

# Curriculum Vitae of Noah D. Goodman

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## Research Interests

Computational models of cognition.  
Probabilistic programming languages.  
Natural language semantics and pragmatics.  
Concepts and intuitive theories.

## Professional Positions

Associate Professor of Psychology and Computer Science, Stanford University, 2017 - .  
(By courtesy, Associate Professor of Linguistics.)

Associate Professor of Psychology, Stanford University, 2016 - 2017.  
(By courtesy, Associate Professor of Computer Science and of Linguistics.)

Assistant Professor of Psychology, Stanford University, 2010 - 2016.  
(By courtesy, Assistant Professor of Computer Science and of Linguistics.)

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.

## Honors

2016 Alfred P. Sloan Research Fellow in Neuroscience.

2015 Cognitive Science Society paper prize for applied computational modeling.

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.  
 2010 J. S. McDonnell Foundation Scholar Award.  
 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.

## Grants

*Homo SocioNeticus: Scaling the cognitive foundations of online social behavior*, 2018 - 2021 (Sub-award from Virginia Tech).  
 Alfred P. Sloan Research Fellow in Neuroscience, 2016 - 2019.  
*Amortized Inference for Probabilistic Programs*, DARPA, Oct 2013 - Jul 2017.  
*Grounding Lexical Meaning in Core Cognition*, ONR, Sep 2013 - Mar 2017.  
*Development of probmods.org web-book*, Stanford VPOL, 2013.  
*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.  
*A Framework for Core Cognition*, ONR, Jul 2009 - Dec 2012 (PI: Tenenbaum).

## Publications

### Peer-reviewed Journal Articles

Scontras, G., Degen, J., & Goodman, N. D. (To appear). On the grammatical source of adjective ordering preferences. *Semantics and Pragmatics*.  
 Degen, J., Trotzke, A., Scontras, G., Wittenberg, E., & Goodman, N. D. (2019). Definitely, maybe: A new experimental paradigm for investigating the pragmatics of evidential devices across languages. *Journal of Pragmatics*, 140, 33-48. (To appear)

- Hartshorne, J. K., de Leeuw, J. R., Goodman, N. D., Jennings, M., & O'Donnell, T. J. (2019). A thousand studies for the price of one: Accelerating psychological science with Pushkin. *Behavior Research Methods*, 1–22.
- Ong, D., Soh, H., Zaki, J., & Goodman, N. (2019). Applying Probabilistic Programming to Affective Computing. *IEEE Transactions on Affective Computing*.
- Bingham, E., Chen, J. P., Jankowiak, M., Obermeyer, F., Pradhan, N., Karaletsos, T., . . . Goodman, N. D. (2019). Pyro: Deep Universal Probabilistic Programming. *Journal of Machine Learning Research*, 20(28), 1–6.
- Tessler, M. H., & Goodman, N. D. (2019). The Language of Generalization. *Psychological Review*, 126(3), 395–436.
- Hawkins, R. X. D., Goodman, N. D., & Goldstone, R. L. (2019). The Emergence of Social Norms and Conventions. *Trends in Cognitive Sciences*, 23(2), 158–169. (To appear)
- Hawthorne-Madell, D., & Goodman, N. D. (2019). Reasoning about Social Sources to Learn from Actions and Outcomes. *Decision*, 6(1), 17–60.
- Ullman, T., Stuhlmüller, A., Goodman, N., & Tenenbaum, J. (2018). Learning Physical Parameters from Dynamic Scenes. *Cognitive Psychology*, 104, 57–82.
- Khani, F., Goodman, N. D., & Liang, P. (2018). Planning, Inference and Pragmatics in Sequential Language Games. *Transactions of the Association for Computational Linguistics (TACL)*.
- Ong, D. C., Zaki, J., & Goodman, N. D. (2018). Computational models of emotion inference in Theory of Mind: A review and roadmap. *Topics in Cognitive Science*.
- Dasgupta, I., Schulz, E., Goodman, N. D., & Gershman, S. J. (2018). Remembrance of inferences past: Amortization in human hypothesis generation. *Cognition*, 178, 67–81.
- Ong, D. C., Goodman, N. D., & Zaki, J. (2018). Happier than thou? A self-enhancement bias in emotion attribution. *Emotion*, 18(1), 116.
- Bennett, E. D., & Goodman, N. D. (2018). Extremely costly intensifiers are stronger than quite costly ones. *Cognition*, 178, 147–161.
- Scontras, G., & Goodman, N. D. (2017). Resolving uncertainty in plural predication. *Cognition*, 168, 294–311.
- Gerstenberg, T., Peterson, M. F., Goodman, N. D., Lagnado, D. A., & Tenenbaum, J. B. (2017). Eye-tracking causality. *Psychological Science*, 28(12), 1731–1744.
- Lieder, F., Griffiths, T. L., Huys, Q. J. M., & Goodman, N. D. (2017). The anchoring bias reflects rational use of cognitive resources. *Psychonomic Bulletin and Review*.
- Lieder, F., Griffiths, T. L., Huys, Q. J. M., & Goodman, N. D. (2017). Empirical evidence for resource-rational anchoring and adjustment. *Psychonomic Bulletin and Review*.
- Monroe, W., Hawkins, R. X. D., Goodman, N. D., & Potts, C. (2017). Colors in Context: A Pragmatic Neural Model for Grounded Language Understanding. *Transactions of the Association for Computational Linguistics*, 5(1), 325–338.
- Hawthorne-Madell, D., & Goodman, N. D. (2017). So Good It Has to Be True: Wishful Thinking in Theory of Mind. *Open Mind*, 1(2), 101–110.

