

# Noah D. Goodman

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## Research Interests

Computational models of cognition.  
Probabilistic programming languages.  
Natural language semantics and pragmatics.  
Representation, acquisition, and use of concepts and intuitive theories.  
Social and affective cognition.  
Cognitive development.

## Professional Positions

- Assistant Professor of Cognitive Psychology, Stanford University, 2010 - .  
(By courtesy, Assistant Professor of Linguistics and of Computer Science.)
- Research Scientist, Massachusetts Institute of Technology, 2008-2010.
- Post-Doctoral Associate, Massachusetts Institute of Technology, 2005-2008.
- Lecturer, St. Edwards University, 2004-2005.

## Education

- Ph.D., Mathematics, University of Texas at Austin, 2003.
- B.S. Physics, Cum Laude, University of Arizona, 1997.
- B.A. Mathematics, Cum Laude, University of Arizona, 1997.

## Grants and Honors

### Grants

- *Amortized Inference for Probabilistic Programs*, DARPA, Oct 2013 - Jul 2017, \$\$\$3,311,403 (approx.).
- *Grounding Lexical Meaning in Core Cognition*, ONR, Sep 2013 - Sep 2016, \$3,311,403.
- *Development of probmods.org web-book*, Stanford VPOL, 2013, \$25,000.
- *A Center for Brains, Minds and Machines: The Science and the Technology of Intelligence*, NSF, Sep 2013 - Sep 2017 (Sub-award from MIT, PI: Poggio), \$475,000.
- *Grounded language understanding as social cognition*, ONR, Jan 2013 - Jan 2016 (PI: Potts).
- *Embedded Humans: Provably Correct Decision Making for Networks of Humans and Unmanned Systems*, ONR, Feb 2013 - Dec 2017 (Sub-award from Berkeley, PI: Sastry; Stanford PI: Guibas).
- J. S. McDonnell Foundation Scholar Award, Oct 2010 - Oct 2016, \$\$\$601,367.
- *A Framework for Core Cognition*, ONR, Jul 2009 - Dec 2012 (PI: Tenenbaum).

## Honors

- 2014 Cognitive Science Society paper prize for computational modeling of language.
- Roger N. Shepard Distinguished Visiting Scholar, 2013-14, University of Arizona.
- John Philip Coghlan Fellow, 2013-14 and 2014-15.
- 2012 Cognitive Science Society paper prize for computational modeling of language.
- 2011 International Joint Conference on Artificial Intelligence best poster prize.
- 2011 Cognitive Science Society paper prize for computational modeling of language.
- 2007 Cognitive Science Society paper prize for computational modeling of higher-level cognition.
- 2007 Cognitive Science Society paper prize for computational modeling of perception and action.
- NSF VIGRE Fellowship, 2001-2002.
- University of Texas Continuing Graduate Study Fellowship, 2001-2002.
- Bruton Graduate Fellowship, 2000.
- National Merit Scholarship, 1994-1997.

## Publications

### Peer-reviewed Journal Articles

- Lassiter, D., & Goodman, N. D. Adjectival vagueness in a Bayesian model of interpretation. *Synthese*. (to appear)
- Griffiths, T. L., Lieder, F., & Goodman, N. D. Rational use of cognitive resources: Levels of analysis between the computational and the algorithmic. *Topics in Cognitive Science*. (to appear)
- Bergen, L., & Goodman, N. D. The strategic use of noise in pragmatic reasoning. *Topics in Cognitive Science*. (to appear)
- Lassiter, D., & Goodman, N. D. (2015). How many kinds of reasoning? Inference, probability, and natural language semantics. *Cognition*.
- Goodman, N. D., Frank, M. C., Griffiths, T. L., Tenenbaum, J. B., Battaglia, P., & Hamrick, J. (2015). Relevant and robust. A response to Marcus and Davis. *Psychological Science*.
- Shafto, P., Goodman, N. D., & Griffiths, T. L. (2014). A rational account of pedagogical reasoning: Teaching by, and learning from, examples. *Cognitive Psychology*.
- Stiller, A. J., Goodman, N. D., & Frank, M. C. (2014). Ad-hoc scalar implicature in preschool children. *Language Learning and Development*.
- Kao, J. T., Wu, J., Bergen, L., & Goodman, N. D. (2014). Nonliteral understanding of number words. *Proceedings of the National Academy of Sciences*.
- Frank, M. C., & Goodman, N. D. (2014). Inferring word meanings by assuming that speakers are informative. *Cognitive Psychology*.
- Pierson, E., & Goodman, N. D. (2014). Uncertainty and denial: a resource-rational model of the value of information. *PLoS ONE*.
- Vul, E., Goodman, N. D., Griffiths, T. L., & Tenenbaum, J. B. (2014). One and Done? Optimal Decisions From Very Few Samples. *Cognitive Science*.
- Goodman, N. D., & Stuhlmüller, A. (2013). Knowledge and implicature: Modeling language understanding as social cognition. *Topics in Cognitive Science*.
- Stuhlmüller, A., & Goodman, N. D. (2013). Reasoning about Reasoning by Nested Conditioning: Modeling Theory of Mind with Probabilistic Programs. *J. Cognitive Systems Research*.

