

JOSHUA BRETT TENENBAUM

*Curriculum Vitae*

Brain and Cognitive Sciences  
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[jbt@mit.edu](mailto:jbt@mit.edu)

**Degrees:**

Ph.D., Brain and Cognitive Sciences, Massachusetts Institute of Technology, 1999, Thesis Advisor: Whitman Richards.

B.S. *magna cum laude*, Physics, Yale University, 1993

**Employment:**

Postdoctoral Associate, Artificial Intelligence Laboratory, Massachusetts Institute of Technology  
Principal Investigator, Computer Science and Artificial Intelligence Laboratory (CSAIL), MIT, 2003-Current  
Associate Professor of Cognitive Science and Computation, MIT, 2007-Present  
Paul E. Newton Career Development Professor, MIT, 2004-2008  
Assistant Professor, Cognitive Science and Computation, MIT, 2002-2007  
Assistant Professor, Psychology, Stanford University, 1999-2002  
Assistant Professor, Computer Science (by courtesy), Stanford University, 2000-2002

**External Positions Held:**

Member of DARPA ISAT (Information Science and Technology) Study Group, 2006-2009  
Associate Editor, *Cognitive Science*, 2004-2008. Editorial board member 2001-2008.

**Honors:**

Outstanding Paper Award, IEEE Conference on Computer Vision and Pattern Recognition, 1997, for “Learning bilinear models for two-factor problems in vision”, with William T. Freeman.  
Distinguished Visiting Junior Scholar, Peter Wall Institute for Advanced Studies, University of British Columbia, July 2000.  
Honorable Mention, Best Student Paper Award, Neural Information Processing Systems conference, 2002, for “Bayesian models of inductive generalization”, by Neville Sanjana (student advisee).  
Best Student Paper Award, Neural Information Processing Systems conference [Natural Systems category], 2003, for “From algorithmic to subjective randomness”, by Thomas L. Griffiths (student advisee).  
Best Student Paper Award, Neural Information Processing Systems conference [Synthetic Systems category], 2003, for “Hierarchical topic models and the nested Chinese restaurant process”, by David Blei, Thomas L. Griffiths (student advisee), and Michael I. Jordan.  
Honorable mention, Marr Prize for Best Student Paper, Twenty-Sixth Annual Conference of the Cognitive Science Society, 2004, for “Using physical theories to infer hidden causal structure”, by Tom Griffiths (student advisee) and Liz Bonawitz.  
New Investigator Award, Society for Mathematical Psychology, 2005.  
Distinguished Lecturer, University of Edinburgh, Division of Informatics, 2006.  
Honorable Mention, Outstanding Student Paper Award, Neural Information Processing Systems conference, 2006, for “Combining causal and similarity-based reasoning”, by Charles Kemp (student advisee), Patrick Shafto, and Allison Berke.

Early Investigator Award, Society of Experimental Psychologists, 2007.  
Fellow, Society of Experimental Psychologists, 2007.  
Distinguished Lecturer, University of British Columbia, Institute for Computing, Information, and Cognitive Systems, 2007.  
Distinguished Lecturer, University of California, San Diego, Department of Cognitive Science, 2007.  
Computational Modeling Prize for Best Paper on Perception and Action, Twenty-Ninth Annual Conference of the Cognitive Science Society, 2007, for “Learning grounded causal models”, with Noah Goodman and Vikash Mansinghka.  
Computational Modeling Prize for Best Paper on Higher-Level Cognition, Twenty-Ninth Annual Conference of the Cognitive Science Society, 2007, for “Learning causal schemata”, with Charles Kemp and Noah Goodman.  
Distinguished Scientific Award for Early Career Contribution to Psychology (in the area of cognition and human learning), American Psychological Association, 2008.  
Posner Visiting Scholar, Symbolic Systems Program, Stanford University, Fall 2010.  
Posner Invited Lecture, Neural Information Processing Systems Conference, December 2010.  
Distinguished Lecturer, University of Toronto, Department of Computer Science, 2011.

#### **Undergraduate Research Supervised:**

Pearson, Mark, 2000..  
Sanjana, Neville, 2000-2001.  
Ramos, Khara, 2000-2001.  
Bell, Matt, 2000-2001.  
Berger, Eric, 2000-2001.  
D’India, John Paul 2001.  
Blum, Ben, 2001-2002.  
Bryan, Ronnie, 2002-2004.  
Chen, Anne, 2002-2004.  
Dwyer, Brigid, 2003-2004.  
Niziolek, Carrie, 2003-2005.  
Jarudi, Izzat, 2004.  
Marzloff, George, 2004.  
Luther, Suzanne, 2004.  
Yu, Ben, 2004.  
Berke, Allison, 2005.  
Chan, Gabe, 2006.  
Shabir, Laila, 2006.  
Kitch, Lacey, 2006.  
Gordon, Matt, 2006.  
Antwi-Boampong, Sadik, 2006.  
Brenman, Stephanie, 2006.  
Tobenkin, Mark, 2006.  
Jotwani, Pooja, 2006.  
Schapiro, Anna, 2006.  
Johnson, Lindsay, 2008.  
Gross, Jason, 2010.  
Gramling, Hannah, 2009.  
Steinhardt, Jacob, 2010.  
Hamrick, Jessica, 2010.

#### **Ph.D. Theses Supervised:**

Griffiths, Thomas L., Causes, coincidences and theories, 2004, Associate Professor of Psychology and Cognitive Science, University of California, Berkeley.

Saxe, Rebecca, What functional magnetic resonance imaging can tell us about theory of mind (secondary advisor; primary advisor Nancy Kanwisher), 2003, Assistant Professor of Cognitive Neuroscience, MIT.

Krynski, Tevye R. (NSF Fellowship), The role of temporal factors and prior knowledge in causal learning and judgment, 2006, Currently at A9.com.

Kemp, Charles, (Albert Memorial Fellowship, MIT), The acquisition of inductive constraints, 2007, Assistant Professor of Psychology, Carnegie Mellon University.

Perfors, Amy (NSF Fellowship, NDSEG Fellowship), Learnability, representation, and language: a Bayesian approach, 2008, Lecturer in Psychology, University of Adelaide.

Schmidt, Lauren (NSF Fellowship), Meaning and compositionality as statistical induction of categories and constraints, 2009, Founder and chief scientist, HeadLamp Research.

Bonawitz, Elizabeth Baraff, The rational child: theories and evidence in [prediction, exploration and explanation (secondary advisor; primary advisor Laura Schulz), 2009, Postdoctoral Researcher at UC Berkeley.

Mansinghka, Vikash (NSF Fellowship), Natively probabilistic computation, 2009, Founder, Navia Systems, Inc.

Frank, Michael C. (NSF Fellowship, Javits Fellowship), Early word learning through communicative inference (secondary advisor; primary advisor Ted Gibson), 2010, Assistant Professor of Psychology, Stanford University.

Vul, Ed (NSF Fellowship), Sampling in human cognition (secondary advisor; primary advisor Nancy Kanwisher), 2010, Assistant Professor of Psychology, UC San Diego.

Baker, Chris, (NSF Fellowship, DHS Fellowship), Theory of mind and activity recognition, in progress.

Roy, Dan (NSF Fellowship). Nonparametric Bayesian models; languages for probabilistic modeling. (Secondary advisor; primary advisor Leslie Kaelbling), in progress.

O'Donnell, Tim, Probabilistic models for language reuse and computation (Secondary advisor; primary advisor is Jesse Snedeker), in progress.

Ullman, Tomer (NSF Fellowship), Models of theory formation, in progress.

