Seminar Series, Brown University, 2020

Models of Core Knowledge  
Center for Human-Compatible AI at UC Berkeley (CHAI), 2020

Discussant in ‘Is that so? How children evaluate claims and conjectures’  
Child Development Society (CDS) Meeting, Louisville, KT, 2019.

Computational Models of Core Intuitive Physics,  
Yale Current Works series, Yale, CN, 2019.

Neuro-symbolic Computing and Machine Common Sense  
AI Research Week, IBM, MA, 2019.

Computational Models of Core Intuitive Physics,  
Facebook Workshop on Understanding Human and Machine Intelligence, NYC, NY,  
2019.

Reverse Engineering a Self,  
Formal and Experimental Conference, Northeastern, MA, 2019

Thinking New Thoughts,  
Workshop on Possibility and Value, Radcliffe Institute for Advanced Studies, MA,  
2019.

Evaluating Future Selves,  
Workshop on Imagination, Simulation, and the Self, Tufts, MA, 2018.

Physics Meets Development,  
CVPR workshop on Vision Meets Cognition, Salt Lake City, UT, 2018.

Canonical Mass: Preschoolers Expectations of Dynamic Variables for Solid Objects,  
Society for Research in Child Development, Austin, TX. 2017.

Modal Imagination,  
Ranch Metaphysics Workshop, Tucson, AZ. 2017.

People and Things,  
Current Work in Developmental Psychology Colloquium. Boston College, MA. 2016.

Development, Psychology, Physics.  
DeepMind Technologies, London. 2016.

Modal Prospection  
Philosophy Seminar. Rutgers University, NJ. 2016.

Imagining and Evaluating Possible Future Selves,  
42nd Meeting of the Society for Philosophy and Psychology. Austin, TX. 2016.

Computational Cognitive Science,  
Interdisciplinary College on AI, Germany. 2016.

Probabilistic Programming,  
Interdisciplinary College on AI, Germany. 2016.

Effort as a Bridge Across Action and Action Understanding,  
The 20<sup>th</sup> International Congress on Infant Studies. New Orleans, LA. 2016.

Children's Learning as Stochastic Search,  
Society for Research in Child Development. Philadelphia, PA. 2015.

Theories, Imagination, and the Generation of New Ideas,  
Center for Brains, Minds and Machines Summer School. Woods Hole, MA. 2015.

Probabilistic Programming Tutorial,  
Center for Brains, Minds and Machines Summer School. Woods Hole, MA. 2015.

Theories of Physics,  
More on Development. Columbus, OH. 2015.

Modeling a Theory of the Self,  
Workshop on Transformative Experiences. Chicago, IL. 2015.

Deep Thoughts: The Value of Understanding,  
Commentator at 41<sup>th</sup> Meeting of the Society for Philosophy and Psychology. Duke University, NC. 2015.

Wins Above Replacement: Responsibility Attributions as Counterfactual Replacement,  
40<sup>th</sup> Meeting of the Society for Philosophy and Psychology. Vancouver, Canada. 2014.

Theories, Imagination, and the Generation of New Ideas,  
Center for Brains, Minds and Machines Summer School. Woods Hole, MA. 2014.

Probabilistic Programming Tutorial,  
Center for Brains, Minds and Machines Summer School. Woods Hole, MA. 2014.

Learning Physics from Dynamic Scenes,  
36<sup>th</sup> Annual Meeting of the Cognitive Science Society. Quebec, Canada. 2014.

Theories, Imagination, and the Generation of New ideas,  
Pre-conference debate at Child Development Society Meeting. Memphis, TN. 2013.

Help or Hinder? Bayesian Models of Social Goal Inference,  
Simons Center, MIT. 2010.

Why Blame Bob? Probabilistic Generative Models and Blame Attribution,  
34<sup>th</sup> Annual Meeting of the Cognitive Science Society. Sapporo, Japan. 2012.

Theory Learning as Stochastic Search,  
32<sup>nd</sup> Annual Meeting of the Cognitive Science Society. Portland, OR. 2010.

Help or Hinder? Bayesian Models of Social Goal Inference,  
Machine Learning Summer School, Cambridge, UK. 2009.

