Joshua T. Abbott

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joshabbott.github.io

Profile

Computational cognitive scientist with expertise in user/behavior modeling, Bayesian statistics, categorization, and language modeling. I use theory and large-scale experiments from psychological sciences to build better machine learning models for recommendation and computer vision systems that behave more like people do.

Programming Experience

Languages: Python, C/C++/C#, MATLAB
ML Tools: pytorch, tensorflow, scikit-learn, huggingface, spaCy, opencv, pandas
Misc: linux, git, latex, mysql, postgres, AWS/MTurk/php/html experiments

Education

2016 **Ph.D. in Cognitive Science**, *University of California, Berkeley*.
Dissertation: *Statistical models of learning and using semantic representations*
Advisor: Thomas L. Griffiths

2010 **M.Phil in Computer Science (CSTIT)**, *University of Cambridge*.
Thesis: *Relevance feedback and novelty detection under the Bayesian Sets framework*
Advisor: Zoubin Ghahramani

2009 **B.A. (Honors) in Computer Science**, *New College of Florida*.
Thesis: *Temporal sequence analysis of Bottlenose dolphin vocalizations*
Advisor: Heidi H. Harley

Research Experience

2022–current **Research Scientist**, *University of California, Berkeley*.
Language and Cognition Lab, PI: Terry Regier

2018–2021 **Postdoctoral Fellow**, *University of Melbourne*.
Complex Human Data Hub, PI: Charles Kemp

2017–2018 **Postdoctoral Fellow**, *Max Planck Institute for Human Development*.
Center for Adaptive Rationality, PI: Tim Pleskac

2010–2016 **Graduate Student Researcher**, *University of California, Berkeley*.
Computational Cognitive Science Lab, PI: Tom Griffiths
Language and Cognition Lab, PI: Terry Regier
Berkeley Artificial Intelligence Research (BAIR) Lab

2014 **Visiting Scholar**, *Brown University*.
Computational Cognitive Science Lab, PI: Joe Austerweil

2011 **Graduate Summer School**, *University of California, Los Angeles*.
Institute for Pure and Applied Mathematics (IPAM)
Probabilistic Models of Cognition: The Mathematics of Mind

2010 **Graduate Summer School**, *Sardinia, Italy*.
Machine Learning Summer School (MLSS)
Cognitive Science and Machine Learning

2009 **Research Assistant**, *Massachusetts Institute of Technology*.
Operations Research, PI: James Orlin

Journal Articles

- D.D. Bourgin, **J.T. Abbott**, and T.L. Griffiths. (2021). Recommendation as generalization: Using big data to evaluate cognitive models. *Journal of Experimental Psychology: General*. 150(7), 1398-1409.
- J.C. Peterson, **J.T. Abbott**, and T.L. Griffiths. (2018). Evaluating (and improving) the correspondence between deep neural networks and human representations. *Cognitive Science*. 42(8), 2648-2669.
- A.E. Skelton, G. Catchpole, **J.T. Abbott**, J.M. Bosten, and A. Franklin. (2017). Biological origins of color categorization. *Proceedings of the National Academy of Sciences*. 114(21), 5545-5550.
- **J.T. Abbott**, T.L. Griffiths, and T. Regier. (2016). Focal colors across languages are representative members of color categories. *Proceedings of the National Academy of Sciences*. 113(40), 11178-11183.
- T.L. Griffiths, **J.T. Abbott**, and A.S. Hsu. (2016). Exploring human cognition using large image databases. *Topics in Cognitive Science*. 8(3), 569-588.
- **J.T. Abbott**, J.L. Austerweil, and T.L. Griffiths. (2015). Random walks on semantic networks can resemble optimal foraging. *Psychological Review*. 122(3), 558-569.

