Joseph Futoma

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EDUCATION

Duke University, Durham, NC

- *Expected* Ph.D. in Statistical Science — Aug 2013 – May 2018
  - Advisor: Katherine Heller, Ph.D.
  - Focus: Bayesian statistics, machine learning, healthcare applications, data analysis of electronic health records.
- M.S. in Statistical Science — Aug 2013 – May 2016
  - GPA: 3.93 / 4.00
  - Coursework: Linear Models, Probability & Measure Theory, Bayesian & Modern Statistics, Advanced Machine Learning, Statistical Inference, Statistical Case Studies, Probability & Statistical Models, Spatial Statistics

Dartmouth College, Hanover, NH

- A.B. with High Honors in Mathematics — Sep 2010 – Jun 2013
  - Advisor: Daniel Rockmore, Ph.D.
  - *Summa Cum Laude*
  - GPA: 3.94 / 4.00 (3.96 in major)
  - Coursework: Abstract Algebra, {Real, Complex, Numerical} Analysis, Chaos, Probability, Quantum Mechanics, Networks, Topology, Measure Theory, Machine Learning, Mathematical Statistics, Intro to Applied Math

RESEARCH INTERESTS

Bayesian methods, big data, machine learning, data science, Bayesian deep learning, scalable inference, healthcare, electronic health records, implementation & deployment of machine learning for healthcare.

RESEARCH EXPERIENCE

Dept. of Statistical Science, Duke University

- NDSEG Research Fellow — Sep 2015 – Present
- Statistical & Applied Mathematical Sciences Inst. (SAMSI) Research Fellow — Aug 2014 – May 2015
  - Mentor: David Dunson, Ph.D.
  - Focus: Analysis of high-dimensional biological data from exercise physiology studies.
- First Year Statistical Science Research Fellow — Aug 2013 – May 2014

Dept. of Mathematics, Dartmouth College

- Presidential Scholar Research Assistant, — May 2012 – Aug 2013
  - Focus: Time-varying topic models, scalable network analysis.
  - Advisor: Daniel Rockmore, Ph.D.

WORK EXPERIENCE

Quintiles Transnational, Predictive Analytics

- Biostatistician Intern — Jun 2014 – Sep 2014
  - Project: Develop statistical models to predict site adherence for risk-based monitoring of clinical trials.
  - Supervisors: Joseph Lucas, Ph.D. and Valerii Fedorov, Ph.D.

Amazon.com, Inc, Prime Music, Personalization

- Research Intern — May 2015 – Aug 2015
  - Project: Fit large-scale regressions with Apache Spark to solve the source appraisal problem in music recommendation. In online A/B testing, proposed algorithm increased overall music consumption by 1.2%.
  - Supervisor: Charles Thompson

Statistical Consulting — Jan 2017 – Present

- International Farming Corporation.
- Lab of Cynthia Toth, MD at Duke University: Predict disease progression in macular degeneration.

HONORS & AWARDS

- **National Defense Science and Engineering Graduate (NDSEG) Fellowship** — 2015
- Winner, LinkedIn Economic Graph Challenge — 2015
- 2x Honorable Mention, NSF Graduate Research Fellowship Program — 2014, 2015
- First Year Statistical Science Research Fellowship, Duke University — 2013 – 2014
- Notable Paper Award (top 2.6% of submissions), AISTATS 2013 — 2013
- Rufus Choate Scholar (GPA in top 5% of class), Dartmouth College — 2010 – 2013

PUBLICATIONS

REFEREED JOURNAL PAPERS

[1] **J. Futoma**, J. Morris, and J. Lucas. "A Comparison of Models for Predicting Early Hospital Readmissions," *Journal of Biomedical Informatics*, vol. 56, pp. 229–238, Aug 2015.

REFEREED CONFERENCE PAPERS

[1] **J. Futoma**, S. Hariharan, M. Sendak, N. Brajer, M. Clement, A. Bedoya, C. O'Brien, and K. Heller. "An Improved Multi-Output Gaussian Process RNN with Real-Time Validation for Early Sepsis Detection," in *Proceedings of the 2nd Machine Learning for Healthcare Conference (MLHC)*, Boston, MA, Aug 2017.

[2] **J. Futoma**, S. Hariharan, and K. Heller. "Learning to Detect Sepsis with a Multitask Gaussian Process RNN Classifier," in *Proceedings of the 34th International Conference on Machine Learning (ICML)*, Sydney, Australia, Aug 2017.