- Tessler, M. H., Goodman, N. D., & Frank, M. C. (2017). Avoiding frostbite: It helps to learn from others. Commentary on B. Lake et al., Building machines that learn and think like people. *Behavioral and Brain Sciences*, 40, e279. <https://doi.org/10.1017/S0140525X17000280>
- Scontras, G., Degen, J., & Goodman, N. D. (2017). Subjectivity predicts adjective ordering preferences. *Open Mind*.
- Ballard, I., Miller, E., Piantadosi, S., Goodman, N., & McClure, S. (2017). Beyond Reward Prediction Errors: Human Striatum Updates Rule Values During Learning. *Cerebral Cortex*.
- Piantadosi, S. T., Tenenbaum, J. B., & Goodman, N. D. (2016). The logical primitives of thought: Empirical foundations for compositional cognitive models. *Psychological Review*, 123(4), 392–424.
- Bergen, L., Levy, R., & Goodman, N. D. (2016). Pragmatic Reasoning through Semantic Inference. *Semantics and Pragmatics*, 9.
- Goodman, N. D., & Frank, M. C. (2016). Pragmatic language interpretation as probabilistic inference. *Trends in Cognitive Sciences*, 20(11), 818–829.
- Ong, D. C., Zaki, J., & Goodman, N. D. (2015). Affective Cognition: Exploring lay theories of emotion. *Cognition*, 143, 141–162.
- Lassiter, D., & Goodman, N. D. (2015). Adjectival vagueness in a Bayesian model of interpretation. *Synthese*.
- Kao, J. T., Levy, R., & Goodman, N. D. (2015). A computational model of linguistic humor in puns. *Cognitive Science*. (Code at <https://github.com/amoudgl/pun-model>)
- Griffiths, T. L., Lieder, F., & Goodman, N. D. (2015). Rational use of cognitive resources: Levels of analysis between the computational and the algorithmic. *Topics in Cognitive Science*, 7(2), 217–229.
- Bergen, L., & Goodman, N. D. (2015). The strategic use of noise in pragmatic reasoning. *Topics in Cognitive Science*, 7(2), 336–350.
- Lassiter, D., & Goodman, N. D. (2015). How many kinds of reasoning? Inference, probability, and natural language semantics. *Cognition*, 136, 123–134.
- 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*, 26(4), 539–541.
- Stiller, A. J., Goodman, N. D., & Frank, M. C. (2015). Ad-hoc scalar implicature in preschool children. *Language Learning and Development*, 11(2), 176–190.
- Kao, J. T., Wu, J., Bergen, L., & Goodman, N. D. (2014). Nonliteral understanding of number words. *Proceedings of the National Academy of Sciences*, 111(33), 12002–12007.
- Shafto, P., Goodman, N. D., & Griffiths, T. L. (2014). A rational account of pedagogical reasoning: Teaching by, and learning from, examples. *Cognitive Psychology*, 71, 55–89.
- Frank, M. C., & Goodman, N. D. (2014). Inferring word meanings by assuming that speakers are informative. *Cognitive Psychology*, 75, 80–96.
- Vul, E., Goodman, N. D., Griffiths, T. L., & Tenenbaum, J. B. (2014). One and Done? Optimal Decisions From Very Few Samples. *Cognitive Science*, 38(4), 599–637.
- Stuhlmüller, A., & Goodman, N. D. (2014). Reasoning about Reasoning by Nested Conditioning: Modeling Theory of Mind with Probabilistic Programs. *J. Cognitive Systems Research*, 28, 80–99.

