

## Tomer D. Ullman

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CONTACT INFORMATION	Massachusetts Institute of Technology Department of Brain and Cognitive Sciences 77 Massachusetts Ave., Bldg. 46-4053 Cambridge, MA 02138 USA	(617)253-2010 tomeru@mit.edu <a href="http://www.mit.edu/~tomeru">http://www.mit.edu/~tomeru</a>
POSITION	Postdoctoral associate at the Center for Brains, Minds & Machines (CBMM) working in Josh Tenenbaum's Computational Cognitive Science group at MIT, and Elizabeth Spelke's Infant Development Lab at Harvard.	
RESEARCH INTERESTS	Computational cognitive modeling, intuitive theories, child development, probabilistic programming, folk physics, folk psychology, common sense, machine learning, theory-of-self	
EDUCATION	<b>Massachusetts Institute of Technology</b> Ph.D. in Brain and Cognitive Sciences (2008-2015) <ul style="list-style-type: none"><li>• Dissertation Topic: On the Nature and Origin of Intuitive Theories</li><li>• Advisor: Josh Tenenbaum</li></ul> <b>Hebrew University of Jerusalem</b> B.S. in Physics and Cognitive Science (double major, 2004-2008) <ul style="list-style-type: none"><li>• <i>Magna Cum Laude</i></li></ul>	

### Publications

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MANUSCRIPTS UNDER REVISION	Ullman, T.D. and McCoy, J.P., A minimal Turing test. (pending final acceptance in <i>J. Exp. Soc. Psychol.</i> )  Ullman, T.D. and McCoy, J.P., The plausible impossible: Judgments of effort for magical violations of intuitive physics.  Gerstenberg, T., Ullman, T.D., Nagel, J., Kleiman-Weiner, M., Lagnado, D., and Tenenbaum, J.B., Lucky or clever? From changed expectations to attributions of responsibility.  Kryven, M., Ullman, T.D., Cowan, W., and Tenenbaum, J.B., Strategy and luck: Intuitive theories of attributed intelligence.	
SUBMITTED MANUSCRIPTS	Ullman, T.D., Kosoy, E., Tenenbaum J.B., and Spelke, E., Preschoolers' understanding of heavy and light: Inference and prediction. (submitted to <i>Child Development</i> ).  Ullman, T.D. and Zimmerman, S., Models of transformative decision making. (submitted to Transformative Experience, eds. Enoch Lambert and John Schwenkler, Oxford University Press).	
MANUSCRIPTS IN PREP	Ullman, T.D., Xu, Y., and Goodman, N.D., The pragmatics of spatial language.	

Ullman, T.D., Baker, C.L., Macindoe, O., Evans, O., Goodman, N.D., and Tenenbaum, J.B., Helping and Hindering: Inferring higher-order social goals.

JOURNAL ARTICLES 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*.

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. (In press), 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 Ullman, T. D., McCoy, J. P., and Paul, L. A., (forthcoming 2018), Modal Prospection. *Metaphysics and Cognitive Science*, eds. Alvin Goldman and Brian McLaughlin. Oxford University Press (US).

PEER REVIEWED CONFERENCE PROCEEDINGS 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., 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.\*, Stuhlmüller, 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*.

## Talks and Presentations

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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,  
32nd 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,  
23rd Annual Conference on Neural Information Processing Systems. Vancouver. 2009.

TEACHING EXPERIENCE AND OUTREACH	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
HONORS AND AWARDS	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	
SERVICE		Reviewer for: Cognition, Cognitive Psychology, Cognitive Development, Cognitive Science, Developmental Psychology, Proceedings of the Royal Society B, Topics in Cognitive Science, Philosophical Psychology, Neural Information Processing Systems (NIPS), The Annual Conference of the Cognitive Science Society (CogSci), AAI
		PC Member AAI main track
		Organizer of “More on Development (MOD)” (Ohio, 2015)
		Co-Organizer of Child Development Society pre-conference on “computational cognitive models and cognitive development” (2014)
STUDENTS MENTORED		Felix Sosa (2017)
		Cameron Nieters (2017)
		Michael Chang (2016, 2017)
		Eliza Kosoy (2016, 2017)
		Heather Tarr (2016)
		Alexandra Wheeler (2016)
		Samuel Zimmerman (2016)
		Marta Kryven (2016)
MEMBERSHIP		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)

SKILLS

Languages: English, Hebrew, some Latin

Programming: Python, Church, Webppl, Javascript, Julia, Blender, Jupyter, and R

REFERENCES

**Josh Tenenbaum**, Professor, Brain and Cognitive Sciences, MIT, [jbt@mit.edu](mailto:jbt@mit.edu)

**Laura Schulz**, Professor, Brain and Cognitive Sciences, MIT, [lschulz@mit.edu](mailto:lschulz@mit.edu)

**Elizabeth Spelke**, Professor, Psychology, Harvard, [spelke@wjh.harvard.edu](mailto:spelke@wjh.harvard.edu)

**Noah Goodman**, Professor, Psychology, Stanford University, [ngoodman@stanford.edu](mailto:ngoodman@stanford.edu)