McCoy, John, (Fulbright International Science Fellowship). Models of learning in decision-making (Primary advisor; secondary advisor is Drazen Prelec), in progress.

Lake, Brenden (NSF Fellowship), Probabilistic models of semantic cognition, in progress.

Kline, Melissa (NSF Fellowship), Probabilistic models in language acquisition (Secondary advisor; primary advisor is Ted Gibson), in progress.

Bergen, Leon. Models of psycholinguistic processing and pragmatics (Secondary advisor; primary advisor is Ted Gibson), in progress.

### **Postdoctoral Research Supervised**

Steyvers, Mark, 2000-2002, Associate Professor at UC Irvine, Department of Cognitive Sciences.

de Silva, Vin, 2000-2004, Assistant Professor at Pomona College, Department of Mathematics.

Stromsten, Sean, 2003-2004, Member of Research Staff at BAE Systems Advanced Information Technologies.

Koerding, Konrad, 2004-2006, Assistant Professor at Northwestern University, Rehabilitation Institute and Department of Physiology.

Shafto, Pat, 2004-2007, Assistant Professor of Psychology, University of Louisville.

Goodman, Noah, 2005-2010, Assistant Professor of Psychology and (by courtesy) Computer Science, Stanford University.

Jakel, Frank, 2008-2010, Lecturer, University of Osnabruck.

Savova, Virginia, 2007-present.

Wingate, David, 2008-present.

Battaglia, Peter, 2008-present.

Salakhutdinov, Ruslan, 2009-present.

## Teaching Experience

### Stanford University

Psychology 205, Foundations of Cognition, Fall 1999, 2000, 2001

Psychology 224, Learning and Inference in Humans and Machines, Spring 2000, 2001

### MIT

9.012, The Brain and Cognitive Sciences II, Spring 2002, 2003, 2004, 2005.

9.69/9.690, Foundations of Cognition, Spring 2003

9.52/9.914, Computational Models of Concepts and Theories, Fall 2003

9.66/9.660/6.804, Computational Cognitive Science, Fall 2004, 2005, 2006, 2007, 2009.

9.012, Cognitive Science, Spring 2006, 2007, 2008, 2009, 2010.

9.916, Computational Models in Cognitive Development, Fall 2008.

## Service

Department of Brain and Cognitive Sciences, Cognitive Faculty Search Committee, 2003-2009.

McGovern Institute for Brain Research, Faculty Search Committee, 2008-2009.

Department of Brain and Cognitive Sciences, Department Head Search Committee, 2008.

Department of Brain and Cognitive Sciences, Department representative at MIT

Commencement PhD Hooding, 2009.

Organizer and instructor for 9.9X, From Vision to Cognition, IAP 2004.

Organizer and instructor for 9.94, The Cognitive Science of Intuitive Theories, IAP 2006.

Co-instructor for 9.93, Marathon Moral Reasoning Laboratory, IAP 2007.

Co-organizer, MIT Intelligence Initiative, 2008-present.

Convener, MIT IdeasLab, "The Nature of Intelligence", World Economic Forum, 2010.

Program Committee member, Annual Conference of the Cognitive Science Society, 2002-2010.

Program Committee member, Neural Information Processing Systems Conference, 2000-2002.

Chair of Cognitive Science section.

Tutorials Chair, Neural Information Processing Systems Conference, 2005.

Program Committee member, National Academy of Sciences Sackler Colloquium on Mapping Knowledge Domains, May 2003.

Program Committee member, Workshop on "Statistical Network Analysis: Models, Issues, and New Directions", June 2006.

Journal reviewing: *Behavioral and Brain Sciences*, *BioMedCentral Bioinformatics*, *Cognition*, *Cognitive Science*, *Communications of the ACM*, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, *IEEE Transactions on Neural Networks*, *Journal of Classification*, *Journal of Experimental Psychology: General*, *Journal of Machine Learning Research*, *Journal of Mathematical Imaging and Vision*, *Language Learning and Development*, *Machine Learning*, *Memory and Cognition*, *Nature*, *Neural Computation*, *Proceedings of the National Academy of Sciences*, *Psychological Review*, *Psychological Science*, *Psychonomic Bulletin and Review*, *Science*, *Trends in Cognitive Sciences*.

Conference reviewing: IEEE Conference on Computer Vision and Pattern Recognition (CVPR), National Conference on Artificial Intelligence (AAAI), Neural Information Processing Systems (NIPS), Annual Conference of the Cognitive Science Society (COGSCI).

Grant reviewing: National Science Foundation (NSF), Natural Sciences and Engineering Research Council of Canada (NSERC), Social Science and Humanities Research Council of Canada (SSHRC), Human Frontiers Science Program (HFSP).

Book proposals reviewed for: MIT Press, CRC Press, Oxford University Press.

## Publications:

(\* indicates a paper arising from doctoral research supervised)

## Refereed Journals

1. Shult, D. L. and Tenenbaum, J. B. (1988). A three-dimensional multiplication table inspires mathematical discovery. *The Mathematics Teacher* 81(2), 92-25.
2. Tenenbaum, J. B. and Freeman, W. T. (2000). Separating style and content with bilinear models. *Neural Computation*, 12 (6), 1247-1283.
3. Tenenbaum, J. B., de Silva, V., and Langford, J. C. (2000). A global geometric framework for nonlinear dimensionality reduction. *Science*, 290 (5500): 2319-2323.
4. \*Tenenbaum, J. B. and Griffiths, T. L. (2001). Generalization, similarity, and Bayesian inference. *Behavioral and Brain Sciences*, 24(4), 629-641.
5. \*Tenenbaum, J. B. and Griffiths, T. L. (2001). Some specifics about generalization. *Behavioral and Brain Sciences*, 24(4), 772-778.
6. Balasubramanian, M., Shwartz, E. L., Tenenbaum, J. B., de Silva, V., and Langford, J. C. (2002). The Isomap Algorithm and Topological Stability. *Science* Jan 4 2002: 7.
7. Freeman, W. T., Tenenbaum, J. B., and Pasztor, E. (2002). Learning style translation for line drawings. *ACM Transactions on Graphics*, 22(1), 33-46.
8. Steyvers, M., Tenenbaum, J. B., Wagenmakers, E., and Blum, B. (2003). Inferring causal networks through observations and interventions. *Cognitive Science*, 27, 453-489.
9. Sharma, J., Dragoi, V., Tenenbaum, J. B., Miller, E. K., and Sur, M. (2003). V1 neurons signal acquisition of an internal representation of stimulus location. *Science*, 300, 1758-1763.
10. Sobel, D., Tenenbaum, J. B., and Gopnik A. (2004). Children's causal inferences from indirect evidence: Backwards blocking and Bayesian reasoning in preschoolers. *Cognitive Science* 28(3), 303-333.
11. Steyvers, M. and Tenenbaum, J. B. (2005). The large-scale structure of semantic networks: statistical analyses and a model of semantic growth. *Cognitive Science* 29(1), 41-78.
12. \*Griffiths, T. L. and Tenenbaum, J. B. (2005). Structure and strength in causal induction. *Cognitive Psychology* 51, 334-384.
13. \*Saxe, R., Tenenbaum, J. B., and Carey, S. (2005). Secret agents: Inferences about hidden causes by 10- and 12-month-old infants. *Psychological Science* 16(12), 995-1001.
14. \*Tenenbaum, J. B., Griffiths, T. L., and Kemp, C. (2006). Theory-based Bayesian models of inductive learning and reasoning. *Trends in Cognitive Sciences* 10(7), 309-318.
15. \*Griffiths, T. L. and Tenenbaum, J. B. (2006). Optimal predictions in everyday cognition. *Psychological Science* 17(9), 767-773.
16. \*Griffiths, T. L. and Tenenbaum, J. B. (2007). From mere coincidences to meaningful discoveries. *Cognition* 103(2), 180-226.
17. Xu, F. and Tenenbaum, J. B. (2007). Sensitivity to sampling in Bayesian word learning. *Developmental Science* 10(3), 288-297.
18. \*Kemp, C., Perfors, A. and Tenenbaum, J. B. (2007). Learning overhypotheses with hierarchical Bayesian models. *Developmental Science* 10(3), 307-321.
19. \*Griffiths, T. L., Steyvers, M. and Tenenbaum, J. B. (2007). Topics in semantic representation. *Psychological Review* 114(2), 211-244.
20. Xu, F. and Tenenbaum, J. B. (2007). Word learning as Bayesian inference. *Psychological Review* 114(2), 245-272.
21. \*Krynski, T. R. and Tenenbaum, J. B. (2007). The role of causality in judgment under uncertainty. *Journal of Experimental Psychology: General* 136(3) 430-450.
22. Kording, K., Tenenbaum, J. B., and Shadmehr, R. (2007). The dynamics of motor memory are a consequence of optimal adaptation to a changing body. *Nature Neuroscience* 10, 779-786.
23. Iwata, T., Saito, K., Ueda, N., Stromsten, S., Griffiths, T. L., and Tenenbaum, J. B. (2007). Parametric Embedding for Class Visualization. *Neural Computation* 19, 2536-2556.
24. Kording, K., Beierholm, U., Ma, W. J., Quartz, S., Tenenbaum, J. B., and Shams, L. (2007). Causal inference in multisensory perception. *Public Library of Science ONE* 2(9), e943.
25. Goodman, N., Tenenbaum, J. B., Griffiths, T. L., and Feldman, J. (2008). A rational analysis of rule-based concept learning. *Cognitive Science* 32:1, 108-154.
26. \*Kemp, C. and Tenenbaum, J. B. (2008). The discovery of structural form. *Proceedings of the National Academy of Sciences*. 105(31), 10687-10692.