Peer-reviewed Conference Proceedings

- **J.T. Abbott** and C. Kemp. (2020). Birds and Words: Exploring environmental influences on folk categorization. In *Proceedings of the 42nd Annual Conference of the Cognitive Science Society*.
- D.D. Bourgin, **J.T. Abbott**, and T.L. Griffiths. (2018). Recommendation as Generalization: Evaluating Cognitive Models In the Wild. In *Proceedings of the 40th Annual Conference of the Cognitive Science Society*.
- J.C. Peterson, **J.T. Abbott**, and T.L. Griffiths. (2017). Adapting deep network features to capture psychological representations: An abridged report. In *Proceedings of the 26th International Joint Conference on Artificial Intelligence*.
- J.C. Peterson, **J.T. Abbott**, and T.L. Griffiths. (2016). Adapting deep network features to capture psychological representations. In *Proceedings of the 38th Annual Conference of the Cognitive Science Society*. (Computational Modeling Prize in Perception and Action).
- D.D. Bourgin, **J.T. Abbott**, K.A. Smith, E. Vul, and T.L. Griffiths. (2014). Empirical evidence for Markov chain Monte Carlo in memory search. In *Proceedings of the 36th Annual Conference of the Cognitive Science Society*.
- Y. Jia, **J.T. Abbott**, J.L. Austerweil, T.L. Griffiths and T. Darrell. (2013). Visual concept learning: combining machine vision and Bayesian generalization on concept hierarchies. In *Advances in Neural Information Processing Systems 26*.
- **J.T. Abbott**, J.B. Hamrick, and T.L. Griffiths. (2013). Approximating Bayesian inference with a sparse distributed memory system. In *Proceedings of the 35th Annual Conference of the Cognitive Science Society*.
- **J.T. Abbott**, J.L. Austerweil, and T.L. Griffiths. (2012). Human memory search as a random walk in a semantic network. In *Advances in Neural Information Processing Systems 25*. (Spotlight Presentation).
- **J.T. Abbott**, T. Regier, and T.L. Griffiths. (2012). Predicting focal colors with a rational model of representativeness. In *Proceedings of the 34th Annual Conference of the Cognitive Science Society*.
- **J.T. Abbott**, J.L. Austerweil, and T.L. Griffiths. (2012). Constructing a hypothesis space from the Web for large-scale Bayesian word learning. In *Proceedings of the 34th Annual Conference of the Cognitive Science Society*.
- **J.T. Abbott**, K.A. Heller, Z. Ghahramani, and T.L. Griffiths. (2011). Testing a Bayesian measure of representativeness using a large image database. In *Advances in Neural Information Processing Systems 24*.
- **J.T. Abbott** and T.L. Griffiths. (2011). Exploring the influence of particle filter parameters on order effects in causal learning. In *Proceedings of the 33rd Annual Conference of the Cognitive Science Society*.
- **J.T. Abbott**. (2009). Generalizations on counting binary strings. In *Congressus Numerantium*, Vol. 198.
- **J.T. Abbott** and T. McGuire. (2008). Using graphs and games to generate cap set bounds. In *Congressus Numerantium*, Vol. 189.
- **J.T. Abbott**, P.Z. Chinn, T.J. Evans, and A.J. Stewart. (2007). Graph adjacency matrix automata. In *Congressus Numerantium* Vol. 188.

Workshop Proceedings and Technical Reports

- D.D. Bourgin, **J.T. Abbott**, and T.L. Griffiths. (2017). Towards More Human-Like Recommendations. In *Proceedings of the NIPS 2017 Workshop on Cognitively Informed Artificial Intelligence: Insights from Natural Intelligence*. (Spotlight Presentation).
- E. Grant, J.C. Peterson, **J.T. Abbott**, S. Levine, T.L. Griffiths, and T. Darrell. (2017). Concept acquisition via meta-learning: Few-shot learning from positive examples. In *Proceedings of the NIPS 2017 Workshop on Cognitively Informed Artificial Intelligence: Insights from Natural Intelligence*.
- J.C. Peterson, **J.T. Abbott**, and T.L. Griffiths. (2016). Adapting deep network features to capture psychological representations. 15th Neural Computation and Psychology Workshop. 38th Annual Conference of the Cognitive Science Society.
- Y. Jia, **J.T. Abbott**, J.L. Austerweil, T.L. Griffiths and T. Darrell. (2012). Visually-grounded Bayesian word learning. Technical Report UCB/EECS-2012-202. EECS Department, University of California, Berkeley.

Teaching Experience

Fall 2019 **Co-Lecturer**, *Department of Psychological Sciences, University of Melbourne.*
CAPSTONE Seminar: Variation in word meanings across cultures

Spring 2016 **Guest Lecturer**, *Department of Cognitive Science, UC Berkeley.*
Data Science and the Mind

Fall 2015 **Guest Lecturer**, *Department of Cognitive Science, UC Berkeley.*
Data Science and Cognition

Spring 2014 **Acting Graduate Instructor of Record**, *Department of Cognitive Science, UC Berkeley.*
Computational Models of Cognition

Spring 2013 **Head Graduate Student Instructor**, *Department of Psychology, UC Berkeley.*
Computational Models of Cognition

Spring 2011 **Graduate Student Instructor**, *Department of Cognitive Science, UC Berkeley.*
Computational Models of Cognition

Fall 2008 **Teaching Assistant**, *Department of Natural Sciences, New College of Florida.*
Calculus I

Spring 2008 **Teaching Assistant**, *Department of Natural Sciences, New College of Florida.*
Linear Algebra

Fall 2007 **Teaching Assistant**, *Department of Natural Sciences, New College of Florida.*
Calculus I

Awards and Honors

2016 Cognitive Science Society Computational Modeling Prize in Perception and Action

2015 UC Berkeley Rosenzweig Departmental Fellowship

2012 Neural Information Processing Systems Conference Travel Award

2012 UC Berkeley Institute of Cognitive and Brain Sciences Research Grant

2011 Neural Information Processing Systems Conference Travel Award

2011 National Science Foundation Graduate Research Fellowship. *Honorable Mention*

2008 Barry M. Goldwater Scholarship

References

- Tom Griffiths
  Professor of Psychology and Computer Science
  Princeton University
  tomg@princeton.edu

- Terry Regier
  Professor of Linguistics and Cognitive Science
  University of California, Berkeley
  terry.regier@berkeley.edu

- Charles Kemp
  Associate Professor of Psychological Sciences
  University of Melbourne
  c.kemp@unimelb.edu.au