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, 300,000 (approx.).
- *Grounding Lexical Meaning in Core Cognition*, ONR, Sep 2013 – Sep 2016, $ 500,000 (approx.).
- *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). Noah D. Goodman 2
- *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, $ 600,000.
- *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

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

- Did she jump because she was the big sister or because the trampoline was safe? Causal inference and the development of social attribution. E. Seiver., A. Gopnik., & N. D. Goodman. (2013). *Child Development*.
- Learning from others: The consequences of psychological reasoning for human learning. P. Shafto., N. D. Goodman., & M. C. Frank. (2012). *Perspectives on Psychological Science*.
- Bootstrapping in a language of thought: A formal model of numerical concept learning. S. T. Piantadosi., J. B. Tenenbaum., & N. D. Goodman. (2012). *Cognition*.
- Predicting pragmatic reasoning in language games. M. C. Frank., & N. D. Goodman. (2012). *Science*.
- Theory learning as stochastic search in the language of thought. T. Ullman., N. D. Goodman., & J. B. Tenenbaum. (2012). *Cognitive Development*.
- Comparing pluralities. G. Scontras., P. Graff., & N. D. Goodman. (2012). *Cognition*.
- Learning a theory of causality.. N. D. Goodman., T. D. Ullman., & J. B. Tenenbaum. (2011). *Psychological Review*.
- The double-edged sword of pedagogy: Instruction limits spontaneous exploration and discovery. E. Bonawitz., P. Shafto., H. Gweon., N. D. Goodman., E. Spelke., & L. Schulz. (2011). *Cognition*.
- The imaginary fundamentalists: The unshocking truth about Bayesian cognitive science. N. Chater., N. Goodman., T. L. Griffiths., C. Kemp., M. Oaksford., & J. B. Tenenbaum. (2011). *Behavioral and Brain Sciences*.
- How to grow a mind: Statistics, structure, and abstraction. J. B. Tenenbaum., C. Kemp., T. L. Griffiths., & N. D. Goodman. (2011). *Science*.
- Where science starts: Spontaneous experiments in preschoolers' exploratory play. C. Cook., N. D. Goodman., & L. E. Schulz. (2011). *Cognition*.
- Learning to learn causal models. C. Kemp., N. D. Goodman., & J. B. Tenenbaum. (2010). *Cognitive Science*.
- Optimal habits can develop spontaneously through sensitivity to local cost. T. M. Desrochers., D. Z. Jin., N. D. Goodman., & A. M. Graybiel. (2010). *Proceedings of the National Academy of Sciences*.
- Predicting object and scene descriptions with an information-theoretic model of pragmatics. M. Frank., A. Kenney., N. Goodman., J. Tenenbaum., A. Torralba., & A. Oliva. (2010). *Journal of Vision*.
- The Structure and Dynamics of Scientific Theories: A Hierarchical Bayesian Perspective. L. Henderson., N. D. Goodman., J. B. Tenenbaum., & J. F. Woodward. (2010). *Philosophy of Science*.
- Using speakers' referential intentions to model early cross-situational word learning. M. C. Frank., N. D. Goodman., & J. B. Tenenbaum. (2009). *Psychological Science*.
- Going beyond the evidence: abstract laws and preschoolers' responses to anomalous data.. L. E. Schulz., N. D. Goodman., J. B. Tenenbaum., & A. C. Jenkins. (2008). *Cognition*. doi:n.2008.07.017
- Church: a language for generative models. N. D. Goodman., V. K. Mansinghka., D. M. Roy., K. Bonawitz., & J. B. Tenenbaum. (2008). *Uncertainty in Artificial Intelligence*.
- A Rational Analysis of Rule-based Concept Learning. N. D. Goodman., J. B. Tenenbaum., J. Feldman., & T. L. Griffiths. (2008). *Cognitive Science*.