- Hamlin, K. J., Ullman, T., Tenenbaum, J. B., Goodman, N. D., & Baker, C. (2013). The mentalistic basis of core social cognition: experiments in preverbal infants and a computational model. *Developmental Science*, 16(2), 209–226.
- Seiver, E., Gopnik, A., & Goodman, N. D. (2013). Did she jump because she was the big sister or because the trampoline was safe? Causal inference and the development of social attribution. *Child Development*, 84(2), 443–454.
- Frank, M. C., & Goodman, N. D. (2012). Predicting pragmatic reasoning in language games. *Science*, 336(6084), 998–998.
- Ullman, T., Goodman, N. D., & Tenenbaum, J. B. (2012). Theory learning as stochastic search in the language of thought. *Cognitive Development*.
- Shafto, P., Goodman, N. D., & Frank, M. C. (2012). Learning from others: The consequences of psychological reasoning for human learning. *Perspectives on Psychological Science*, 7(4), 341–351.
- Piantadosi, S. T., Tenenbaum, J. B., & Goodman, N. D. (2012). Bootstrapping in a language of thought: A formal model of numerical concept learning. *Cognition*, 123(2), 199–217.
- Scontras, G., Graff, P., & Goodman, N. D. (2012). Comparing pluralities. *Cognition*, 123(1), 190–197.
- Tenenbaum, J. B., Kemp, C., Griffiths, T. L., & Goodman, N. D. (2011). How to grow a mind: Statistics, structure, and abstraction. *Science*, 331(6022), 1279–1285.
- Bonawitz, E., Shafto, P., Gweon, H., Goodman, N. D., Spelke, E., & Schulz, L. (2011). The double-edged sword of pedagogy: Instruction limits spontaneous exploration and discovery. *Cognition*, 120(3), 322–330.
- Chater, N., Goodman, N., Griffiths, T. L., Kemp, C., Oaksford, M., & Tenenbaum, J. B. (2011). The imaginary fundamentalists: The unshocking truth about Bayesian cognitive science. *Behavioral and Brain Sciences*, 34(04), 194–196. (Commentary on Jones and Love.)
- Cook, C., Goodman, N. D., & Schulz, L. E. (2011). Where science starts: Spontaneous experiments in preschoolers’ exploratory play. *Cognition*, 120(3), 341–349.
- Goodman, N. D., Ullman, T. D., & Tenenbaum, J. B. (2011). Learning a theory of causality. *Psychological Review*, 118(1), 110.
- Kemp, C., Goodman, N. D., & Tenenbaum, J. B. (2010). Learning to learn causal models. *Cognitive Science*, 34(7), 1185–1243.
- Desrochers, T. M., Jin, D. Z., Goodman, N. D., & Graybiel, A. M. (2010). Optimal habits can develop spontaneously through sensitivity to local cost. *Proceedings of the National Academy of Sciences*, 107(47), 20512–20517.
- Frank, M., Kenney, A., Goodman, N., Tenenbaum, J., Torralba, A., & Oliva, A. (2010). Predicting object and scene descriptions with an information-theoretic model of pragmatics. *Journal of Vision*, 10(7), 1241–1241.
- Henderson, L., Goodman, N. D., Tenenbaum, J. B., & Woodward, J. F. (2010). The Structure and Dynamics of Scientific Theories: A Hierarchical Bayesian Perspective. *Philosophy of Science*, 77(2), 172–200.
- Frank, M. C., Goodman, N. D., & Tenenbaum, J. B. (2009). Using speakers’ referential intentions to model early cross-situational word learning. *Psychological Science*.
- Schulz, L. E., Goodman, N. D., Tenenbaum, J. B., & Jenkins, A. C. (2008). Going beyond the evidence: abstract laws and preschoolers’ responses to anomalous data. *Cognition*, 109(2), 211–223. doi:n.2008.07.017
- Goodman, N. D., Tenenbaum, J. B., Feldman, J., & Griffiths, T. L. (2008). A Rational Analysis of Rule-based Concept Learning. *Cognitive Science*, 32(1), 108–154.
- Giroux, E. & Goodman, N. D. (2006). On the stable equivalence of open books in three-manifolds. *Geometry & Topology*.
- Goodman, N. D. (2005). Overtwisted open books from sobering arcs. *Algebraic and Geometric Topology*.