27. Shafto, P., Kemp, C., Baraff, E. R., Coley, J., and Tenenbaum, J. B. (2008). Inductive reasoning about causally transmitted properties. *Cognition* 109(2), 175-192.
28. Schulz, L. E., Goodman, N. D., Tenenbaum, J. B., and Jenkins, A. (2008). Going beyond the evidence: Abstract laws and preschoolers' responses to anomalous data. *Cognition* 109(2), 211-223.
29. \*Kemp, C. and Tenenbaum, J. B. (2009). Structured statistical models of inductive reasoning. *Psychological Review* 116(1), 20-58.
30. Foraker, S., Regier, T., Khetarpal, N., Perfors, A., and Tenenbaum, J. B. (2009). Indirect evidence and the poverty of the stimulus: The case of anaphoric one. *Cognitive Science* 33, 287-300.
31. \*Frank, M., Goodman, N. D., and Tenenbaum, J. B. (2009). Using speakers' referential intentions to model early cross-situational word learning. *Psychological Science* 20, 578-585.
32. \*Baker, C. L., Tenenbaum, J. B., and Saxe, R. R. (2009). Action understanding as inverse planning. *Cognition* 113(3), 329-349.
33. \*Griffiths, T. L. and Tenenbaum, J. B. (2009). Theory-based causal induction. *Psychological Review* 116, 661-716.
34. \*Kemp, C., Tenenbaum, J. B., Griffiths, T. L., and Niyogi, S. (2010). A probabilistic model of theory formation. *Cognition* 114(2), 165-196.
35. Henderson, L., Goodman, N. D., Tenenbaum, J. B., and Woodward, J. F. (2010). The structure and dynamics of scientific theories: A hierarchical Bayesian perspective. *Philosophy of Science* 77(2), 172-200.
36. \*Perfors, A., Tenenbaum, J. B., and Wonnacott, E. (2010) Variability, negative evidence, and the acquisition of verb argument constructions. *Journal of Child Language* 37, 607-642.
37. Griffiths, T. L., Chater, N., Kemp, C., Perfors, A., and Tenenbaum, J. B. (in press). Probabilistic models of cognition: Exploring the laws of thought. *Trends in Cognitive Sciences*.
38. Gweon, H., Tenenbaum, J. B., and Schulz, L. E. (2010). Infants jointly infer sampling processes and the extension of non-obvious properties. *Proceedings of the National Academy of Sciences* 107 (20), 9066-9071.
39. \*Kemp, C., Goodman, N. D., and Tenenbaum, J. B. (in press). Learning to learn causal relations. *Cognitive Science*.
40. Goodman, N. D., Ullman, T., and Tenenbaum, J. B. (in press). Learning a theory of causality. *Psychological Review*.
41. \*Frank, M. C., Goldwater, S., Griffiths, T. L., and Tenenbaum, J. B. (in press). Modeling human performance in statistical word segmentation. *Cognition*.
42. \*Frank, M. C. and Tenenbaum, J. B. (accepted pending revision). Three ideal observer models for rule learning in simple languages. *Cognition*.

### Refereed Conference Proceedings

43. Tenenbaum, J. B. (1994). Functional parts. *Proceedings of the Sixteenth Annual Conference of the Cognitive Science Society*. Hillsdale, NJ: Erlbaum, 864-869. [poster]
44. Tenenbaum, J. B. and Todorov, E. V. (1995). Factorial learning by clustering features. In G. Tesauro, D. Touretzky, and T. Leen (eds.), *Advances in Neural Information Processing Systems* 7. Cambridge, MA: MIT Press, 561-568. [poster]
45. Tenenbaum, J. B. (1996). Learning the structure of similarity. In D. Touretzky, M. Mozer, and M. Hasselmo (eds.), *Advances in Neural Information Processing Systems* 8. Cambridge, MA: MIT Press, 3-9. [oral]
46. Tenenbaum, J. B. and Freeman, W. T. (1997). Separating style and content. In M. Mozer, M. Jordan, and T. Petsche (eds.), *Advances in Neural Information Processing Systems* 9. Cambridge, MA: MIT Press, 662-668. [oral]
47. Freeman, W. T. and Tenenbaum, J. B. (1997). Learning bilinear models for two-factor problems in vision. *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*. IEEE Press, 554-560. [oral]
48. Tenenbaum, J. B. (1997). A Bayesian framework for concept learning. *Proceedings of the Interdisciplinary Workshop on Similarity and Categorization 1997*, University of Edinburgh, 249-255. [oral]