- Pierson, E., & Goodman, N. D. (2014). Uncertainty and denial: a resource-rational model of the value of information. *PLoS ONE*, 9(11), e113342.
- 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.
- Goodman, N. D., & Stuhlmüller, A. (2013). Knowledge and implicature: Modeling language understanding as social cognition. *Topics in Cognitive Science*, 5, 173–184.
- 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.
- 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.
- Ullman, T., Goodman, N. D., & Tenenbaum, J. B. (2012). Theory learning as stochastic search in the language of thought. *Cognitive Development*, 27(4), 455–480.
- Frank, M. C., & Goodman, N. D. (2012). Predicting pragmatic reasoning in language games. *Science*, 336(6084), 998–998.
- 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.
- 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.
- 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.
- Goodman, N. D., Ullman, T. D., & Tenenbaum, J. B. (2011). Learning a theory of causality. *Psychological Review*, 118(1), 110.
- 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.
- Kemp, C., Goodman, N. D., & Tenenbaum, J. B. (2010). Learning to learn causal models. *Cognitive Science*, 34(7), 1185–1243.
- 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*, 20(5), 578–585.

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.

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. <https://doi.org/n.2008.07.017>

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

Wu, M., Goodman, N., & Ermon, S. (2019). Differentiable Antithetic Sampling for Variance Reduction in Stochastic Variational Inference. In *AISTATS*. (To appear)

Wu, M., Mosse, M., Goodman, N., & Piech, C. (2019). Zero Shot Learning for Code Education: Rubric Sampling with Deep Learning Inference. In *Association for the Advancement of Artificial Intelligence (AAAI)*. [**Winner best student paper award.**]

Dasgupta, I., Guo, D., Stuhlmüller, A., Gershman, S. J., & Goodman, N. D. (2018). Evaluating Compositionality in Sentence Embeddings. In *Proceedings of the Fortieth Annual Conference of the Cognitive Science Society*.

Hahn, M., Degen, J., Goodman, N., Jurafsky, D., & and Richard Futrell. (2018). An information-theoretic explanation of adjective ordering preferences. In *Proceedings of the Fortieth Annual Conference of the Cognitive Science Society*.

Cohn-Gordon, R., Goodman, N. D., & and Christopher Potts. (2018). An incremental iterated response model of pragmatics. In *Proceedings of the Society for Computation in Linguistics (SCiL)*. Linguistic Society of America.

Zhao, S., Ren, H., Yuan, A., Song, J., Goodman, N., & Ermon, S. (2018). Bias and Generalization in Deep Generative Models: An Empirical Study. In S. Bengio, H. Wallach, H. Larochelle, K. Grauman, N. Cesa-Bianchi, & R. Garnett (Eds.), *Advances in Neural Information Processing Systems 31* (pp. 10814–10823). Curran Associates, Inc.

Hawkins, R. X. D., Franke, M., Smith, K., & Goodman, N. D. (2018). Emerging Abstractions: Lexical conventions are shaped by communicative context. In *Proceedings of the Fortieth Annual Conference of the Cognitive Science Society*.

Ouyang, L., Tessler, M. H., Ly, D., & Goodman, N. D. (2018). webppl-oed: A practical optimal experiment design system. In *Proceedings of the Fortieth Annual Conference of the Cognitive Science Society*.

Wu, M., & Goodman, N. (2018). Multimodal Generative Models for Scalable Weakly-Supervised Learning. In S. Bengio, H. Wallach, H. Larochelle, K. Grauman, N. Cesa-Bianchi, & R. Garnett (Eds.), *Advances in Neural Information Processing Systems 31* (pp. 5576–5586). Curran Associates, Inc.