## Peer-reviewed Conference Proceedings

- Ritchie, D., Mildenhall, B., Goodman, N. D., & Hanrahan, P. Controlling Procedural Modeling Programs with Stochastically-Ordered Sequential Monte Carlo. In *SIGGRAPH 2015*. (to appear)
- Ritchie, D., Lin, S., Goodman, N. D., & Hanrahan, P. (2015). Generating Design Suggestions under Tight Constraints with Gradient-based Probabilistic Programming. In *Proceedings of Eurographics 2015*.
- Gerstenberg, T., Goodman, N. D., Lagnado, D. A., & Tenenbaum, J. B. (2014). From counterfactual simulation to causal judgment. In *Proceedings of the Thirty-Sixth Annual Conference of the Cognitive Science Society*.
- Tessler, M. H., & Goodman, N. D. (2014). Some arguments are probably valid: Syllogistic reasoning as communication. In *Proceedings of the Thirty-Sixth Annual Conference of the Cognitive Science Society*.
- Yang, L., Hanrahan, P., & Goodman, N. D. (2014). Generating Efficient MCMC Kernels from Probabilistic Programs. In *AISTATS*.
- Gershman, S., & Goodman, N. D. (2014). Amortized inference in probabilistic reasoning. In *Proceedings of the Thirty-Sixth Annual Conference of the Cognitive Science Society*.
- Degen, J., & Goodman, N. D. (2014). Lost your marbles? The puzzle of dependent measures in experimental pragmatics. In *Proceedings of the Thirty-Sixth Annual Conference of the Cognitive Science Society*.
- Bergen, L., & Goodman, N. D. (2014). The strategic use of noise in pragmatic reasoning. In *Proceedings of the Thirty-Sixth Annual Conference of the Cognitive Science Society*. **[Winner of the 2014 Cognitive Science Society computational modeling prize for Language.]**
- Kao, J. T., Bergen, L., & Goodman, N. D. (2014). Formalizing the pragmatics of metaphor understanding. In *Proceedings of the Thirty-Sixth Annual Conference of the Cognitive Science Society*.
- Kao, J. T., Levy, R., & Goodman, N. D. (2013). The Funny Thing About Incongruity: A Computational Model of Humor in Puns. In *Proceedings of the Thirty-Fifth Annual Conference of the Cognitive Science Society*.
- Smith, N. J., Goodman, N., & Frank, M. (2013). Learning and using language via recursive pragmatic reasoning about other agents. In *Advances in Neural Information Processing Systems*.
- Stuhlmüller, A., Taylor, J., & Goodman, N. (2013). Learning Stochastic Inverses. In *Advances in Neural Information Processing Systems*.
- Lieder, F., Goodman, N. D., & Huys, Q. J. M. (2013). Learned helplessness and generalization. In *Proceedings of the Thirty-Fifth Annual Conference of the Cognitive Science Society*.
- Lassiter, D., & Goodman, N. D. (2013). Context, scale structure, and statistics in the interpretation of positive-form adjectives. In *Semantics and Linguistic Theory (SALT) 23*.
- Talton, J., Yang, L., Kumar, R., Lim, M., Goodman, N. D., & Mech, R. (2012). Learning design patterns with bayesian grammar induction. In *Proceedings of the 25th annual ACM symposium on User interface software and technology* (pp. 63–74). **[Nominated for Best Paper Award.]**
- Stuhlmüller, A., & Goodman, N. D. (2012). A dynamic programming algorithm for inference in recursive probabilistic programs. In *Second Statistical Relational AI workshop at UAI 2012 (StaRAI-12)*.
- Lieder, F., Griffiths, T. L., & Goodman, N. D. (2012). Burn-in, bias, and the rationality of anchoring. In *NIPS 2012* (pp. 2699–2707).
- Yeh, Y.-T., Yang, L., Watson, M., Goodman, N. D., & Hanrahan, P. (2012). Synthesizing open worlds with constraints using locally annealed reversible jump MCMC. In *SIGGRAPH 2012* (Vol. 31, p. 56).
- Goodman, N. D., & Stuhlmüller, A. (2012). Knowledge and implicature: Modeling language understanding as social cognition. In *Proceedings of the Thirty-Fourth Annual Conference of the Cognitive Science Society*. **[Winner of the 2012 Cognitive Science Society computational modeling prize for Language.]**
- Bergen, L., Goodman, N. D., & Levy, R. (2012). That’s what she (could have) said: How alternative utterances affect language use. In *Proceedings of the thirty-fourth annual conference of the Cognitive Science Society*.
- Gerstenberg, T., & Goodman, N. D. (2012). Ping pong in Church: Productive use of concepts in human probabilistic inference. In *Proceedings of the 34th annual conference of the Cognitive Science Society*.