49. Tenenbaum, J. B. (1998). Mapping a manifold of perceptual observations. In M. Jordan, M. Kearns, and S. Solla (eds.), *Advances in Neural Information Processing Systems 10*. Cambridge, MA: MIT Press, 682-688. [poster]
50. Tenenbaum, J. B. (1999). Bayesian modeling of human concept learning. In M. Kearns, S. Solla, and D. Cohn (eds.), *Advances in Neural Information Processing Systems 11*. Cambridge, MA: MIT Press, 59-65. [spotlight]
51. Tenenbaum, J. B. (2000). Rules and similarity in concept learning. In S. Solla, T. Leen, and K. R. Mueller (eds.), *Advances in Neural Information Processing Systems 12*. Cambridge, MA: MIT Press, 59-65. [oral]
52. \*Griffiths, T. L. and Tenenbaum, J. B. (2000). Teacakes, trains, toxins, and taxicabs: A Bayesian account of predicting the future. *Proceedings of the Twenty-Second Annual Conference of the Cognitive Science Society*, 202-207. [oral]
53. Tenenbaum, J. B. and Xu, F. (2000). Word learning as Bayesian inference. *Proceedings of the Twenty-Second Annual Conference of the Cognitive Science Society*, 517-522. [oral]
54. \*Tenenbaum, J. B. and Griffiths, T. L. (2001). Structure learning in human causal induction. In T. Leen, T. Dietterich, and V. Tresp (eds.), *Advances in Neural Information Processing Systems 13*. Cambridge, MA: MIT Press, 59-65. [poster]
55. \*Tenenbaum, J. B. and Griffiths, T. L. (2001). The rational basis of representativeness. *Proceedings of the Twenty-Third Annual Conference of the Cognitive Science Society*, 1036-1041. [oral]
56. \*Griffiths, T. L. and Tenenbaum, J. B. (2001). Randomness and coincidences: Reconciling intuition and probability theory. *Proceedings of the Twenty-Third Annual Conference of the Cognitive Science Society*, 370-375. [oral]
57. \*Griffiths, T. L. and Tenenbaum, J. B. (2002). Using vocabulary knowledge in Bayesian multinomial estimation. In T. G. Dietterich, S. Becker, and Z. Ghahramani (eds.), *Advances in Neural Information Processing Systems 14*. Cambridge, MA: MIT Press, 1385-1392. [poster]
58. \*Tenenbaum, J. B. and Griffiths, T. L. (2003). Theory-based causal inference. In S. Becker, S. Thrun, and K. Obermayer (eds.), *Advances in Neural Information Processing Systems 15*. Cambridge, MA: MIT Press, 35-42. [poster]
59. Sanjana, N. and Tenenbaum, J. B. (2003). Bayesian modeling of inductive generalization. In S. Becker, S. Thrun, and K. Obermayer (eds.), *Advances in Neural Information Processing Systems 15*. Cambridge, MA: MIT Press, 51-58. [spotlight]
60. Danks, D., Griffiths, T. L., and Tenenbaum, J. B. (2003). Dynamical causal learning. In S. Becker, S. Thrun, and K. Obermayer (eds.), *Advances in Neural Information Processing Systems 15*. Cambridge, MA: MIT Press, 67-74. [poster]
61. de Silva, V., and Tenenbaum, J. B. (2003). Local versus global approaches to nonlinear dimensionality reduction. In S. Becker, S. Thrun, and K. Obermayer (eds.), *Advances in Neural Information Processing Systems 15*. Cambridge, MA: MIT Press, 705-712. [poster]
62. \*Griffiths, T. L. and Tenenbaum, J. B. (2003). Probability, algorithmic complexity, and subjective randomness. *Proceedings of the Twenty-Fifth Annual Conference of the Cognitive Science Society*, 480-485. [poster]
63. \*Kemp, C. and Tenenbaum, J. B. (2003). Theory-based induction. *Proceedings of the Twenty-Fifth Annual Conference of the Cognitive Science Society*, 658-663. [oral]
64. \*Krynski, T. R. and Tenenbaum, J. B. (2003). The role of causal models in reasoning under uncertainty. *Proceedings of the Twenty-Fifth Annual Conference of the Cognitive Science Society*, 693-698. [oral]
65. Tenenbaum, J. B. and Niyogi, S. (2003). Learning causal laws. *Proceedings of the Twenty-Fifth Annual Conference of the Cognitive Science Society*, 1152-1157. [oral]
66. \*Griffiths, T. L. and Tenenbaum, J. B. (2004). From algorithmic to subjective randomness. In S. Thrun, L. K. Saul, and B. Scholkopf (eds.), *Advances in Neural Information Processing Systems 16*, 953-960. [oral]
67. \*Blei, D., Griffiths, T. L., Jordan, M. I., and Tenenbaum, J. B. (2004). Hierarchical topic models and the nested Chinese restaurant process. In S. Thrun, L. K. Saul, and B. Scholkopf (eds.), *Advances in Neural Information Processing Systems 16*, 17-24. [oral]
68. \*Kemp, C., Griffiths, T. L., Stromsten, S., and Tenenbaum, J. B. (2004). Semi-supervised learning with trees. In S. Thrun, L. K. Saul, and B. Scholkopf (eds.), *Advances in Neural*

- Information Processing Systems 16*, 257-264. [poster]
69. Balas, B. J. and Tenenbaum, J. B. (2004). Domain-specificity in the perception and representation of shape. *Proceedings of the Twenty-Sixth Annual Conference of the Cognitive Science Society*, 67-72. [oral]
70. \*Griffiths, T. L., Baraff, E., R., and Tenenbaum, J. B. (2004). Using physical theories to infer hidden causal structure. *Proceedings of the Twenty-Sixth Annual Conference of the Cognitive Science Society*, 446-451. [oral]
71. \*Kemp, C., Perfors, A. F., and Tenenbaum, J. B. (2004). Learning domain structure. *Proceedings of the Twenty-Sixth Annual Conference of the Cognitive Science Society*, 672-677. [oral]
72. \*T. L. Griffiths, M. Steyvers, D. Blei, and J. B. Tenenbaum (2005). Integrating topics and syntax. In L. K. Saul, Y. Weiss, and L. Bottou (eds.), *Advances in Neural Information Processing Systems 17*, 537-544. [spotlight]
73. T. Iwata, K. Saito, N. Ueda, S. Stromsten, T. L. Griffiths, J. B. Tenenbaum (2005). Parametric Embedding for Class Visualization. *Advances in Neural Information Processing Systems 17*, 617-624. [oral]
74. \*Kemp, C., Bernstein, A., and Tenenbaum, J. B. (2005). A generative theory of similarity. *Proceedings of the Twenty-Seventh Annual Conference of the Cognitive Science Society*, 1132-1137. [poster]
75. Shafto, P., Kemp, C., Baraff, L., Coley, J., and Tenenbaum, J. B. (2005). Context-sensitive induction. *Proceedings of the Twenty-Seventh Annual Conference of the Cognitive Science Society*, 2003-2008. [oral]
76. \*Perfors, A., Kemp, C., and Tenenbaum, J. B. (2005). Modeling the acquisition of domain structure and feature understanding. *Proceedings of the Twenty-Seventh Annual Conference of the Cognitive Science Society*, 1720-1725. [poster]
77. Xu, F., and Tenenbaum, J. B. (2005). Word learning as Bayesian inference: Evidence from Preschoolers. *Proceedings of the Twenty-Seventh Annual Conference of the Cognitive Science Society*, 517-522. [oral]
78. \*Baker, C., Saxe, R., and Tenenbaum J. B. (2006). A Bayesian framework for human action understanding. In Y. Weiss, B. Scholkopf, and J. Platt (eds.), *Advances in Neural Information Processing Systems 18*, 99-106. [poster]
79. \*Kemp, C., Perfors, A., and Tenenbaum J. B. (2006). Learning overhypotheses. *Proceedings of the Twenty-Eighth Annual Conference of the Cognitive Science Society*, 417-422. [oral]
80. \*Perfors, A., Tenenbaum J. B., and T. Regier (2006). Poverty of the stimulus? A rational approach. *Proceedings of the Twenty-Eighth Annual Conference of the Cognitive Science Society*, 663-668. [oral]
81. \*Schmidt, L., Kemp, C., and Tenenbaum J. B. (2006). Nonsense and sensibility: Inferring unseen possibilities. *Proceedings of the Twenty-Eighth Annual Conference of the Cognitive Science Society*, 744-749. [oral]
82. Shafto, P., Kemp, C., Mansinghka, V., Gordon, M., and Tenenbaum J. B. (2006). Learning cross-cutting systems of categories. *Proceedings of the Twenty-Eighth Annual Conference of the Cognitive Science Society*, 2146-2151. [poster]
83. Goodman, N. D., Baker, C. L., Bonawitz, E. B., Mansinghka, V. K., Gopnik, A., Wellman, H., Schulz, L., and Tenenbaum, J. B. (2006). Intuitive theories of mind: A rational approach to false belief. *Proceedings of the Twenty-Eighth Annual Conference of the Cognitive Science Society*, 1382-1387. [poster]
84. \*Kemp, C., Tenenbaum J. B., Griffiths, T. L., Yamada, T., and Ueda, N. (2006). Learning systems of concepts with an infinite relational model. *Twenty-First National Conference on Artificial Intelligence (AAAI 2006)*, 381-388. [oral]
85. Purver, M., Kording, K., Griffiths, T. L., and Tenenbaum, J. B. (2006). Unsupervised topic modeling for multi-party spoken discourse. *Proceedings of COLING-ACL 2006 (Joint Conference of the International Committee on Computational Linguistics and the Association for Computational Linguistics)*, 17-24. [oral]
86. \*Mansinghka, V. K., Kemp, C., Tenenbaum, J. B., and Griffiths, T. L. (2006). Structured priors for structure learning. *Twenty-Second Conference on Uncertainty in Artificial Intelligence (UAI 2006)*, 324-331. [oral]