Hawkins, R. X. D., Frank, M. C., & Goodman, N. D. (2017). Convention-formation in iterated reference games. In *Proceedings of the Thirty-Ninth Annual Conference of the Cognitive Science Society*.

- Dasgupta, I., Schulz, E., Goodman, N., & Gershman, S. (2017). Amortized Hypothesis Generation. In *Proceedings of the Thirty-Ninth Annual Conference of the Cognitive Science Society*.
- Tessler, M. H., Lopez-Brau, M., & Goodman, N. D. (2017). Warm (for winter): Comparison class understanding in vague language. In *Proceedings of the Thirty-Ninth Annual Conference of the Cognitive Science Society*.
- Yoon, E. J., Tessler, M. H., Goodman, N. D., & Frank, M. C. (2017). “I won’t lie, it wasn’t amazing”: Modeling polite indirect speech. In *Proceedings of the Thirty-Ninth Annual Conference of the Cognitive Science Society*.
- Siddharth, N., Paige, B., de Meent, V., Desmaison, A., Wood, F., Goodman, N. D., ... Torr, P. H. S. (2017). Learning Disentangled Representations with Semi-Supervised Deep Generative Models. In *Advances in Neural Information Processing Systems* 30.
- Yoon, E. J., Tessler, M. H., Goodman, N. D., & Frank, M. C. (2016). Talking with tact: Polite language as a balance between kindness and informativity. In *Proceedings of the Thirty-Eighth Annual Conference of the Cognitive Science Society*. (2016)
- Ritchie, D., Stuhlmüller, A., & Goodman, N. D. (2016). C3: Lightweight Incrementalized MCMC for Probabilistic Programs using Continuations and Callsite Caching. In *AISTATS 2016*.
- Evans, O., Stuhlmüller, A., & Goodman, N. D. (2016). Learning the Preferences of Ignorant, Inconsistent Agents. In *Proceedings of the 30th AAAI Conference on Artificial Intelligence (AAAI-2016)*.
- Qing, C., Goodman, N. D., & Lassiter, D. (2016). A rational speech-act model of projective content. In *Proceedings of the Thirty-Eighth Annual Conference of the Cognitive Science Society*. (2016)
- Ullman, T. D., Xu, Y., & Goodman, N. D. (2016). The Pragmatics of Spatial Language. In *Proceedings of the Thirty-Eighth Annual Conference of the Cognitive Science Society*. (2016)
- Franke, M., Dablander, F., Schöller, A., Bennett, E., Degen, J., Tessler, M. H., ... Goodman, N. D. (2016). What does the crowd believe? A hierarchical approach to estimating subjective beliefs from empirical data. In *Proceedings of the Thirty-Eighth Annual Conference of the Cognitive Science Society*. (2016)
- Ong, D. C., Zaki, J., & Goodman, N. D. (2016). Emotions in lay explanations of behavior. In *Proceedings of the Thirty-Eighth Annual Conference of the Cognitive Science Society*. (2016)
- Graf, C., Degen, J., Hawkins, R. X. D., & Goodman, N. D. (2016). Animal, dog, or dalmatian? Level of abstraction in nominal referring expressions. In *Proceedings of the Thirty-Eighth Annual Conference of the Cognitive Science Society*. (2016)
- Tessler, M. H., & Goodman, N. D. (2016). Communicating generalizations about events. In *Proceedings of the Thirty-Eighth Annual Conference of the Cognitive Science Society*. (2016)
- Hawkins, R. X. D., & Goodman, N. D. (2016). Conversational expectations account for apparent limits on theory of mind use. In *Proceedings of the Thirty-Eighth Annual Conference of the Cognitive Science Society*. (2016)
- Ritchie, D., Thomas, A., Hanrahan, P., & Goodman, N. D. (2016). Neurally-Guided Procedural Models: Amortized Inference for Procedural Graphics Programs using Neural Networks. In *Advances in Neural Information Processing Systems (NIPS 2016)*.
- Monroe, W., Goodman, N. D., & Potts, C. (2016). Learning to Generate Compositional Color Descriptions. In *Proceedings of the 2016 Conference on Empirical Methods on Natural Language Processing (EMNLP 2016)*.