- Gerstenberg, T., Goodman, N., Lagnado, D. A., & Tenenbaum, J. B. (2012). Noisy Newtons: Unifying process and dependency accounts of causal attribution. In *Proceedings of the Thirty-Fourth Annual Conference of the Cognitive Science Society*.
- Lassiter, D., & Goodman, N. D. (2012). How many kinds of reasoning? Inference, probability, and natural language semantics. In *34th Annual Conference of the Cognitive Science Society*.
- O'donnell, T. J., Snedeker, J., Tenenbaum, J. B., & Goodman, N. D. (2011). Productivity and reuse in language. In *Proceedings of the Thirty-Third Annual Conference of the Cognitive Science Society*. [**Winner of the 2011 Cognitive Science Society computational modeling prize for Language.**]
- Wingate, D., Stuhlmüller, A., & Goodman, N. D. (2011). Lightweight implementations of probabilistic programming languages via transformational compilation. In *Proceedings of the 14th international conference on Artificial Intelligence and Statistics* (p. 131).
- Wingate, D., Goodman, N. D., Roy, D. M., Kaelbling, L. P., & Tenenbaum, J. B. (2011). Bayesian policy search with policy priors. In *Proceedings of the Twenty-Second international joint conference on Artificial Intelligence (IJCAI 11)*. [**Winner of the Best Poster prize**]
- Stiller, A., Goodman, N. D., & Frank, M. C. (2011). Ad-hoc scalar implicature in adults and children. In *Proceedings of the 33rd Annual Meeting of the Cognitive Science Society*.
- Wingate, D., Goodman, N. D., Stuhlmüller, A., & Siskind, J. M. (2011). Nonstandard Interpretations of Probabilistic Programs for Efficient Inference. In *Advances in Neural Information Processing Systems 23* (pp. 1152–1160).
- Shafto, P., Goodman, N. D., Gerstle, B., & Ladusaw, F. (2010). Prior expectations in pedagogical situations. In *32nd annual conference of the Cognitive Science Society*.
- Stuhlmüller, A., Tenenbaum, J. B., & Goodman, N. D. (2010). Learning structured generative concepts. In *Proceedings of the Thirty-Second Annual Conference of the Cognitive Science Society*.
- Piantadosi, S. T., Tenenbaum, J. B., & Goodman, N. D. (2010). Beyond Boolean logic: exploring representation languages for learning complex concepts. In *Proceedings of the 32nd Annual Conference of the Cognitive Science Society* (pp. 859–864).
- Ullman, T. D., Goodman, N. D., & Tenenbaum, J. B. (2010). Theory Acquisition as Stochastic Search. In *Proceedings of Thirty Second Annual Meeting of the Cognitive Science Society*.
- Goodman, N. D., Baker, C. L., & Tenenbaum, J. B. (2009). Cause and intent: Social reasoning in causal learning. In *Proceedings of the 31st Annual Conference of the Cognitive Science Society*.
- Goodman, N. D., Ullman, T. D., & Tenenbaum, J. B. (2009). Learning a theory of causality. In *Proceedings of the 31st Annual Conference of the Cognitive Science Society*.
- Vul, E., Goodman, N. D., Griffiths, T. L., & Tenenbaum, J. B. (2009). One and done: Globally optimal behavior from locally suboptimal decisions. In *Proceedings of the 31st Annual Conference of the Cognitive Science Society*.
- Schmidt, L. A., Goodman, N. D., Barner, D., & Tenenbaum, J. B. (2009). How tall is Tall? compositionality, statistics, and gradable adjectives. In *Proceedings of the 31st annual conference of the Cognitive Science Society* (pp. 2759–2764).
- Frank, M. C., Goodman, N. D., Tenenbaum, J. B., & Fernald, A. (2009). Continuity of discourse provides information for word learning. In *Proceedings of the 31st Annual Cognitive Science Society*.
- Wingate, D., Goodman, N. D., Roy, D. M., & Tenenbaum, J. B. (2009). The infinite latent events model. In *Proceedings of the Twenty-Fifth Conference on Uncertainty in Artificial Intelligence* (pp. 607–614). AUAI Press.
- Ullman, T., Baker, C. L., Macindoe, O., Evans, O., Goodman, N. D., & Tenenbaum, J. B. (2009). Help or hinder: Bayesian models of social goal inference. In *Advances in Neural Information Processing Systems 22*.
- Frank, M. C., Goodman, N. D., Lai, P., & Tenenbaum, J. B. (2009). Informative communication in word production and word learning. In *Proceedings of the 31st Annual Conference of the Cognitive Science Society*.
- Baker, C. L., Goodman, N. D., & Tenenbaum, J. B. (2008). Theory-based Social Goal Inference. In *Proceedings of Thirtieth Annual Meeting of the Cognitive Science Society*.
- Mayrhofer, R., Goodman, N. D., Waldmann, M. R., & Tenenbaum, J. B. (2008). Structured Correlation from the Causal Background. In *Proceedings of the Thirtieth Annual Conference of the Cognitive Science Society*.