87. \*Kemp, C., Shafto, P., Berke, A., and Tenenbaum, J. B. (2007). Combining causal and similarity-based reasoning. *Advances in Neural Information Processing Systems 19*, 681-688. [oral]
88. \*Roy, D., Kemp, C., Mansinghka, V. K., and Tenenbaum, J. B. (2007). Learning annotated hierarchies from relational data. *Advances in Neural Information Processing Systems 19*, 1185-1192. [oral]
89. Kording, K. and Tenenbaum, J. B. (2007). Causal inference in multisensory and sensorimotor integration. *Advances in Neural Information Processing Systems 19*, 737-744. [poster]
90. Kording, K., Tenenbaum, J. B., and Shadmehr, R. (2007). Multiple timescales and uncertainty in motor adaptation. *Advances in Neural Information Processing Systems 19*, 745-752. [spotlight]
91. \*Mansinghka, V., Roy, D., Rifkin, R., and Tenenbaum, J. B. (2007). AClass: A simple online parallelizable algorithm for probabilistic classification. *AISTATS 2007*, 40-47. [poster]
92. \*Baker, C. L., Tenenbaum, J. B., and Saxe, R. (2007). Goal inference as inverse planning. *Proceedings of the Twenty-Ninth Annual Conference of the Cognitive Science Society*, 779-784. [poster]
93. Goodman, N. D., Tenenbaum, J. B., and Mansinghka, V. K. (2007). Learning grounded causal models. *Proceedings of the Twenty-Ninth Annual Conference of the Cognitive Science Society*, 305-310. [oral]
94. Goodman, N. D., Griffiths, T. L., Feldman, J., and Tenenbaum, J. B. (2007). A rational analysis of rule-based concept learning. *Proceedings of the Twenty-Ninth Annual Conference of the Cognitive Science Society*, 108-154. [oral]
95. \*Kemp, C., Goodman, N. D., and Tenenbaum, J. B. (2007). Learning causal schemata. *Proceedings of the Twenty-Ninth Annual Conference of the Cognitive Science Society*, 389-394. [oral]
96. Savova, V., Roy, D., Schmidt, L., and Tenenbaum, J. B. (2007). Discovering syntactic hierarchies. *Proceedings of the Twenty-Ninth Annual Conference of the Cognitive Science Society*, 629-634. [oral]
97. \*Frank, M. C., Goldwater, S., Mansinghka, V. K., Griffiths, T. L., and Tenenbaum, J. B. (2007). Modeling human performance in statistical word segmentation. *Proceedings of the Twenty-Ninth Annual Conference of the Cognitive Science Society*, 281-286. [oral]
98. \*Frank, M. C., Goodman, N. D., and Tenenbaum, J. B. (2008). A Bayesian framework for cross-situational word learning. *Advances in Neural Information Processing Systems 20*, 1240-1247. [spotlight]
99. \*Kemp, C., Goodman, N. D., and Tenenbaum, J. B. (2008). Learning and using relational theories. *Advances in Neural Information Processing Systems 20*, 41-48. [poster]
100. \*Kemp, C., Goodman, N. D., and Tenenbaum, J. B. (2008). Theory acquisition and the language of thought. *Proceedings of the Thirtieth Annual Conference of the Cognitive Science Society*, 1606-1611. [poster]
101. \*Piantadosi, S. T., Goodman, N. D., Ellis, B. A., and Tenenbaum, J. B. (2008). A Bayesian model of the acquisition of compositional semantics. *Proceedings of the Thirtieth Annual Conference of the Cognitive Science Society*, 826-832. [poster]
102. Mayrhofer, R., Goodman, N. D., Waldmann, M., and Tenenbaum, J. B. (2008). Structured correlation from the causal background. *Proceedings of the Thirtieth Annual Conference of the Cognitive Science Society*, 303-308. [oral]
103. \*Katz, Y., Goodman, N. D., Kersting, K., Kemp, C., and Tenenbaum, J. B. (2008). Modeling semantic cognition as logical dimensionality reduction. *Proceedings of the Thirtieth Annual Conference of the Cognitive Science Society*, 71-76. [oral]
104. \*Baker, C. L., Goodman, N. D., and Tenenbaum, J. B. (2008). Theory-based social goal inference. *Proceedings of the Thirtieth Annual Conference of the Cognitive Science Society*, 1447-1452. [poster]
105. Savova, V., and Tenenbaum, J. B. (2008). A grammar-based approach to visual category learning. *Proceedings of the Thirtieth Annual Conference of the Cognitive Science Society*, 1191-1196. [poster]
106. \*Frank, M., Ichinco, D., and Tenenbaum, J. B. (2008). Principles of generalization for learning sequential structure in language. *Proceedings of the Thirtieth Annual Conference of the*