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*. [**Best paper award honorable mention.**]

Luong, T., O'Donnell, T., & Goodman, N. D. (2015). Evaluating Models of Computation and Storage in Human Sentence Processing. In *CogACLL 2015*.

Ritchie, D., Mildenhall, B., Goodman, N. D., & Hanrahan, P. (2015). Controlling Procedural Modeling Programs with Stochastically-Ordered Sequential Monte Carlo. In *SIGGRAPH 2015*.

Ong, D. C., Goodman, N. D., & Zaki, J. (2015). Near-misses sting even when they are uncontrollable. In *Proceedings of the Thirty-Seventh Annual Conference of the Cognitive Science Society*.

Krafft, P. M., Hawkins, R. X. D., Pentland, A., Goodman, N. D., & Tenenbaum, J. B. (2015). Emergent Collective Sensing in Human Groups. In *Proceedings of the Thirty-Seventh Annual Conference of the Cognitive Science Society*. [**Winner of the 2015 Cognitive Science Society computational modeling prize for Applied Cognition.**]

Kao, J. T., & Goodman, N. D. (2015). Let's talk (ironically) about the weather: Modeling verbal irony. In *Proceedings of the Thirty-Seventh Annual Conference of the Cognitive Science Society*.

Icard III, T. F., & Goodman, N. D. (2015). A Resource-Rational Approach to the Causal Frame Problem. In *Proceedings of the Thirty-Seventh Annual Conference of the Cognitive Science Society*.

Hawthorne, D., & Goodman, N. D. (2015). So good it has to be true: Wishful thinking in theory of mind. In *Proceedings of the Thirty-Seventh Annual Conference of the Cognitive Science Society*.

Hawkins, R. X. D., Stuhlmüller, A., Degen, J., & Goodman, N. D. (2015). Why do you ask? Good questions provoke informative answers. In *Proceedings of the Thirty-Seventh Annual Conference of the Cognitive Science Society*.

Gerstenberg, T., Goodman, N. D., Lagnado, D. A., & Tenenbaum, J. B. (2015). How, whether, why: Causal judgments as counterfactual contrasts. In *Proceedings of the Thirty-Seventh Annual Conference of the Cognitive Science Society*.

Degen, J., Tessler, M. H., & Goodman, N. D. (2015). Wonky worlds: Listeners revise world knowledge when utterances are odd. In *Proceedings of the Thirty-Seventh Annual Conference of the Cognitive Science Society*.

Bennett, E., & Goodman, N. D. (2015). Extremely costly intensifiers are stronger than quite costly ones. In *Proceedings of the Thirty-Seventh Annual Conference of the Cognitive Science Society*.

Bass, I., Hawthorne, D., Goodman, N. D., & Gweon, H. (2015). Not by number alone: The effect of teacher's knowledge and its value in evaluating "sins of omission". In *Proceedings of the Thirty-Seventh Annual Conference of the Cognitive Science Society*.

Sumner, E., DeAngelis, E., Hyatt, M., Goodman, N. D., & Kidd, C. (2015). Toddlers Always Get the Last Word: Recency biases in early verbal behavior. In *Proceedings of the Thirty-Seventh 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.**]

Ullman, T. D., Stuhlmüller, A., Goodman, N. D., & Tenenbaum, J. B. (2014). Learning physics from dynamical scenes. 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 2014*.

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*.

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*.

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*.

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*.

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* (pp. 587–610).

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*.

Smith, N. J., Goodman, N., & Frank, M. (2013). Learning and using language via recursive pragmatic reasoning about other agents. In C. J. C. Burges, L. Bottou, M. Welling, Z. Ghahramani, & K. Q. Weinberger (Eds.), *Advances in Neural Information Processing Systems (NIPS 2013)* (pp. 3039–3047). Curran Associates, Inc.

Stuhlmüller, A., Taylor, J., & Goodman, N. (2013). Learning Stochastic Inverses. In *Advances in Neural Information Processing Systems (NIPS 2013)*.

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.]**

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*.

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*.