Peer-reviewed Conference Proceedings

- Generating Design Suggestions under Tight Constraints with Gradient-based Probabilistic Programming. D. Ritchie., S. Lin., N. D. Goodman., & P. Hanrahan. (2015). In *Proc. Eurographics 2015 (to appear)*.
- From counterfactual simulation to causal judgment. T. Gerstenberg., N. D. Goodman., D. A. Lagnado., & J. B. Tenenbaum. (2014). In *Proceedings of the Thirty-Sixth Annual Conference of the Cognitive Science Society*.
- Some arguments are probably valid: Syllogistic reasoning as communication. M. H. Tessler., & N. D. Goodman. (2014). In *Proceedings of the Thirty-Sixth Annual Conference of the Cognitive Science Society*.
- Generating Efficient MCMC Kernels from Probabilistic Programs. L. Yang., P. Hanrahan., & N. D. Goodman. (2014). In *AISTATS*.

- Amortized inference in probabilistic reasoning. S. Gershman., & N. D. Goodman. (2014). In *Proceedings of the Thirty-Sixth Annual Conference of the Cognitive Science Society.*
- Lost your marbles? The puzzle of dependent measures in experimental pragmatics. J. Degen., & N. D. Goodman. (2014). In *Proceedings of the Thirty-Sixth Annual Conference of the Cognitive Science Society.*
- The strategic use of noise in pragmatic reasoning. L. Bergen., & N. D. Goodman. (2014). In *Proceedings of the Thirty-Sixth Annual Conference of the Cognitive Science Society.*
- Formalizing the pragmatics of metaphor understanding. J. T. Kao., L. Bergen., & N. D. Goodman. (2014). In *Proceedings of the Thirty-Sixth Annual Conference of the Cognitive Science Society.*
- The Funny Thing About Incongruity: A Computational Model of Humor in Puns. J. T. Kao., R. Levy., & N. D. Goodman. (2013). In *Proceedings of the Thirty-Fifth Annual Conference of the Cognitive Science Society.*
- Learning and using language via recursive pragmatic reasoning about other agents. N. J. Smith., N. Goodman., & M. Frank. (2013). In *Advances in Neural Information Processing Systems.*
- Learning Stochastic Inverses. A. Stuhlmüller., J. Taylor., & N. Goodman. (2013). In *Advances in Neural Information Processing Systems.*
- Learned helplessness and generalization. F. Lieder., N. D. Goodman., & Q. J. M. Huys. (2013). In *Proceedings of the Thirty-Fifth Annual Conference of the Cognitive Science Society.*
- Context, scale structure, and statistics in the interpretation of positive-form adjectives. D. Lassiter., & N. D. Goodman. (2013). In *Semantics and Linguistic Theory (SALT) 23.*
- Learning design patterns with bayesian grammar induction. J. Talton., L. Yang., R. Kumar., M. Lim., N. D. Goodman., & R. Mech. (2012). In *Proceedings of the 25th annual ACM symposium on User interface software and technology.*
- A dynamic programming algorithm for inference in recursive probabilistic programs. A. Stuhlmüller., & N. D. Goodman. (2012). In *Second Statistical Relational AI workshop at UAI 2012 (StaRAI-12).*
- Burn-in, bias, and the rationality of anchoring. F. Lieder., T. L. Griffiths., & N. D. Goodman. (2012). In *NIPS 2012.*
- Synthesizing open worlds with constraints using locally annealed reversible jump MCMC. Y.-T. Yeh., L. Yang., M. Watson., N. D. Goodman., & P. Hanrahan. (2012). In *SIGGRAPH 2012.*
- Knowledge and implicature: Modeling language understanding as social cognition. N. D. Goodman., & A. Stuhlmüller. (2012). In *Proceedings of the Thirty-Fourth Annual Conference of the Cognitive Science Society.*
- That's what she (could have) said: How alternative utterances affect language use. L. Bergen., N. D. Goodman., & R. Levy. (2012). In *Proceedings of the thirty-fourth annual conference of the Cognitive Science Society.*
- Ping pong in Church: Productive use of concepts in human probabilistic inference. T. Gerstenberg., & N. D. Goodman. (2012). In *Proceedings of the 34th annual conference of the Cognitive Science Society.*
- Noisy Newtons: Unifying process and dependency accounts of causal attribution. T. Gerstenberg., N. Goodman., D. A. Lagnado., & J. B. Tenenbaum. (2012). In *Proceedings of the Thirty-Fourth Annual Conference of the Cognitive Science Society.*
- How many kinds of reasoning? Inference, probability, and natural language semantics. D. Lassiter., & N. D. Goodman. (2012). In *34th Annual Conference of the Cognitive Science Society.*
- Productivity and reuse in language. T. J. O'donnell., J. Snedeker., J. B. Tenenbaum., & N. D. Goodman. (2011). In *Proceedings of the Thirty-Third Annual Conference of the Cognitive Science Society.*
- Lightweight implementations of probabilistic programming languages via transformational compilation. D. Wingate., A. Stuhlmüller., & N. D. Goodman. (2011). In *Proceedings of the 14th international conference on Artificial Intelligence and Statistics.*
- Bayesian policy search with policy priors. D. Wingate., N. D. Goodman., D. M. Roy., L. P. Kaelbling., & J. B. Tenenbaum. (2011). In *Proceedings of the Twenty-Second international joint conference on Artificial Intelligence.*
- Ad-hoc scalar implicature in adults and children. A. Stiller., N. D. Goodman., & M. C. Frank. (2011). In *Proceedings of the 33rd Annual Meeting of the Cognitive Science Society.*