- Cognitive Science Society*, 763-768. [oral]
107. Goodman, N. D., Mansinghka, V. K., Roy, D., Bonawitz, K., and Tenenbaum J. B. (2008). Church: A language for generative models. *Uncertainty in Artificial Intelligence (UAI) 2008*, 220-229.
  108. \*Mansinghka, V. K., Roy, D. M., Jonas, E., and Tenenbaum, J. B. (2009). Exact and Approximate Sampling by Systematic Stochastic Search. *AISTATS 2009*, 400-407.
  109. Wingate, D., Goodman, N. D., Roy, D., and Tenenbaum, J. B. (2009). The infinite latent events model. *Uncertainty in Artificial Intelligence (UAI) 2009*, 607-614.
  110. \*Vul, E., Goodman, N. D., Griffiths, T. L., and Tenenbaum, J. B. (2009). One and done? Optimal decisions from very few samples. *Proceedings of the Thirty-First Annual Conference of the Cognitive Science Society*, 148-153. [oral]
  111. Goodman, N. D., Baker, C., and Tenenbaum, J. B. (2009). Cause and intent: Social reasoning in causal learning. *Proceedings of the Thirty-First Annual Conference of the Cognitive Science Society*, 2759-2764. [poster]
  112. Goodman, N. D., Ullman, T., and Tenenbaum, J. B. (2009). Learning a theory of causality. *Proceedings of the Thirty-First Annual Conference of the Cognitive Science Society*, 2188-2193. [oral]
  113. Warner, R. E., Shafto, P., Baker, C., and Tenenbaum, J. B. (2009). Abstract knowledge guides search and prediction in novel situations. *Proceedings of the Thirty-First Annual Conference of the Cognitive Science Society*, 869-874. [poster]
  114. \*Frank, M. C., Goodman, N. D., Tenenbaum, J. B., and Fernald, A. (2009). Continuity of Discourse Provides Information for Word Learning. *Proceedings of the Thirty-First Annual Conference of the Cognitive Science Society*, 1418-1423. [oral]
  115. \*Perfors, A. F., and Tenenbaum, J. B. (2009). Learning to learn categories. *Proceedings of the Thirty-First Annual Conference of the Cognitive Science Society*, 136-141. [oral]
  116. Savova, V., Jakel, F., and Tenenbaum, J. B. (2009). Grammar-based object representations in a scene parsing task. *Proceedings of the Thirty-First Annual Conference of the Cognitive Science Society*, 857-862. [poster]
  117. Gweon, H., Tenenbaum, J. B., and Schulz, L. E. (2009). What are you trying to tell me? A Bayesian model of how toddlers can simultaneously infer property extension and sampling processes. *Proceedings of the Thirty-First Annual Conference of the Cognitive Science Society*, 1282-1287. [oral]
  118. \*Frank, M. C., Goodman, N. D., Lai, P., and Tenenbaum, J. B. (2009). Informative Communication in Word Production and Word Learning. *Proceedings of the Thirty-First Annual Conference of the Cognitive Science Society*, 1228-1233. [oral]
  119. \*Schmidt, L., Goodman, N. D., Barner, D., and Tenenbaum, J. B. (2009). How Tall Is Tall? Compositionality, Statistics, and Gradable Adjectives. *Proceedings of the Thirty-First Annual Conference of the Cognitive Science Society*, 3151-3156. [poster]
  120. Sutskever, I., Salakhutdinov, R., and Tenenbaum, J. B. (2010). Modeling relational data using Bayesian clustered tensor factorization. *Advances in Neural Information Processing Systems 22*, 1821-1828. [poster]
  121. \*Ullman, T., Baker, C. L., Evans, O., Macindoe, O., and Tenenbaum, J. B. (2010). Help or hinder: Bayesian models of social goal inference. *Advances in Neural Information Processing Systems 22*, 1874-1882. [poster]
  122. \*Vul, E., Frank, M. C., Alvarez, G., and Tenenbaum, J. B. (2010). Explaining human multiple object tracking as resource-constrained approximate inference in a dynamic probabilistic model. *Advances in Neural Information Processing Systems 22*, 1955-1963. [oral]
  123. Gershman, S. J., Vul, E., and Tenenbaum, J. B. (2010). Perceptual stability as Markov chain Monte Carlo inference. *Advances in Neural Information Processing Systems 22*, 611-619. [spotlight]
  124. \*Piantadosi, S. T., Tenenbaum, J. B. and Goodman, N. D. (2010). Beyond Boolean logic: Exploring representation languages for learning complex concepts. *Proceedings of the Thirty-Second Annual Conference of the Cognitive Science Society*, in press. [talk]
  125. \*Stuhlmüller, A., Tenenbaum, J. B. and Goodman, N. D. (2010). Learning structured generative concepts. *Proceedings of the Thirty-Second Annual Conference of the Cognitive Science Society*, in press. [poster]

126. \*Lake, B. and Tenenbaum, J. B. (2010). Discovering structure by learning sparse graphs. *Proceedings of the Thirty-Second Annual Conference of the Cognitive Science Society*, in press. [poster]
127. Bergen, L., Evans, O., and Tenenbaum, J. B. (2010). Learning structured preferences. *Proceedings of the Thirty-Second Annual Conference of the Cognitive Science Society*, in press. [poster]
128. \*Ullman, T. D., Goodman, N. D., and Tenenbaum, J. B. (2010). Theory learning as stochastic search. *Proceedings of the Thirty-Second Annual Conference of the Cognitive Science Society*, in press. [talk]
129. Brady, T. F. and Tenenbaum, J. B. (2010). Encoding higher-order structure in working memory: A probabilistic model. *Proceedings of the Thirty-Second Annual Conference of the Cognitive Science Society*, in press. [talk]
130. Buchanan, D. W., Tenenbaum, J. B., and Sobel, D. M. (2010). Edge replacement and nonindependence in causation. *Proceedings of the Thirty-Second Annual Conference of the Cognitive Science Society*, in press. [talk]

### Journal Manuscripts in progress

131. \*Griffiths, T. L., Sobel, D. M., Tenenbaum, J. B., and Gopnik, A. (under review). Bayesian reasoning in adults' and children's causal inferences. *Cognitive Science*.
132. \*Perfors, A., Tenenbaum, J., Griffiths, T.L., Xu, F. (under review) A tutorial introduction to Bayesian models of cognitive development. *Cognition*.
133. \*Bonawitz, E. B. and Tenenbaum, J. B. (under review). Sticking to the Evidence? A computational and behavioral case study of micro-theory change in the domain of magnetism. *Cognition*.
134. Goodman, N. D. and Tenenbaum, J. B. (under revision). Learning grounded causal models. *Psychological Science*.
135. \*Vul, E., Goodman, N. D., Tenenbaum, J. B., and Griffiths, T. L. (under revision). One and done? Optimal decisions from very few samples. *Psychological Review*.
136. \*Perfors, A. F., Tenenbaum, J. B., and Regier, T. (under revision). The learnability of abstract syntactic principles. *Cognition*.
137. \*Griffiths, T. L. and Tenenbaum, J. B. (under revision). Testing a Bayesian analysis of predicting the future. *Journal of Experimental Psychology: General*.
138. Shafto, P., Kemp, C., Mansinghka, V. K., and Tenenbaum, J. B. (revision under review). Learning cross-cutting systems of categories. *Cognition*.

### Book Chapters (not competitively refereed)

139. Tenenbaum, J. B. and Bricolo, E. (1997). Analyzing the view-dependence of population codes in inferior temporal cortex. In J. M. Bower, (ed.) *Computational Neuroscience: Trends in Research 1997*. New York: Plenum. 867-872.
140. de Silva, V., and Tenenbaum, J. B. (2002). Unsupervised learning of curved manifolds. In D. D. Denison, M. H. Hansen, C. C. Holmes, B. Mallick and B. Yu (eds.), *Nonlinear Estimation and Classification*, Springer-Verlag, New York.
141. Tenenbaum, J.B., Griffiths, T. L., and Niyogi, S. (2007). Intuitive theories as grammars for causal inference. In A. Gopnik and L. Schulz (eds.), *Causal Learning*. Oxford University Press.
142. \*Griffiths, T. L. and Tenenbaum, J.B. (2007). Two proposals for causal grammar. In A. Gopnik and L. Schulz (eds.), *Causal Learning*. Oxford University Press.
143. Tenenbaum, J. B., Kemp, C., Shafto, P. (2007). Theory-based Bayesian models for inductive reasoning. In A. Feeney and E. Heit (eds.), *Induction*. Cambridge University Press.
144. \*Griffiths, T. L., Kemp, C., and Tenenbaum, J. B. (2008). Bayesian models of cognition. R. Sun (ed.), *Cambridge Handbook of Computational Psychology*. Cambridge University Press.
145. Goodman, N. D., Tenenbaum, J. B., Griffiths, T. L., & Feldman, J. (2008). Compositionality in

rational analysis: Grammar-based induction for concept learning. M. Oaksford and N. Chater (Eds.). *The probabilistic mind: Prospects for rational models of cognition*. Oxford: Oxford University Press.