- Lieder, F., Griffiths, T. L., & Goodman, N. D. (2012). Burn-in, bias, and the rationality of anchoring. In *Advances in Neural Information Processing Systems* (pp. 2699–2707).
- 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)*.
- 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.]**
- 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).
- 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]**
- 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 (NIPS 2011)* (pp. 1152–1160).
- 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*.
- 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* (pp. 770–778).
- 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).
- Shafto, P., Goodman, N. D., Gerstle, B., & Ladusaw, F. (2010). Prior expectations in pedagogical situations. In *Proceedings of the Thirty-Second 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*.
- 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*.
- Ullman, T., Baker, C. L., Macindoe, O., Evans, O., Goodman, N. D., & Tenenbaum, J. B. (2010). Help or hinder: Bayesian models of social goal inference. In *Advances in Neural Information Processing Systems (NIPS 2010)*.
- 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*.

- 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.
- 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*.
- 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*.
- 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*.
- 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*.
- 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*.
- 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*.
- Kemp, C., Goodman, N. D., & Tenenbaum, J. B. (2007). Learning and using relational theories. In *Advances in Neural Information Processing Systems (NIPS 2007)*.
- 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.]**
- Frank, M. C., Goodman, N. D., & Tenenbaum, J. B. (2007). A bayesian framework for crosssituational word-learning. In *Advances in Neural Information Processing Systems (NIPS 2007)* (Vol. 20). MIT Press.

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., 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., & 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., 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. (in prep). *Reverse engineering the mind: the Bayesian approach*. (in prep)

Goodman, N. D., & Stuhlmüller, A. (2015). *The Design and Implementation of Probabilistic Programming Languages*. (<http://dippl.org>)

Goodman, N. D., & Tenenbaum, J. B. (2014). *Probabilistic Models of Cognition*. (<https://probmods.org>)

## Technical Reports

Hawkins, R. X. D., & Goodman, N. D. (Manuscript). *Questions and answers in dialogue*.

Hawkins, R. X. D., Sano, M., Goodman, N. D., & Fan, J. E. (Manuscript). *Graphical convention formation in visual communication*.

Hawkins, R. X. D., Gweon, H., & Goodman, N. D. (Manuscript). *Speakers account for asymmetries in visual perspective so listeners don't have to*. *arXiv: 1807.09000*. (Manuscript)

Choi, K., Wu, M., Goodman, N., & Ermon, S. (Manuscript). *Meta-Amortized Variational Inference and Learning*. *arXiv preprint arXiv:1902.01950*.

Obermeyer, F., Bingham, E., Jankowiak, M., Chiu, J., Pradhan, N., Rush, A., & Goodman, N. (2019). *Tensor Variable Elimination for Plated Factor Graphs*. *arXiv preprint arXiv:1902.03210*.

Chen, J. P., Obermeyer, F., Lyapunov, V., Gueguen, L., & Goodman, N. D. (2018). *Joint Mapping and Calibration via Differentiable Sensor Fusion*. *arXiv preprint arXiv:1812.00880*.

Nie, A., Bennett, E. D., & Goodman, N. D. (2017). *DisSent: Sentence Representation Learning from Explicit Discourse Relations*. *arXiv:1710.04334*.

Ritchie, D., Horsfall, P., & Goodman, N. D. (2016). *Deep Amortized Inference for Probabilistic Programs*. *Technical report: arXiv:1610.05735*.

Ouyang, L., Tessler, M. H., Ly, D., & Goodman, N. D. (2016). *Practical optimal experiment design with probabilistic programs*. *Technical report: arXiv:1608.05046*.

Stuhlmüller, A., Hawkins, R. X. D., Siddharth, N., & Goodman, N. D. (2015). *Coarse-to-Fine Sequential Monte Carlo for Probabilistic Programs*. *Technical report: arXiv:1509.02962*.

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

Yoon, E. J., Frank, M. C., Tessler, M. H., & Goodman, N. D. (Manuscript). *Polite speech emerges from competing social goals*.

Goodman, N. D. (2013). *Grounding Lexical Meaning in Core Cognition*. (Unpublished manuscript.)

Goodman, N. D. (2013). The principles and practice of probabilistic programming. *POPL 2013*. (Extended abstract of keynote talk.)

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.

[Pyro](#). A deep probabilistic programming language based on Python and PyTorch.

