

# Jonathan H. Huggins

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## CONTACT INFORMATION

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🌐 [jhhuggins.org](http://jhhuggins.org)

## RESEARCH INTERESTS

large-scale learning, inference algorithms for rich model classes (e.g., Bayesian nonparametric models, probabilistic program), interface between learning and inference.

## EDUCATION

**Massachusetts Institute of Technology**, Cambridge, MA USA

Ph.D., Computer Science, June 2018

- Dissertation topic: Scaling Bayesian Inference: Theoretical Foundations and Practical Methods
- Advisor: Tamara Broderick

S.M., Computer Science, June 2014 (GPA: 5.00)

- Advisor: Joshua B. Tenenbaum
- Selected coursework: Advanced Algorithms, Probability Theory, Inference and Information Theory

**Columbia University, Columbia College**, New York, NY USA

B.A., Mathematics, May 2012 (GPA: 4.04)

- Research Advisors: Liam Paninski and Frank D. Wood
- Selected coursework: Machine Learning, Computational Learning Theory, Probability Theory, Real Analysis, Graph Theory

## GRANTS, HONORS, AND AWARDS

ISBA@NIPS travel award (2016)

DoD National Defense Science and Engineering Graduate Fellowship (2013-2015)

NSF Graduate Research Fellowship (2013) (*declined for DoD NDSEG*)

Hertz Fellowship Finalist (2013)

Summa Cum Laude, Columbia University (2012)

Phi Beta Kappa (2011)

Rabi Scholar, Columbia College (2008-2012)

Intel Science Talent Search Finalist (2008)

## ACADEMIC EXPERIENCE

**Harvard University**, Cambridge MA USA

*Postdoctoral Research Fellow*

*Department of Biostatistics, T.H. Chan School of Public Health*

**March 2018 - present**

**Massachusetts Institute of Technology**, Cambridge, MA USA

*Graduate Student*

*Department of EECS and Computer Science and Artificial Intelligence Laboratory*

**September 2012 - February 2018**

*Teaching Assistant*

Held office hours, conducted recitation sessions, graded homework, and advised students on class projects for graduate-level machine learning courses (6.862 and 6.867).

**September 2016 - May 2017**

**Microsoft Research New England**, Cambridge, MA USA

*Research Intern*

Research topic: Random feature Stein discrepancies (advisor: Lester Mackey).

**June 2017 - August 2017**

**Columbia University, Columbia College**, New York, NY USA

*Undergraduate Researcher*

**June 2011 - May 2012**

Conducted independent research in statistics for neuroscience (advisor: Liam Paninski) and Bayesian nonparametric modeling (advisor: Frank Wood).

*Teaching Assistant*

**June 2011 - May 2012**

Duties included office hours and grading of homework for introductory statistics and data structures courses.

PREPRINTS

- J. H. Huggins\* & L. Mackey\*. Random feature Stein discrepancies. *Under review*. [pdf]
- J. H. Huggins, T. C. Campbell, M. Kasprzak & T. Broderick. Scalable Gaussian process inference with finite-data mean and variance guarantees. *Under review*. [pdf]
- R. Agrawal, T. C. Campbell, J. H. Huggins & T. Broderick. Data-dependent compression of random features for large-scale kernel approximation. *Under review*.