Help or Hinder? Bayesian Models of Social Goal Inference,  
23<sup>rd</sup> Annual Conference on Neural Information Processing Systems. Vancouver. 2009.

HONORS AND AWARDS	2024	APA Award for Distinguished Scientific Early Career Contributions to Psychology
	2021	Jacobs Foundation Research Fellowship
	2020	Harvard University Special Commendation: Extraordinary Teaching in Extraordinary Times
	2011	ICDL Best Paper Award: Experiment with computational model
	2011	MIT Continued Dedication to Teaching award
	2010	MIT Excellence in Teaching award
	2010	National Science Foundation (NSF) fellowship
	2009	Singleton Graduate Fellowship
	2009	National Science Foundation (NSF) honorable mention
	2004-2007	Hebrew University of Jerusalem Scholarships of Excellence

POPULAR PRESS	Work has been discussed in, and have been interviewed for (partial list): New York Times, The New Yorker, BBC, The Verge, Psychology Today, The Register, Harvard Gazette, Harvard Brain, The Interneuron, Discover Magazine, Scientific American, Wired, MIT Technology Review, Nature, This American Life, Washington Post.
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TEACHING EXPERIENCE AND OUTREACH
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	2025	Instructor, ‘Imagination, Pretense, and Make-Believe Worlds’ (Harvard PSY1340)
	2025	Instructor, ‘Decisions Big and Small’ (Harvard PSY1322)
	2024	Instructor, ‘Decisions Big and Small’ (Harvard PSY1322)
	2024	Guest lecturer, ‘Biological and Artificial Intelligence’ (Harvard NEURO140)
	2023	Instructor, ‘Imagination, Pretense, and Make-Believe Worlds’ (Harvard PSY1340)
	2023	Guest lecturer, Israeli Arab and Jewish high school outreach
	2023	Co-organizer of funded workshop ‘Computational Cognitive Models of Learning and Development’
	2023	Instructor, ‘Decisions Big and Small’ (Harvard PSY1322)
	2023	Guest lecturer, ‘Biological and Artificial Intelligence’ (Harvard NEURO140)
	2023	Guest lecturer, ‘Mind and Brain’ (Howard University)
	2023	Colloquium committee member, Harvard Psychology
	2022	Instructor, ‘Decisions Big and Small’ (Harvard PSY1322)
	2021	Instructor and organizer, ‘Research Seminar in Cognition, Brain, and Behavior’ (Harvard PSY3340)
	2021	Instructor, ‘Imagination, Pretense, and Make-Believe Worlds’ (Harvard PSY1340)
	2021	Instructor, ‘Decisions Big and Small’ (Harvard PSY1322)
	2021	Instructor and organizer, ‘Research Seminar in Cognition, Brain, and Behavior’ (Harvard PSY3340)
	2021	Guest lecturer, ‘Biological and Artificial Intelligence’ (Harvard NEURO140)
	2021	Guest lecturer, Harvard Developmental Seminars
	2021	Guest lecturer, Harvard Cognition, Brain, Behavior Seminar
	2021	Colloquium committee member, Harvard Psychology
	2020	Instructor, ‘Imagination, Pretense, and Make-Believe Worlds’ (Harvard PSY1340)
	2020	Instructor, ‘Decisions Big and Small’ (Harvard PSY1322)
	2020	Instructor and organizer, ‘Research Seminar in Cognition, Brain, and Behavior’ (Harvard PSY3340)
	2020	Colloquium committee member, Harvard Psychology
	2019	Guest lecturer, Harvard Developmental Seminars
	2018	Guest lecturer, Harvard Developmental Seminars
	2017	Lecturer and Teaching Assistant, CBMM summer school
	2015	Lecturer and Teaching Assistant, CBMM summer school
	2014	Lecturer and Teaching Assistant, CBMM summer school
	2012	Teaching Assistant, Topics in early childhood cognition (MIT 9.85)
	2011	Teaching Assistant, Cognitive processes (MIT 9.65)
	2010	Planning committee member, Cambridge Science Festival
	2009	Presenter and volunteer at Neuroscience Day, Museum of Science
SERVICE		Reviewer (partial, alphabetical): Brain and Behavioral Sciences, Cognition, Cognitive Psychology, Cognitive Development, Cognitive Science, Cognitive Research: Principles and Implications, Developmental Psychology, Developmental Science, JEP: General, JEP: HPP, Memory and Cognition, Nature Human Behavior, Nature Communications, PLoS ONE, PNAS, Proceedings of the Royal Society B, Psychological Review, Psychological Science, Topics in Cognitive Sciences, Philosophical Psychology, Psychonomic Bulletin, Science, Scientific Avances, Scientific Reports, and various conferences including CVPR, ICLR, Neural Information Processing Systems (NeurIPS), The Annual Conference of the Cognitive Science Society (CogSci), AAAI, JoV, Society for Philosophy and Psychology (SPP), and others.