- Katz, Y., Goodman, N. D., Kersting, K., Kemp, C., & Tenenbaum, J. B. (2008). Modeling Semantic Cognition as Logical Dimensionality Reduction. In *Proceedings of the Thirtieth Annual Conference of the Cognitive Science Society*.
- Kemp, C., Goodman, N. D., & Tenenbaum, J. B. (2008). Theory acquisition and the language of thought. In *Proceedings of Thirtieth Annual Meeting of the Cognitive Science Society*.
- Piantadosi, S. T., Goodman, N. D., Ellis, B. A., & Tenenbaum, J. B. (2008). A Bayesian Model of the Acquisition of Compositional Semantics. In *Proceedings of Thirtieth Annual Meeting of the Cognitive Science Society*.
- Shafto, P., & Goodman, N. D. (2008). Teaching Games: Statistical Sampling Assumptions for Learning in Pedagogical Situations. In *Proceedings of the Thirtieth Annual Meeting of the Cognitive Science Society*.
- Goodman, N. D., Mansinghka, V. K., Roy, D. M., Bonawitz, K., & Tenenbaum, J. B. (2008). Church: a language for generative models. In *Uncertainty in Artificial Intelligence*.
- Frank, M. C., Goodman, N. D., & Tenenbaum, J. B. (2007). A bayesian framework for crosssituational word-learning. In *Advances in Neural Information Processing Systems* (Vol. 20). MIT Press.
- Kemp, C., Goodman, N. D., & Tenenbaum, J. B. (2007). Learning and using relational theories. In *NIPS*.
- Kemp, C., Goodman, N. D., & Tenenbaum, J. B. (2007). Learning causal schemata. In *Proceedings of the Twenty-ninth Annual Meeting of the Cognitive Science Society*. [**Winner of the 2007 Cognitive Science Society computational modeling prize for Higher-level Cognition.**]
- Goodman, N. D., Mansinghka, V., & Tenenbaum, J. B. (2007). Learning grounded causal models. In *Proceedings of the Twenty-Ninth Annual Conference of the Cognitive Science Society*. [**Winner of the 1007 Cognitive Science Society computational modeling prize for Perception and Action.**]
- Goodman, N. D., Baker, C. L., Baraff-Bonawitz, E., Mansinghka, V. K., Gopnik, A., Wellman, H., ... Tenenbaum, J. B. (2006). Intuitive theories of mind: a rational approach to false belief. In *Proceedings of the Twenty-Eight Annual Conference of the Cognitive Science Society*.
- Goodman, N. D., Griffiths, T. L., Feldman, J., and Tenenbaum, J. B. (2007). A rational analysis of rule-based concept learning. In *Proceedings of the Twenty-Ninth Annual Conference of the Cognitive Science Society*.
- Henderson, L., Goodman, N. D., Tenenbaum, J. B., and Woodward, J. (2007). Frameworks in science: a Bayesian approach. *LSE-Pitt Conference Confirmation, Induction and Science*.

## Chapters

- Goodman, N. D., & Lassiter, D. (2015). Probabilistic Semantics and Pragmatics: Uncertainty in Language and Thought. In S. Lappin & C. Fox (Eds.), *The Handbook of Contemporary Semantic Theory, 2nd Edition*. Wiley-Blackwell.
- Goodman, N. D., Tenenbaum, J. B., & Gerstenberg, T. (2015). Concepts in a probabilistic language of thought. In Morgolis & Lawrence (Eds.), *The Conceptual Mind: New Directions in the Study of Concepts*. MIT Press.
- Goodman, N. D., Tenenbaum, J. B., Griffiths, T. L., & Feldman, J. (2008). Compositionality in rational analysis: Grammar-based induction for concept learning. In M. Oaksford & N. Chater (Eds.), *The probabilistic mind: Prospects for rational models of cognition*. Oxford University Press.

## Books (print and web)

- Tenenbaum, J. B., Griffiths, T. L., Chater, N., Kemp, C., Goodman, N. D., & Yuille, A. *Reverse engineering the mind: the Bayesian approach*. (in prep)
- Goodman, N. D., & Tenenbaum, J. B. (2014). *Probabilistic Models of Cognition*. (<http://probmods.org>)
- Goodman, N. D., & Stuhlmüller, A. *The Design and Implementation of Probabilistic Programming Languages*. (<http://dippl.org>)

## Technical Reports

- Hwang, I., Stuhlmüller, A., & Goodman, N. D. (2011). *Inducing probabilistic programs by Bayesian program merging*. Technical report: *arXiv:1110.5667*.
- O'Donnell, T. J., Tenenbaum, J. B., & Goodman, N. D. (2009). *Fragment grammars: Exploring computation and reuse in language*. Technical Report MIT-CSAIL-TR-2009-013. Massachusetts Institute of Technology.
- McAllester, D., Milch, B., & Goodman, N. D. (2008). *Random-World Semantics and Syntactic Independence for Expressive Languages* (No. MIT-CSAIL-TR-2008-025). Massachusetts Institute of Technology.

## Other

- Bergen, L., Levy, R., & Goodman, N. D. *Pragmatic Reasoning through Semantic Inference*. (Unpublished manuscript.)
- Goodman, N. D. (2013). The principles and practice of probabilistic programming. *POPL 2013*. (Extended abstract of keynote talk.)
- Goodman, N. D. (2013). *Grounding Lexical Meaning in Core Cognition*. (Unpublished manuscript.)
- Roy, D. M., Mansinghka, V. K., Goodman, N. D., & Tenenbaum, J. B. (2008). A stochastic programming perspective on nonparametric Bayes. *Nonparametric Bayesian Workshop, Int. Conf. on Machine Learning*.

## Software

- Webchurch, MIT-Church, Bher, Cosh. Implementations of the Church probabilistic programming language.
- WebPPL. A javascript-based probabilistic programming language.

## Popular Press (selected articles)

- “A grand unified theory of AI,” MIT News, March 30, 2010. (Picked up by slashdot.org, reddit.com, etc.)
- “I, algorithm.” New Scientist, January 29, 2011.
- “More Than Child’s Play: Ability to Think Scientifically Declines as Kids Grow Up.” Scientific American, September 21, 2011.
- “Artificial Intelligence Could Be on Brink of Passing Turing Test.” WIRED, April 12, 2012.
- “Context is key to making computers better conversationalists.” WIRED.uk, June 20, 2012.
- “Forget the Turing Test: Here’s How We Could Actually Measure AI.” WIRED, June 12, 2014.
- “Solve For Standing Ovation: Should AI Researchers Bother Building A TED-Bot?” Popular Science, March 28, 2014.
- “This Computer Knows When ‘Literally’ Isn’t Literal.” Discover, August 5, 2014.
- “Why Can’t Robots Understand Sarcasm?” The Atlantic, January 22, 2015.