PUBLICATIONS

13. T. C. Campbell\*, J. H. Huggins\*, J. P. How & T. Broderick (To appear). Truncated Random Measures. *Bernoulli*. [pdf]
12. J. H. Huggins\* & D. M. Roy\* (To appear). Sequential Monte Carlo as approximate sampling: bounds, adaptive resampling via  $\infty$ -ESS, and an application to particle Gibbs. *Bernoulli*. [pdf]
11. J. H. Huggins, R. P. Adams & T. Broderick (2017). PASS-GLM: polynomial approximate sufficient statistics for scalable Bayesian GLM inference. In *Proc. of Advances in Neural Information Processing Systems*. [pdf]  
▷ Selected for spotlight presentation (top 22% of accepted papers)
10. J. H. Huggins\* & J. Zou\* (2017). Quantifying the Accuracy of Approximate Diffusions and Markov Chains. In *Proc. of the 19th International Conference on Artificial Intelligence and Statistics*. [pdf]
9. J. H. Huggins, T. C. Campbell & T. Broderick (2016). Coresets for Scalable Bayesian Logistic Regression. In *Proc. of Advances in Neural Information Processing Systems*. [pdf]
8. J. H. Huggins & J. B. Tenenbaum (2015). Risk and Regret of Hierarchical Bayesian Learners. In *Proc. of the 32nd International Conference on Machine Learning*. [pdf]
7. J. H. Huggins\*, A. Saeedi\*, K. Narasimhan\* & V. K. Mansinghka (2015). JUMP-Means: Small-Variance Asymptotics for Markov Jump Processes. In *Proc. of the 32nd International Conference on Machine Learning*. [pdf]
6. J. H. Huggins & C. Rudin (2014). A statistical learning theory framework for supervised pattern discovery. In *Proc. of SIAM International Conference on Data Mining*. [pdf]
5. A. Pakman, J. H. Huggins, C. Smith & L. Paninski (2014). Fast state-space methods for inferring dendritic synaptic connectivity. *Journal of Computational Neuroscience* 36(3), 415-443. [pdf]
4. E. Pnevmatikakis, K. Rahnema Rad, J. H. Huggins & L. Paninski (2014). Fast low-SNR Kalman filtering and forward-backward smoothing via a low-rank perturbative approach. *Journal of Computational and Graphical Statistics* 23(2), 316-339. [pdf]

3. J. H. Huggins & L. Paninski (2012). Optimal experimental design for sampling voltage on dendritic trees in the low-SNR regime. *Journal of Computational Neuroscience* 32(2), 347-66. [pdf]
2. M. Vilain, J. H. Huggins & B. Wellner (2009). Sources of performance in CRF transfer training: a business name-tagging case study. In *Proc. of Recent Advances in Natural Language Processing 2009*. [pdf]
1. M. Vilain, J. H. Huggins & B. Wellner (2009). A simple feature-copying approach to long-distance dependencies. In *Proc. of the 13th Conference on Computational Natural Language Learning 2009*. [pdf]

★ = contributed equally

UNPUBLISHED  
WORK

2. J. H. Huggins, A. Saeedi & M. J. Johnson (2014). Detailed Derivations of Small-variance Asymptotics for some Hierarchical Bayesian Nonparametric Models. *arXiv:1501.00052 [stat.ML]*. [pdf]
1. J. H. Huggins & F. Wood (2014). Infinite structured hidden semi-Markov models. *arXiv:1407.0044 [stat.ME]*. [pdf]

TALKS

**Upcoming**

ISBA World Meeting (contributed session) June 2018  
*Scaling Bayesian inference using exponential family approximations*

**Previous**

SPA 2018 June 2018  
*Finite-dimensional Approximations of Completely Random Measures*

Boston Bayesian Meetup April 2018  
*Scaling Bayesian Inference by Constructing Approximating Exponential Families*

Schlumberger Doll Research April 2018  
*Scaling Bayesian Inference by Constructing Approximating Exponential Families*

Raytheon BBN Technologies February 2018  
*Scaling Bayesian Inference: Theoretical Foundations and Practical Methods*

BNP 2017 (contributed talk) June 2017  
*Truncated Random Measures*

PROFESSIONAL  
SERVICE

Journal Reviewer:  

- PLoS One
- Journal of Machine Learning Research

Conference Reviewer:  

- Advances in Neural Information Processing Systems, 2011-present
- International Conference on Machine Learning, 2015-present
- Artificial Intelligence and Statistics, 2016-present

PROFESSIONAL  
EXPERIENCE

**Google Inc.**, New York, NY USA **May 2012 - August, 2012**  
*Summer Engineering Intern*  
 Developed, created, and deployed a language-model based “gibberish detector” for identifying short

text sequences as nonsensical.

**MITRE Corp.**, Bedford, MA USA

*Technical Co-op*

**May 2007 - August 2009**

Worked with multiple teams on natural language processing problems such as co-reference finding, action recognition in free text, and named entity recognition. Projects were implemented in OCaml, Python, and Perl and used techniques such as integer linear programming and conditional random fields.