- Nonstandard Interpretations of Probabilistic Programs for Efficient Inference. D. Wingate., N. D. Goodman., A. Stuhlmueller., & J. M. Siskind. (2011). In *Advances in Neural Information Processing Systems 23*.
- Prior expectations in pedagogical situations. P. Shafto., N. D. Goodman., B. Gerstle., & F. Ladusaw. (2010). In *32nd annual conference of the Cognitive Science Society*.
- Learning structured generative concepts. A. Stuhlmüller., J. B. Tenenbaum., & N. D. Goodman. (2010). In *Proceedings of the Thirty-Second Annual Conference of the Cognitive Science Society*.
- Beyond Boolean logic: exploring representation languages for learning complex concepts. S. T. Piantadosi., J. B. Tenenbaum., & N. D. Goodman. (2010). In *Proceedings of the 32nd Annual Conference of the Cognitive Science Society*.
- Theory Acquisition as Stochastic Search. T. D. Ullman., N. D. Goodman., & J. B. Tenenbaum. (2010). In *Proceedings of Thirty Second Annual Meeting of the Cognitive Science Society*.
- Cause and intent: Social reasoning in causal learning. N. D. Goodman., C. L. Baker., & J. B. Tenenbaum. (2009). In *Proceedings of the 31st Annual Conference of the Cognitive Science Society*.
- Learning a theory of causality. N. D. Goodman., T. D. Ullman., & J. B. Tenenbaum. (2009). In *Proceedings of the 31st Annual Conference of the Cognitive Science Society*.
- One and done: Globally optimal behavior from locally suboptimal decisions.. E. Vul., N. D. Goodman., T. L. Griffiths., & J. B. Tenenbaum. (2009). In *Proceedings of the 31st Annual Conference of the Cognitive Science Society*.
- How tall is Tall? compositionality, statistics, and gradable adjectives. L. A. Schmidt., N. D. Goodman., D. Barner., & J. B. Tenenbaum. (2009). In *Proceedings of the 31st annual conference of the Cognitive Science Society*.
- Continuity of discourse provides information for word learning. M. C. Frank., N. D. Goodman., J. B. Tenenbaum., & A. Fernald. (2009). In *Proceedings of the 31st Annual Cognitive Science Society*.
- The infinite latent events model. D. Wingate., N. D. Goodman., D. M. Roy., & J. B. Tenenbaum. (2009). In *Proceedings of the Twenty-Fifth Conference on Uncertainty in Artificial Intelligence*.
- Help or hinder: Bayesian models of social goal inference.. T. Ullman., C. L. Baker., O. Macindoe., O. Evans., N. D. Goodman., & J. B. Tenenbaum. (2009). In *Advances in Neural Information Processing Systems 22*.
- Informative communication in word production and word learning. M. C. Frank., N. D. Goodman., P. Lai., & J. B. Tenenbaum. (2009). In *Proceedings of the 31st Annual Conference of the Cognitive Science Society*.
- Structured Correlation from the Causal Background. R. Mayrhofer., N. D. Goodman., M. R. Waldmann., & J. B. Tenenbaum. (2008). In *Proceedings of the Thirtieth Annual Conference of the Cognitive Science Society*.
- Modeling Semantic Cognition as Logical Dimensionality Reduction. Y. Katz., N. D. Goodman., K. Kersting., C. Kemp., & J. B. Tenenbaum. (2008). In *Proceedings of the Thirtieth Annual Conference of the Cognitive Science Society*.
- Theory-based Social Goal Inference. C. L. Baker., N. D. Goodman., & J. B. Tenenbaum. (2008). In *Proceedings of Thirtieth Annual Meeting of the Cognitive Science Society*.
- Theory acquisition and the language of thought. C. Kemp., N. D. Goodman., & J. B. Tenenbaum. (2008). In *Proceedings of Thirtieth Annual Meeting of the Cognitive Science Society*.
- A Bayesian Model of the Acquisition of Compositional Semantics. S. T. Piantadosi., N. D. Goodman., B. A. Ellis., & J. B. Tenenbaum. (2008). In *Proceedings of Thirtieth Annual Meeting of the Cognitive Science Society*.
- Teaching Games: Statistical Sampling Assumptions for Learning in Pedagogical Situations. P. Shafto., & N. D. Goodman. (2008). In *Proceedings of the Thirtieth Annual Meeting of the Cognitive Science Society*.
- A bayesian framework for crosssituational word-learning. M. C. Frank., N. D. Goodman., & J. B. Tenenbaum. (2007). In *Advances in Neural Information Processing Systems*.
- Learning and using relational theories.. C. Kemp., N. D. Goodman., & J. B. Tenenbaum. (2007). In *NIPS*.
- Learning causal schemata. C. Kemp., N. D. Goodman., & J. B. Tenenbaum. (2007). In *Proceedings of the Twenty-ninth Annual Meeting of the Cognitive Science Society*.
- Learning grounded causal models. N. D. Goodman., V. Mansinghka., & J. B. Tenenbaum. (2007). In *Proceedings of the Twenty-Ninth Annual Conference of the Cognitive Science Society*.
- Intuitive theories of mind: a rational approach to false belief. N. D. Goodman., C. L. Baker., E. Baraff-Bonawitz., V. K. Mansinghka., A. Gopnik., H. Wellman., L. Schulz., & J. B. Tenenbaum. (2006). In *Proceedings of the Twenty-Eight Annual Conference of the Cognitive Science Society*.