[3] **J. Futoma**, M. Sendak, C. B. Cameron, and K. Heller. "Predicting Disease Progression with a Model for Multivariate Longitudinal Clinical Data," in *Proceedings of the 1st Machine Learning for Healthcare Conference (MLHC)*, Los Angeles, CA, Aug 2016.

[4] **J. Futoma**, M. Sendak, C. B. Cameron, and K. Heller. "Scalable Joint Modeling of Longitudinal and Point Process Data for Disease Trajectory Prediction and Improving Management of Chronic Kidney Disease," in *Proceedings of the 32nd Conference on Uncertainty in Artificial Intelligence (UAI)*, New York City, NY, Jun 2016.

[5] N. Foti, **J. Futoma**, D. Rockmore, and S. Williamson. "A Unifying Representation for a Class of Dependent Random Measures," in *Proceedings of the 16th Conference on Artificial Intelligence and Statistics (AISTATS)*, Scottsdale, AZ, May 2013.

REFEREED WORKSHOP PAPERS

[1] **J. Futoma** and J. Lucas. "Predicting Early Hospital Readmissions using Electronic Health Records," in *NIPS 2014 Workshop on Machine Learning for Clinical Data, Healthcare and Genomics*, Montreal, Canada, Dec 2014.

OTHER PAPERS

[1] **J. Futoma**. "Scalable Inference Algorithms for Clustering Large Networks," *Dartmouth College Senior Thesis*, Jun 2013.

PAPERS IN PREPARATION

[1] Z. Sun, O. Huang, E. Lorenzi, B. Chang, M. Turner, **J. Futoma**, T. Li, K. Heller, C. Mantyh, and E. Huang. "Validation and Implementation of Wide and Deep Learning for Surgical Risk Prediction At the Point-Of-Care".

PRESENTATIONS & TALKS

- Spotlight Presentation, MLHC 2017. Aug 2017
- Oral Presentation, ICML 2017. Aug 2017
- Oral Presentation, INFORMS Healthcare 2017. Jul 2017
- Spotlight Presentation, MLHC 2016. Aug 2016
- Invited Talk, UAI 2016 Workshop on Bayesian Applications. Jun 2016
- Poster Presentation, UAI 2016. Jun 2016
- Oral Presentation, Bayesian Young Statisticians Meeting. Jun 2016
- Poster Presentation, ISBA 2016 World Meeting. Jun 2016
- Poster Presentation, Society of General Internal Medicine. May 2016
  - M. Sendak, C. B. Cameron, E. Komives, **J. Futoma**, E. Huang, K. Heller, D. Sangvai; L. E. Boulware, and U.D.Patel. "Developing a Data-Driven Workflow for Population Health Rounding".
- Oral Presentation & Contributed 1 page paper, NIH-IEEE 2015 Strategic Conference on Healthcare Innovations and Point-of-Care Technologies for Precision Medicine. Oct 2015
  - Z. Sun, **J. Futoma**, M. Sendak, E. Lorenzi, S. Brown, O. Huang, K. Heller, J. Thacker, C. Mantyh, and E. Huang. "Precision Medicine in Point-Of-Care Management of Surgical Complications."
- Invited Talk, Applied and Computational Mathematics Seminar Series, Dartmouth College. Apr 2013

PROFESSIONAL SERVICE

Peer Reviewer 2015 – Present

- ICML 2017, MLHC {2016,2017}, IEEE TPAMI, AMIA 2015

SKILLS

Python (TensorFlow, PyTorch), MATLAB, R, BUGS/JAGS, Apache Spark, Scala, Julia, UNIX/Linux shell scripting, HTML/CSS, LaTeX, Mathematica, Microsoft Office.

REFERENCES

- **Katherine Heller, Ph.D.**
  Assistant Professor, Duke: Dept. of Statistical Science, Center for Cognitive Neuroscience
  kheller@gmail.com
- **David Dunson, Ph.D.**
  Arts & Sciences Distinguished Professor, Duke: Depts. of Statistical Science, Math, ECE
  dunson@duke.edu
- **Joseph Lucas, Ph.D.**
  Associate Research Professor, Duke: Social Science Research Institute, Duke Clinical Research Institute
  joseph.lucas@duke.edu
- **Suresh Balu, MBA**
  Program Director: Duke Institute for Health Innovation.
  suresh.balu@duke.edu

[*CV compiled on 2017-08-29*]