146. \*Perfors, A., Tenenbaum, J.B., Gibson, E., Regier, T. (2010). How recursive is language? Bayesian exploration. In *Recursion and Human Language*, H. van der Hulst (ed). Mouton De Gruyter.

#### **Other Publications (not competitively refereed)**

147. Xu, F., Tenenbaum, J. B., and Sorrentino, C. (1998). Concepts are not beliefs, but having concepts is having beliefs. Comment on R. Millikan, "A Common structure for concepts of individuals, stuffs and real kinds and real kinds; more mama, more milk, and more mouse." *Behavioral and Brain Sciences*, 22 (1).
148. Tenenbaum, J. B. (1999). *A Bayesian Framework for Concept Learning*. Ph.D. Thesis, Massachusetts Institute of Technology.
149. \*C. Kemp, T. L. Griffiths, and J. B. Tenenbaum (2004). Discovering latent classes in relational data. MIT AI Memo 2004-019.
150. Chater, N., Tenenbaum, J. B., and Yuille, A. (2006). Probabilistic models of cognition: Conceptual foundations. *Trends in Cognitive Sciences* 10(7), 287-291.
151. \* Griffiths, T. L. and Tenenbaum, J. B. (2006), Statistics and the Bayesian Mind. *Significance*. [Magazine of the Royal Statistical Society]

#### **Invited Presentations:**

Yale University, Department of Computer Science, Vision seminar, November 1996.  
University of Toronto, Department of Computer Science, Neural Networks Research Group, October 1997.  
Brown University, Department of Cognitive and Linguistic Sciences, Vision and Neural Networks seminar, November 1997.  
Schlumberger Cambridge Research, UK, November 1997.  
NEC Research Institute, Vision Research seminar, January 1998.  
University of California, Irvine, Department of Cognitive Sciences Colloquium, February, 1998.  
University of Rochester, Department of Brain and Cognitive Science Colloquium, February 1998.  
Stanford University, Department of Psychology Colloquium, February 1998.  
Workshop on Learning from Relational Data Representations, Breckenridge, CO, December 1998.  
Yale University, Department of Psychology, Cognitive Seminar, February 1999.  
Invited Discussant, "Finding the Words..." workshop, Stanford University, April 2000.  
Stanford University, Center for the Study of Language and Information, May 2000.  
Cold Spring Harbor Laboratory, Bainbury Center Workshop on Network Models of Brain Function, September 2000.  
Schlumberger Doll Research, Ridgefield, CT, September 2000.  
UC Berkeley, Cognitive Science Colloquium, November 2000.  
MIT, Brain and Cognitive Sciences Seminar, February 2001.  
MIT, Perceptual Sciences Seminar, February 2001.  
Stanford University, Department of Statistics Colloquium, April 2001.  
University of Edinburgh, Division of Informatics, Colloquium, August 2001.  
Gatsby Institute, University College London, Colloquium, August 2001.  
Indiana University, Cognitive Science Colloquium, April 2002.  
Indiana University, Mathematical Psychology Seminar, April 2002

Harvard University, Concepts and Words Seminar, April 2002  
Brown University, Causality Seminar, April 2002.  
New York University, Cognitive Psychology Colloquium, September 2002.  
University of Pennsylvania, Institute for Research in Cognitive Science (IRCS) Colloquium, September 2002.  
Cornell University, Department of Psychology Colloquium, October 2002.  
Harvard University, Department of Psychology, Cognition, Brain and Behavior Seminar, October 2002.  
Symposium on Causal Inference, Biennial Meeting of the Philosophy of Science Association, Milwaukee, WI, November 2002.  
NTT Communication Sciences Research Labs, Intelligent Communication Laboratory, January 2003.  
Yale University, Department of Psychology, Cognitive Lunch, February 2003.  
Brown University, Brain Sciences Program Speaker Series, March 2003.  
Northwestern University, Cognitive Science Program, Week-long Tutorial, May 2003.  
Annual Meeting of the Society for Mathematical Psychology, Invited Tutorial, July 2003.  
Rutgers University, Center for Cognitive Science (RUCCS), Colloquium, October 2003.  
MIT Sloan School, Marketing Seminar, November 2003.  
MIT Japan program, Mitsui/Toshiba Executive Mission, November 2003.  
Air Force Office of Scientific Research, Workshop on Culture and Personality in Models of Adversarial Decision Making, McLean, VA, November 2003.  
MIT Language, Cognition, and Computation Seminar Series, December 2003.  
Knight Fellows Medical Evidence Bootcamp, Keynote talk, December 2003.  
Workshop on Syntax, Semantics, and Statistics, Invited discussant, Whistler, B.C., Canada, December 2003.  
Workshop on Infinite Models and Nonparametric Bayesian methods, Invited talk, December 2003.  
The Johns Hopkins University, Center for Language and Speech Processing, Invited talk, February 2004.  
MIT Stochastic Systems Seminar, Laboratory for Information and Decision Systems, April 2004.  
Carnegie Mellon University, Department of Psychology, Colloquium, April 2004.  
Carnegie Mellon University, Department of Psychology, Brownbag lunch speaker, April 2004.  
Center for Advanced Study in the Behavioral Sciences, Stanford, CA, Invited Symposium on Causation, Theory Formation, and Explanation, April 2004.  
International workshop on “Theories of Causality in Cognition: Frameworks, Frailties and Future Directions”, Invited speaker, July 2004.  
International Conference on Thinking, Invited Symposium on Induction, July 2004.  
Workshop on Probabilistic Models of Cognition: The Mathematics of Mind, Institute for Pure and Applied Mathematics, UCLA, January 2005.  
University of Rochester, Department of Brain and Cognitive Sciences, Colloquium, February, 2005.  
Brown University, Symposium for Undergraduates in the Mathematical Sciences, February 2005.  
Stanford University, Department of Computer Science, Broad Area Colloquium for Artificial Intelligence, Graphics, Geometry and Computer Vision, March 2005.  
California Institute of Technology, Sloan-Swartz Center for Theoretical Neuroscience, Colloquium, March 2005.  
Rensselaer Polytechnic Institute, Cognitive Science Colloquium, September 2005.  
Harvard University, Applied Statistics Workshop, October 2005.  
International workshop on Bayesian Cognition, College de France, Paris, France, January 2006.  
University of Arizona, Cognitive Science Colloquium, March 2006.  
University of Southern California/Information Sciences Institute, “Young Stars” Colloquium Series, March 2006.  
Harvard University, Computer Science Colloquium, May 2006.

University of Rochester, Center for Visual Science symposium on “Statistical learning and brain plasticity”, May 2006.

New York University Conference on Causation, Villa La Pietra, Florence, Italy, June 2006.

University of Edinburgh, Distinguished Lecture in Informatics, June 2006.

Rational Models of Cognition, Invited Conference Address, University College London, June 2006.

DARPA ISAT/IXO Workshop on “Adaptive and Interactive Representations”, Cambridge, MA, July 2006.

Society for Mathematical Psychology, Plenary address, July 2006.

NSF Workshop on “Mind and Brain: Strategies and Directions for Future Research”, Arlington, VA, July 2006.