Chapters

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

Books (print and web)

- Probabilistic Models of Cognition. N. D. Goodman., & J. B. Tenenbaum. (2014).
- The Design and Implementation of Probabilistic Programming Languages. N. D. Goodman., & A. Stuhlmüller. n.d. Retrieved from http://dippl.org

Technical Reports

- Inducing probabilistic programs by Bayesian program merging. I. Hwang., A. Stuhlmüller., & N. D. Goodman. (2011). *Technical report: arXiv:1110.5667.*
- Fragment grammars: Exploring computation and reuse in language. T. J. O'Donnell., J. B. Tenenbaum., & N. D. Goodman. (2009). *Technical Report MIT-CSAIL-TR-2009-013.*
- Random-World Semantics and Syntactic Independence for Expressive Languages. D. McAllester., B. Milch., & N. D. Goodman. (2008).

Other

- Pragmatic Reasoning through Semantic Inference. L. Bergen., R. Levy., & N. D. Goodman.
- Grounding Lexical Meaning in Core Cognition. N. D. Goodman. (2013).
- The principles and practice of probabilistic programming. N. D. Goodman. (2013). *POPL 2013.*
- A stochastic programming perspective on nonparametric Bayes. D. M. Roy., V. K. Mansinghka., N. D. Goodman., & J. B. Tenenbaum. (2008). *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.

Invited Presentations

- 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.
- Cognitive Science Colloquium, University of Arizona, Tucson, Arizona, February 2014.
- AI Colloquium, Groningen, Netherlands, February 2014.
- Amsterdam Colloquium, Amsterdam, Netherlands, December 2013.
- NeuroSpin, Paris, France, December 2013.
- IIIS 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, Jan- uary 2013.
- Indiana Cognitive Science Colloquium, Bloomington, IN, November 2012.
- IIIS 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.
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- "Rational Choice Workshop", Dept. of Economics, University of Chicago, Chicago, IL, May 2013.
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- 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, Jan- uary 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 Rea- soning, 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, Decem- ber 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 concep- tual 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. Luis, 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. 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.
- 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". Whister, 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.