Grant and Award Reviews (Partial): APA Dissertation Research Award, European Research Council (ERC), Dutch Research Council (NWO), Israel-US Binational Science Foundation (BSF), Israel Science Foundation (ISF), National Science Foundation (NSF), Templeton Foundation, Swiss National Science Foundation (SNSF).

Advised the Massachusetts Attorney General Office

Advised AI UK (nationally funded, AI UK initiative)

Mentor in PPREP Harvard Workshop to help students from historically minoritized groups with their applications to positions in academia

Associate Editor for Open Mind

Guest Editor for Open Mind

Guest Editor for PNAS

Co-organizer of special workshop, ‘Computational Cognitive Models of Learning and Development’,  
funded by the Estes Fund through APS, Harvard (2023)

Ongoing organizer of Machine Common Sense reasoning meetings (intuitive psychology and general track, 2019-2021)

Co-organizer of “The Origins of Commonsense in Humans and Machines” Workshop, Cogsci (2020)

Co-organizer of Lorentz Center “Developing Models of the Word” Workshop, Leiden, Netherlands (2020)

Co-organizer of Cognition, Brain, Behavior lunch seminar series, Harvard (2019, 2020)

PC Member AAAI main track

Organizer of “More on Development (MOD)” special workshop on learning (Ohio, 2015)

Co-Organizer of Child Development Society pre-conference on “computational cognitive models and cognitive development” (2014)

MENTORED  
(PARTIAL LIST)

Ilona Bass (2022-, won an NSF STEM Education grant during this time), Peng Qian (2023-), Jennifer Hu (2024-2025, now faculty at JHU), Sonia Murthy (2022-), Eric Bigelow (2020-), Mariel Goddu (2020-2023), Sophie Bridgers (2020-2023, went on to become Cognitive Scientist at DeepMind), Yichen Li (2020-), YingQiao Wang (2020-), Tal Boger (2021-2023, went on to graduate studies at JHU), Brandon Woo (2020-2023, now faculty at UCSB), Izabele Jonusaitė (2021-2023, went on to graduate studies at MIT), Colin Conwell (2019-), Pechthida Kim (2020-2021, won Mary Gordon Roberts MBB Research Fellowship during this time), Zana Bucina (2020), Konstantina Katsimeni (2020), Julian De Freitas (2020, now faculty at HBS), Arunima Sarin (2019-2023), Enosa Ogbemide (2019), Nensi Gjata (2019), Shari Liu (2018-2020, went on to post-doc at MIT and then faculty at JHU), Felix Sosa (2017-), Cameron Nieters (2017), Michael Chang (2016, 2017, went on to graduate studies at UC Berkeley), Eliza Kosoy (2016-2017, went on to graduate studies at Berkeley), Heather Tarr (2016, went on to graduate

studies at Brown), Alexandra Wheeler (2016), Samuel Zimmerman (2016-2017), Marta Kryven (2016, went on to post-doc position at MIT)

- MEMBERSHIP
- American Psychological Association (APA)
  - Association for Psychological Science (APS)
  - Cognitive Science Society (CSS)
  - Society for Research in Child Development (SRCD)
  - Cognitive Development Society (CDS)
  - Society for Philosophy and Psychology (SPP)
  - Society for Personality and Social Psychology (SPSP)