## Popular Press (selected articles)

“A grand unified theory of AI,” MIT News, March 30, 2010.

“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.
- “Think you’re punny? Computer that can tell how good a joke is.” New Scientist, August 12, 2015.
- “Call it Clement Droid: a machine that has a droll sense of humour.” The Times, August 15, 2015.
- “What people can learn from algorithms — and algorithms can learn from people.” Boston Globe, May 27, 2016.
- “AI’s Languange Problem.” MIT Technology Review, August 9, 2016.

## Invited Presentations

- ICLR, New Orleans, LA, May 2019.
- Open Source Leadership Summit, Half Moon Bay, CA, March 2019.
- College de France, Paris, France, February 2019.
- “Robots Seminar”, Oxford, UK, February 2019.
- Deepmind, London, UK, February 2019.
- Probabilistic Programming, Cambridge, MA, October 2018.
- KogWis (Germany Cognitive Science Society Biannual Conference), Darmstadt, Germany, September 2018.
- “Program Induction” workshop, CogSci, Madison, WI, July 2018.
- A-Star, Singapore, June 2018.
- Dubrovnik Cognitive Science Conference, Dubrovnik, Croatia, May 2018.
- Cognitive Science Colloquium, Johns Hopkins University, Baltimore, MD, March 2018.
- “Emergent Language” workshop, NIPS, Long Beach, CA, November 2017.
- “Combining Academia and Industry Workshop”, CogSci, London, UK, July 2017.
- Gatsby Unit, London, UK, July 2017.
- PLEMM workshop, Facebook, Menlo Park, CA, May 2017.
- EmTech Digital, San Francisco, CA, March 2017.
- Uber Technology Conference, Uber, Palo Alto, CA, February 2017.
- Machine Learning Seminar, University of Washington, Seattle, WA, January 2017.
- Tokyo, Japan, December 2016.

Society for Philosophy and Psychology, Austin, TX, May 2016.

Adobe Machine Learning Seminar, San Jose, CA, April 2016.

DGfS workshop on Computational Pragmatics, Konstanz, Germany, February 2016.

SPLAP Workshop, UCSC, Santa Cruz, CA, February 2016.

Linguistic Universals Colloquium, Harvard University, Cambridge, MA, October 2015.

CS, Brown University, Providence, RI, October 2015.

CLPS Colloquium, Brown University, Providence, RI, October 2015.

ILLC Colloquium, University of Edinburgh, Edinburgh, UK, September 2015.

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 Gottingen, Cognitive and Decision Sciences seminar. Gottingen, 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. PNAS. Cognition. Trends in Cognitive Science. Cognitive Science. Cognitive Psychology. Child Development. Memory and Cognition. 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. Natural Language Semantics.

Conference Proceedings Reviewer (selected): Cognitive Science. Neural Information Processing Systems. Society for Philosophy and Psychology. Uncertainty in Artificial Intelligence.

Grant reviewer: NSF (ad-hoc and panelist), ONR.

Program committee / Senior PC: Cognitive Science Society, 2014, 2015, 2016. AAAI 2016. AISTATS 2017.

Co-organizer: Cognitive Science Society, symposium “Empirical and Computational Approaches to Metaphor and Figurative Meaning”, Pennsylvania, August 2016.

Co-organizer: Cognitive Science Society, symposium “The Emergence of Conventions”, Pennsylvania, August 2016.

Co-Organizer: European Summer School of Logic Language and Information, workshop “Formal and Experimental Pragmatics”. Tübingen, August 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 ’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

Guest lecture, Summer School in Cognitive Science, Montreal, Canada, June 2016.

Guest lecturer, [SAILORS](#) program, Stanford, 2015, 2016, 2017.

Studium Generale, Groningen, Netherlands, February 2014.

Visiting Lecturer (2006, 2008, 2010, 2011, 2014), Canada/USA Mathcamp.

## Teaching

### Summer Schools and Tutorials

Probabilistic Programming for Advanced Machine Learning (summer school for DARPA program of the same name), Portland, August 2016.

“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. Düsseldorf, 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

“Language and Thought” (Psych 132). Stanford. Spring 2019.