## Invited Presentations

- XPRAG 7, Plenary Speaker, Chicago, IL, July 2015.
- Microsoft Faculty Summit, Seattle, WA, July 2015.
- AAAI symposium on Knowledge Representation and Reasoning, Stanford, CA, March 2015.
- UCSD seminar on Computational and Experimental Pragmatics, San Diego, CA, February 2015.
- Princeton Cognitive Science Colloquium, Princeton, NJ, January 2015.
- University of Maryland Cognitive Science Colloquium, College Park, MD, January 2015.
- University of Maryland NLP Seminar, College Park, MD, January 2015.

- Northwestern University Linguistics Colloquium, Evanston, IL, January 2015.
- Cognitive Science Society invited symposium “Foundations of Social Cognition”, Quebec City, Canada, July 2014.
- NYU Psychology, New York, April 2014.
- DE Shaw Tech Talk, New York, April 2014.
- University of Arizona Cognitive Science Colloquium, Tucson, AZ, February 2014.
- AI Colloquium, Groningen, Netherlands, February 2014.
- Amsterdam Colloquium, Amsterdam, Netherlands, December 2013.
- NeuroSpin, Paris, France, December 2013.
- IIS Machine Learning Seminar, Tsinghua University, Beijing, China, October 2013.
- “Logic across the university” workshop, Tsinghua University, Beijing, China, October 2013.
- Intelligence Initiative Seminar, MIT, Cambridge, MA, September 2013.
- Laboratory for Developmental Science Seminar, Harvard, Cambridge, MA, September 2013.
- CogSci workshop “Producing Referring Expressions”, Berlin, Germany, August 2013.
- CogSci workshop “Motivations and Goals in Developing Integrative Models of Human Cognition”, Berlin, Germany, August 2013.
- “Rational Choice Workshop”, Dept. of Economics, University of Chicago, Chicago, IL, May 2013.
- UT-Austin Linguistics Colloquium, Austin, TX, April 2013.
- UT-Austin Cognitive Systems Forum, Austin, TX, April, 2013.
- Google, Mountain View, CA, April 2013.
- Intel, Sunnyvale, CA, April 2013.
- IMBS workshop “Quantum thinking”, Irvine, CA, February 2013.
- Keynote, Principles of Programming Languages (POPL 13 ), Rome, Italy, January 2013.
- Linguistics Colloquium, Tübingen, Germany, January 2013.
- Invited Symposium, Budapest CEU Conference on Cognitive Development, Budapest, Hungary, January 2013.
- Indiana Cognitive Science Colloquium, Bloomington, IN, November 2012.
- Statistical Relational Artificial Intelligence workshop, UAI, Avalon, CA, August 2012.
- Early Career Keynote Speaker, International Conference on Thinking, symposium on Causal Learning & Reasoning, London 2012.
- Early Career Keynote Speaker, International Conference on Thinking, symposium on Inductive Reasoning, London 2012.
- Reasoning and Interaction workshop, UT-Austin, Austin, TX, June 2012.
- Workshop “Interdisciplinary approaches to implicature.” MIT, Cambridge, MA, May 2012.
- California Cognitive Science Conference, Berkeley, CA, April 2012.
- International Congress on Computer Vision, Vision Grammars Workshop, Barcelona, Spain, November 2011.
- UC Berkeley Institute for Human Development seminar, Berkeley, CA, October 2011.
- UC Berkeley Institute for Cognitive and Brain Sciences seminar, Berkeley, CA, September 2011.
- Gatsby Unit special seminar, University College, London, UK, September 2011.
- London Judgment and Decision Making seminar, London, UK, September 2011.
- AAAI workshop on Plan and Intent Recognition, San Francisco, CA, August 2011.