Symposium on “Exploring Mind and World” (in honor of Roger Shepard), Annual Conference of the Cognitive Science Society, July 2006.

Symposium on “Building and Evaluating Models of Human-Level Intelligence”, Annual Conference of the Cognitive Science Society, July 2006.

Invited Tutorial, Neural Information Processing Systems Conference, Vancouver, B.C., Canada, December 2006.

Carnegie Mellon University, School of Computer Science, Intelligence Seminar, February 2007.

Air Force Office of Scientific Research Workshop on “Robust Decision Making”, February 2007.

NSF Workshop on Learning, Development and Plasticity, Arlington, VA, March 2007.

University of British Columbia, Distinguished Lecture, Institute for Computing, Information, and Cognitive Systems, March 2007.

University of Washington, Center for Statistics in the Social Sciences (CSSS) seminar, March 2007.

University of California, San Diego, Distinguished Lecture, Department of Cognitive Science, April 2007.

Origins of Causal Cognition, Workshop sponsored by the University of Leuven, Belgium, May 2007.

Max Plank Institute for Biological Cybernetics, Colloquium, May 2007.

International Conference on Machine Learning, invited plenary address, June 2007.

Symposium on “Cognitive Decision Theory: Developing Models of Real-World Decision Behavior”, Annual Conference of the Cognitive Science Society, July 2007.

Workshop on “Cases, rules and probabilities”, Cowles Institute, Yale University, September 2007.

Workshop on “Where does syntax come from?”, Cambridge, MA, October 2007.

Symposium on “Generalization in Language Learning”, Society for Language Development, Boston, MA, November 2007.

Workshop on “Bridging the developmental divide: Sentence processing meets word and grammar learning”, Institute for Research in Cognitive Science, University of Pennsylvania, November 2007.

Columbia University, Department of Psychology, Colloquium, February 2008.

CUNY conference on sentence processing, invited address, March 2008.

Rockefeller University, Center for Studies in Physics and Biology seminar, April 2008.

University of Wisconsin, Cognitive Science cluster, Colloquium, May 2008.

Workshop on “Connecting probabilistic models of cognition and neural networks”, Berkeley, CA, August 2008.

Tufts University, Department of Computer Science Colloquium, September 2008.

Brown University, Department of Cognitive and Linguistic Sciences, Colloquium, November 2008.

Yale University, Cognitive Science seminar series, December 2008.

COSYNE (Computational and Systems Neuroscience) meeting, Invited speaker, February 2009.

Princeton University, Department of Psychology, Colloquium, March 2009.

Workshop on “Probabilistic models in cognitive development”, Banff International Research Station, May 2009.  
Plenary address, Thirty-First Annual Conference of the Cognitive Science Society, July 2009.  
Plenary address, Cognitive Development Society, October 2009.  
Keynote address, Computational Cognitive Neuroscience Conference, November 2009.  
Convener and presenter, IdeasLab Session on “The Nature of Intelligence”, World Economic Forum, Davos, January 2010.  
Brandeis University, Department of Psychology Colloquium, February 2010.  
Brain Theory Seminar, Harvard University, March 2010.  
MIT Lincoln Labs Colloquium, March 2010.  
Cognitive Science Colloquium, University of Maryland, April 2010.  
Cognitive Science Seminar, The Johns Hopkins University, April 2010.  
Keynote speaker, Statistical and Relational Artificial Intelligence (StarAI) workshop, AAAI, July 2010.  
Invited public lecture, UCLA IPAM (Institute for Pure and Applied Mathematics) Tenth Anniversary Meeting, November 2010.  
Posner Lecture, Neural Information Processing Systems conference, December 2010.  
Distinguished Lecturer, Department of Computer Science, University of Toronto, February 2011.

### **Research Contracts and Grants:**

The Schlumberger Foundation, September 1999, \$30,000, “Manifold learning for nonlinear inverse problems.”  
Center for the Study of Language and Information, Stanford University, November 1999, \$12,500, “A Bayesian framework for example-driven database search.”  
MERL (Mitsubishi Electric Research Labs), January 2000, \$20,000, “Bayesian models of perception and cognition.”  
The Schlumberger Foundation, May 2000, \$30,000, “Manifold learning for nonlinear inverse problems” (continuation of previous award).  
DARPA/ONR, October 2000 – July 2002, \$137,613, “Human ID and the structure of perceptual face space.”  
NTT Communications Sciences Laboratory, April 2001-April 2002, \$115,000, “Theory and applications of Bayesian concept learning.”  
MERL (Mitsubishi Electric Research Labs), April 2001, \$10,000, “Bayesian models of perception and cognition”.  
NSF Focused Research Group, July 2001-July 2004, \$1,000,000, “Topological methods in data analysis”, with Gunnar Carlsson and Persi Diaconis.  
NTT Communications Sciences Laboratory, July 2002-December 2010, \$890,000 (approximate), “Learning semantic structure”.  
DARPA/SRI CALO Project, July 2004-February 2009, \$470,000, “Topic modeling and identification.”  
AFOSR MURI, June 2005-June 2008, \$4,600,000, “Computational modeling of adversary attitudes and behaviors: computational models for belief structures and intentions”, with Whitman Richards (PI) and eight other investigators across five institutions. MIT component, supporting Richards, Winston, Tenenbaum and several students and postdoctoral researchers, is \$840,000.  
James S. McDonnell Foundation Causal Learning Research Collaborative, September 2005-July 2010, \$225,000 (approximate), “Prior knowledge in causal learning and categorization.”  
DARPA BICA (Biologically Inspired Cognitive Architectures) Program, October 2005-May 2007. Support for Phase I study by CSAIL team, with Patrick Winston (PI) and several other investigators. Total support for Tenenbaum is \$75,000.  
Eli Lilly & Co., October 2006, \$50,000, “Finding structure in heterogenous scientific data”.  
ONR MURI, June 2007-June 2012, \$6,500,000, “Robust learning and skill transfer with video

games”, with Daphne Bavelier (PI) and six other investigators across six institutions. MIT component is approximately \$650,000 over five years.

AFOSR Cognition and Decision Program, December 2006-December 2009, \$225,000, “Theory-based Bayesian models of inductive inference”.

Google Research Award, December 2007, \$100,000, “Scalable Approximate Inference for Structured Probabilistic Models”.

ARL MURI, June 2008-July 2011, “A unified approach to abductive inference”, with Pedro Domingos (PI) and five other investigators across seven institutions. MIT component is approximately \$750,000 over five years.

ONR Cognitive Science Program, July 2009-July 2012, \$458,802, “A framework for core cognition”, with Noah Goodman as co-PI.

AFOSR Robust Decision Making program, September 2009-September 2012, \$600,000, “Rich causal models for robust decision making”, with Leslie Kaelbling and Michael Littman.

Shell, \$375,000, July 2009 – July 2012, “Manifold learning for muldi-attribute dynamic co-visualization”, with Alan Willsky.

Qualcomm, \$200,000, “A generative approach to visual scene understanding”, with Antonio Torralba.

IARPA ICARUS (Integrated Cognitive Architectures for Understanding Sensemaking; Award approved subject to contract negotiation). Joint with BBN and multiple MIT faculty. MIT component is approximately \$850,000/year, for 3-5 years.

ONR MURI, 2010-2015, “Knowledge Representation, Reasoning and Learning for Understanding Scenes and Events”, joint with multiple faculty at Stanford, Berkeley, MIT, Caltech, and USC (Song-Chun Zhu, PI).