“Computation and Cognition: the Probabilistic Approach” (Psych 204 / CS 428). Stanford. Winter 2011, Winter 2012, Autumn 2012, Autumn 2013, Spring 2015, Autumn 2016, Autumn 2017, Autumn 2018.

“Topics in Natural and Artificial Intelligence”. Stanford. Autumn 2018.

“Seminar on the Science of Meditation” (Psych 295). Stanford. Spring 2018.

“Seminar in Semantics: Formal semantics and the psychology of reasoning” (LINGUIST 236/PSYCH 236). Stanford. Spring 2017.

“Foundations of Cognition” (Psych 205). Stanford. Spring 2015.

“Probabilistic Models of Social Behavior and Affect” (Psych 241). Stanford. Spring 2014. (Co-taught with J. Zaki, M. Frank.)

“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.

Experience teaching mathematics at all levels, 1997-2005. (Details by request.)

## Advising

### Post-doctoral students

Judy Fan, 2017-present

Daniel Ritchie, 2016-17 (Now assistant professor of CS, Brown)

Leon Bergen, 2016-2017 (Now assistant professor of Linguistics, UCSD)

Judith Degen, 2013-2017 (Now assistant professor of Linguistics, Stanford)

Andreas Stuhmueller, 2015-2017 (Now CEO Ought, Inc.)

Long Ouyang, 2015-2016

Gregory Scontras, 2014-2016 (Now assistant professor of Linguistics, UC Irvine)

Siddarth Narayanaswami 2013-15 (Now post-doc, Oxford University)

Daniel Ly, 2013-15

Daniel Lassiter, 2011-13 (Now assistant professor of Linguistics, Stanford University)

Joseph Austerweil, 2013 (Now associate professor of Cognitive Science, University of Wisconsin)

**Ph.D. students**

Mike Wu (Stanford, Computer Science)  
Ben Peloquin (Stanford, Psychology)  
Erin Bennett (Stanford, Psychology)  
Robert X. D. Hawkins (Stanford, Psychology)  
Michael Henry Tessler (Stanford, Psychology), completed 2018  
Desmond Ong (Stanford, Psychology), completed 2017  
Daniel Ritchie (Stanford, Computer Science), completed 2016  
Justine Kao (Stanford, Psychology), completed 2016  
Long Ouyang (Stanford, Psychology), completed 2015  
Daniel Hawthorne (Stanford, Psychology), completed 2015  
Andreas Stuhmueller (MIT, BCS), completed 2015

**Ph.D. Committees**

Natalia Velez (Stanford, Psychology)  
Andrew Lampinen (Stanford, Psychology)  
Erica Yoon (Stanford, Psychology)  
Ziang Xie (Stanford, CS), completed 2018  
Justin Johnson (Stanford, CS), completed 2018  
Will Munroe (Stanford, CS), completed 2018  
Steven Hansen (Stanford, Psychology), completed 2018  
Sida Wang (Stanford, CS), completed 2017  
Ian Ballard (Stanford, Neuroscience), completed 2017  
Molly Lewis (Stanford, Psychology), completed 2016  
Leon Bergen (MIT, BCS), completed 2015  
Lingfeng Yang (Stanford, Computer Science), completed 2015  
Rahul Sharma (Stanford, Computer Science), completed 2015  
Eric Schkufza (Stanford, Computer Science), completed 2015  
Eric Miller (Stanford, Psychology), completed 2015  
Tomer Ulman (MIT, BCS), completed 2014  
Spence Green (Stanford, Computer Science), completed 2014

Ranjitha Kumar (Stanford, Computer Science), completed 2013  
 Yi-Ting Yeh (Stanford, Computer Science), completed 2013  
 Thomas Icard III (Stanford, Philosophy), completed 2013  
 Jerry Talton III (Stanford, Computer Science), completed 2012  
 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

## University Committees

Human-centered AI Initiative Design Committee, 2018-19.  
 Psychology Department, Graduate Admissions Committee (*Chair*), 2018-19.  
 CS Department, Graduate Admissions Committee, 2018-19.  
 CS Department, Ad-Hoc Promotion Committee, 2018-19.  
 Psychology Department, Graduate Admissions Committee, 2016-17, 2017-18.  
 CS Department, MA Advising Committee, 2017-18.  
 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.