- UC Merced Cognitive and Information Sciences Colloquium, Merced, CA, March 2011.
- UCSC Psychology Colloquium, Santa Cruz, CA, February 2011.
- Neural Information Processing Systems workshop “Modeling human communication dynamics”. Whistler, BC, December 2010.
- SRI, Menlo Park, CA, November 2010.
- UCSD Psychology Colloquium, San Diego, CA, November 2010.
- CSLI Symposium, Stanford University, Stanford, CA, October 2010.
- Humanity+ Summit, Harvard University, Cambridge, MA, June 2010.
- Cornell Workshop on Grammar Induction, Ithaca, NY, May 2010.
- Massachusetts General Hospital, Biostatistics Seminar. Boston, MA, March 2010.
- Johns Hopkins University, Psychology Department special seminar. Baltimore, MD, January 2010.
- Stanford University, Psychology Department special seminar. Stanford, CA, January 2010.
- University of Rochester, Brain and Cognitive Sciences colloquium. Rochester, NY, October 2009.
- University of Michigan, Developmental Psychology Brown Bag seminar. Ann Arbor, MI, October 2009.
- Brown University, Pattern Theory seminar. Providence, RI, October 2009.
- University of Edinburgh, Informatics Division colloquium. Edinburgh, UK, July 2009.
- Banff International Research Station workshop “Probabilistic models of cognitive development”. Banff, BC, May 2009.
- Invited commentary, Interdisciplinary Graduate Conference on Consciousness. Boston, MA, April 2009.
- MIT, Brain and Cognitive Sciences special seminar. Boston, MA, March 2009.
- Neural Information Processing Systems workshop “Probabilistic programming”, Whistler, BC, December 2008.
- Neural Information Processing Systems workshop “Human learning meets machine learning”. Whistler, BC, December 2008.
- New York University, Developmental Psychology seminar. New York, NY, October 2008.
- Keynote speaker, International Conference on Inductive Logic Programming. Prague, September 2008.
- University of Texas, Cognitive Psychology seminar. Austin, TX, August 2008.
- Center for Advanced Study in the Behavioral Sciences workshop “Early mechanisms of understanding social causation” (Festschrift for John S. Watson). Stanford, CA, April 2008.
- International Conference on Infant Studies invited symposium “From statistical regularities to conceptual inference”. Vancouver, BC, March 2008.
- ONR Workshop on Computational Social Cognition. MIT, Cambridge, MA, March 2008.
- Harvard university, Psychology colloquium. Cambridge, MA, February 2008.
- University of California, Berkeley, Computational Cognitive Science seminar. Berkeley, CA, November 2007.
- AAAI Fall Symposia workshop “Representation Change”. Washington, DC, November 2007.
- Society for Philosophy and Psychology. Toronto, ON, June 2007. (Invited commentary on D. Lyons, “Covert Rationality: Overimitation and the Structure of Children’s Causal Learning”.)
- McDonnell Foundation Workshop on Moral Cognition. Pasadena, CA, May 2007.
- University of Salzburg, Institute fur Psychologie colloquium. Salzburg, AU, April 2007.
- University of Göttingen, Cognitive and Decision Sciences seminar. Göttingen, GM, April 2007.
- Rutgers University, Center for Cognitive Science seminar. Piscataway, NJ, March 2007.

- Society for Philosophy and Psychology, Invited symposium on Causality. St. Louis, MO, June 2006.
- University of California, Berkeley, Cognitive Development seminar. Berkeley, CA, 2006.
- University of Michigan, Developmental Psychology seminar. Ann Arbor, MI, 2006.
- Brown University, Cognitive Science seminar. Providence, RI, 2005.
- M.I.T., Computational Cognitive Science seminar. Cambridge, MA, December 2004.
- Bryn Mawr College, Contact Topology seminar. Bryn Mawr, PA, April 2003.
- University of Pennsylvania, Department of Mathematics Geometry-Topology seminar. Philadelphia, PA, January 2003.
- University of Texas at Austin, Department of Mathematics Topology seminar. Austin, TX, March 2002.
- Columbia University, Department of Mathematics Topology seminar. New York, NY, March 2001.
- State University of New York, Department of Mathematics Geometry seminar. Stony Brook, NY, March 2001.

## Professional Services

- Journal Reviewer: Science. Nature. Cognition. Child Development. Trends in Cognitive Science. Cognitive Science. Memory and Cognition. Cognitive Psychology. Journal of Mathematical Psychology. Cognitive Processing. Journal of Experimental Psychology: Learning, Memory, & Cognition. Journal of Experimental Psychology: General. Philosophical Transactions A. American Journal of Psychology. Cerebral Cortex. Decision.
- Conference Proceedings Reviewer: Cognitive Science. Neural Information Processing Systems. Society for Philosophy and Psychology. Uncertainty in Artificial Intelligence. TARK.
- Ad-hoc grant reviewer: NSF.
- Co-Organizer: European Summer School of Logic Language and Information, workshop “Formal and Experimental Pragmatics”. Tübingen, August 2014.
- Program committee: Cognitive Science Society, 2014.
- Organizer: Stanford Pragmatics and Social Cognition Workshop, March 2013.
- Co-Organizer: NIPS workshop on Probabilistic Programming, December 2012.
- Area chair: NIPS 2011. Granada, Spain, December 2011.
- Co-Organizer: IPAM summer school “Probabilistic Models of Cognition”. Los Angeles, CA, July 2011.
- Organizer: workshop “Probabilistic Programming in AI”. Los Altos, CA, January 2010.
- Co-Organizer: NIPS workshop “Bounded-rational analyses of human cognition: Bayesian models, approximate inference, and the brain”. Whistler, BC, December 2009.
- Program committee: International Workshop on Statistical Relational Learning. Leuven, Belgium, July 2009.
- Co-Organizer: Cognitive Science Society, workshop “Intuitive pedagogical reasoning: an interdisciplinary workshop”. Amsterdam, Netherlands, August 2009.
- Co-Organizer: Annual Summer Interdisciplinary Conference, symposium “Bayesian models in psychology”. Valle d’Aosta, Italy, July 2009.
- Co-Organizer: Eastern Psychology Association, workshop “Social routes to causal knowledge: action, imitation, and pedagogy”. Boston, MA, March 2008.
- Co-Organizer: McDonnell Foundation workshop “Explanation and prior knowledge”. Cambridge, MA, November 2006.
- Mentor (1999-2001), Canada/USA Mathcamp.
- Co-Organizer and Coordinator of Hiring, Canada/USA Mathcamp 2000, 2001.

