Jonathan H. Huggins

Contact Information

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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. Student, Computer Science, September 2012 - present

- 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

Massachusetts Institute of Technology, Cambridge, MA USA

Graduate Student **September 2012 - present**

Teaching Assistant **September 2016 - present**
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).

Microsoft Research New England, Cambridge, MA USA

Research Intern **June 2017 - August 2017**
Research topic: Fast kernel discrepancy measures with finite-sample guarantees (advisor: Lester Mackey).

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.

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 ∞-ESS, and an application to Particle Gibbs. *Bernoulli*. [pdf]

11. J. H. Huggins, Ryan 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]
$\triangleright$ Selected for spotlight presentation (top 22% of accepted papers)

10. J. H. Huggins* & James 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. Rahnama 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]

$\star$ = contributed equally

Technical Reports

2. J. H. Huggins, A. Saeedi & M. J. Johnson (2014). Detailed Derivations of Small-variance Asymp-

totics 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]

Professional Service

Journal Reviewer:
- PLoS One

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

Summer Engineering Intern **May, 2012 - August, 2012**

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.