## Outreach

- Studium Generale, Groningen, Netherlands, February 2014.
- Visiting Lecturer (2006, 2008, 2010, 2011, 2014), Canada/USA Mathcamp.

## Teaching

### Summer Schools and Tutorials

- “Probabilistic programming languages.” European Summer School of Logic Language and Information. Tübingen, August 2014.
- “Probability in semantics and pragmatics” (with D. Lassiter). European Summer School of Logic Language and Information. Dusseldorf, August 2013.
- “Stochastic lambda calculus and its applications in cognitive science.” (Invited course.) North-American Summer School of Logic, Language, and Information. Austin, TX, June 2012.
- “Computational Cognitive Science: Probability, Programs, and the Mind.” European Summer School of Logic Language and Information. Copenhagen, August 2010.
- Tutorial on probabilistic models of cognition (with T. O’Donnell). Cornell University, October 2009.
- IPAM Graduate Summer School: “Probabilistic Models of Cognition: The Mathematics of Mind”, Los Angeles CA, July 2007. ( 3 lectures.)

### University Courses

- “Probabilistic Models of Social Behavior and Affect” (Psych 241). Stanford. Spring 2014. (Co-taught with J. Zaki, M. Frank.)
- “Computation and Cognition: the Probabilistic Approach” (Psych 204). Stanford. Winter 2011, Winter 2012, Autumn 2012, Autumn 2013.
- “Representations of Meaning” (Psych 236 c, Linguist 236). Stanford. Spring 2013.(Co-taught with C. Potts.)
- “Introduction to Cognitive Science” (SymSys 100, Psych 34). Stanford. Spring 2012, Winter 2013, Winter 2014.
- “Formal and Computational Approaches in Psychology and Cognitive Science” (Psych 239). Stanford. Spring 2011. (Co-taught with J. McClelland.)
- Co-taught (with L. Schulz and C. Moore): “Perception, Conception, and Action: Grounding Thoughts in Experience (and Vice Versa)”, MIT, Spring 2008.
- Extensive experience teaching mathematics at all levels, 1997-2005. (Details by request.)

## Advising

### Post-doctoral students

- Gregory Scontras.
- Judith Degan.
- Siddarth Narayanaswami.
- Daniel Ly.
- Daniel Lassiter. Now assistant professor of Linguistics, Stanford University.
- Joseph Austerweil. Now assistant professor of Cognitive Science, Brown University.

## **Ph.D. students (principal or co-principal advisor)**

- Andreas Stuhmueller (MIT, BCS)
- Leon Bergen (MIT, BCS)
- Long Ouyang (Stanford, Psychology)
- Justine Kao (Stanford, Psychology)
- Daniel Hawthorne (Stanford, Psychology)
- Desmond Ong (Stanford, Psychology)
- Michael Henry Tessler (Stanford, Psychology)
- Robert X. D. Hawkins (Stanford, Psychology)

## **Ph.D. Committees**

- Ian Ballard (Stanford, Neuroscience)
- Eric Miller (Stanford, Psychology)
- Molly Lewis (Stanford, Psychology)
- Tomer Ulman (MIT, BCS)
- Yi-Ting Yeh (Stanford, Computer Science), completed 2013
- Thomas Icard III (Stanford, Philosophy), completed 2013
- Jeremy Glick (Stanford, Psychology), completed 2011
- Daniel Sternberg (Stanford, Psychology), completed 2011
- Steve Piantadosi (MIT, BCS), completed 2011
- Timothy J. O'Donnell (Harvard, Psychology), completed 2011
- Jerry Talton (Stanford, Computer Science), completed 2011

## **University Committees**

- Psychology Department, Colloquium Committee, 2014-2015.
- Psychology Department, Cognitive Search Committee, 2014-2015.
- Psychology Department, Curriculum Committee, 2014-2015.
- Psychology Department, Colloquium Committee, 2013-2014.
- Human Subjects Research IRB, 2013-2014.
- Psychology Department, Colloquium Committee, 2012-2013.
- Psychology Department, Graduate Admissions Committee, 2012-2013.
- Psychology Department, Cognitive Search Committee, 2012-2013.
- Psychology Department, Computer Committee, 2012-2013.
- Psychology Department, Graduate Program Committee, 2011-2012.
- Psychology Department, Graduate Admissions Committee, 2011-2012.
- Psychology Department, Cognitive Search Committee, 2011-2012.
- Psychology Department, Computer Committee, 2011-2012.
- Psychology Department, Cognitive Search Committee, 2010-2011.

**Miscellaneous:**

Citizen of the USA.

Member Cognitive Science Society.

Member Psychonomic Society.