Melissa Jay Smith

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EDUCATION

PhD, Biostatistics, University of Iowa   2018 — 2022

- *Dissertation: Bayesian methods for estimation and mediation in disease mapping applications*
- *Advisor: Jacob J. Oleson*
- *GPA: 4.06/4.00*

MS, Biostatistics, University of Iowa   2018 — 2019
PhD Student, Biostatistics, Harvard University   2017 — 2018
BA, Mathematics, Colorado College   2012 — 2016

- *Honors: Distinction in Mathematics, cum laude*

EMPLOYMENT

Assistant Professor   2022 — Present
  Department of Biostatistics, University of Alabama at Birmingham
NSF Graduate Research Fellow   2017 — 2022
  Department of Biostatistics, University of Iowa
  Department of Biostatistics, Harvard University
Graduate Research Assistant   2019 — 2020
  Department of Biostatistics, University of Iowa
Graduate Student Trainee   2017 — 2018
  Department of Biostatistics, Harvard University
Junior Statistician & Technical Writing Lead   2015 — 2017
  Dascena

HONORS AND AWARDS

- Milford E. Barnes Award *(for outstanding achievement in Biostatistics)*, University of Iowa College of Public Health, 2022.
- Featured Researcher in the Dare to Discover Campaign, University of Iowa Office of the Vice President for Research, 2022.
- Leon F. Burmeister Graduate Student Service Award, Department of Biostatistics, University of Iowa, 2021.
- Lester R. Curtin Award, American Statistical Association, 2020.
- Inducted into Delta Omega Honorary Society in Public Health, College of Public Health, University of Iowa, 2020.
- Advancing Graduate Student Success Award, College of Public Health, University of Iowa, 2020.
- NSF Graduate Research Fellowship, National Science Foundation, 2017.
- Florian Cajori Award, Department of Mathematics & Computer Science, Colorado College, 2016.
- Sophie Germain Award, Department of Mathematics & Computer Science, Colorado College, 2016.
- Outstanding Winner in the Mathematical Contest in Modeling *(top 10 out of 7,636 paper submissions)*, Consortium for Mathematics and its Applications, 2015.

- INFORMS Prize *(awarded for our 2015 Mathematical Contest in Modeling paper)*, Institute for Operations Research and the Management Sciences, 2015.
- Colorado Mathematics Award *(for the top-performing Colorado teams in the Mathematical Contest in Modeling)*, Colorado Mathematics Awards Committee, 2015.
- Barry M. Goldwater Scholar, Barry Goldwater Scholarship and Excellence in Education Program, 2015.
- Euclid Scholarship, Colorado College Department of Mathematics & Computer Science, 2014.
- Finalist Winner in the Mathematical Contest in Modeling *(top 21 out of 6,755 paper submissions)*, Consortium for Mathematics and its Applications, 2014.
- Colorado Mathematics Award *(for the top-performing Colorado teams in the Mathematical Contest in Modeling)*, 2014.
- SIAM Student Chapter Certificate of Recognition, Society for Industrial and Applied Mathematics, 2014.
- Sharon Credit Union Scholarship, Sharon Credit Union, 2012.

Other award nominations:

- Nominated for the Hancher-Finkbine Medallion *(recognizes individuals who exemplify learning, leadership, and loyalty)*, University of Iowa, 2021 & 2022.

PUBLICATIONS

Peer reviewed:

1. **Jay M**, Oleson J, Charlton M, Arab A. A Bayesian approach for estimating age-adjusted rates for low-prevalence diseases over space and time. *Statistics in Medicine*. 2021;40(12):2922-2938.

2. Sewell DK, Penney J, **Jay M**, Zhang Y, Paulsen JS. Predicting an optimal composite outcome variable for Huntington's disease clinical trials. *Journal of Applied Statistics*. 2021;48(7):1339-1348.

3. **Jay M**, Betensky RA. Displaying survival of patient groups defined by covariate paths: Extensions of the Kaplan-Meier estimator. *Statistics in Medicine*. 2021;40(8):2024-2036.

4. Mao Q, **Jay M**, Hoffman JL, Calvert J, Barton C, Shimabukuro D, Shieh L, Chettipally U, Fletcher G, Kerem Y, Zhou Y, Das R. Multicentre validation of a sepsis prediction algorithm using only vital sign data in the emergency department, general ward and ICU. *BMJ Open*. 2018;8:e017833.

5. Desautels T, Calvert J, Hoffman J, Mao Q, **Jay M**, Fletcher G, Barton C, Chettipally UK, Kerem Y, Das R. Using transfer learning for improved mortality prediction in a data-scarce hospital setting. *Biomedical Informatics Insights*. 2017;9:1-8.

6. Calvert J, Hoffman J, Barton C, Shimabukuro D, Ries M, Chettipally U, Kerem Y, **Jay M**, Mataraso S, Das R. Cost and mortality impact of an algorithm-driven sepsis prediction system. *Journal of Medical Economics*. 2017;20(6):646-651.

7. Desautels T, Calvert J, Hoffman J, **Jay M**, Kerem Y, Shieh L, Shimabukuro D, Chettipally U, Feldman MD, Barton C, Wales DJ, Das R. Prediction of sepsis in the Intensive Care Unit with minimal electronic health record data: a machine learning approach. *JMIR Medical Informatics*. 2016;4.3:e28.

8. Calvert J, Mao Q, Hoffman J, **Jay M**, Desautels T, Mohamadlou H, Chettipally U, Das R. Using electronic health record collected clinical variables to predict medical intensive care unit mortality. *Annals of Medicine and Surgery*. 2016;11:52-57.

9. Calvert J, Desautels T, Chettipally U, Barton C, Hoffman J, **Jay M**, Mao Q, Mohamadlou H, Das R. High-performance detection and early prediction of septic shock for alcohol-use disorder patients. *Annals of Medicine and Surgery*. 2016;8:50-55.

10. Calvert J, Mao Q, Rogers AJ, Barton C, **Jay M**, Desautels T, Mohamadlou H, Jan J, Das R. A computational approach to mortality prediction of alcohol use disorder inpatients. *Computers in Biology and Medicine*. 2016;75:74-79.

11. Calvert JS, Price DA, Chettipally U, Barton CW, Feldman MD, Hoffman JL, **Jay M**, Das R. A computational approach to early sepsis detection. *Computers in Biology and Medicine*. 2016;74:69-73.

12. **Jay M***, Karapakula VG*, Krakoff E*. Determining the top all-time college coaches through Markov chain-based rank aggregation. *SIAM Undergraduate Research Online*. 2015;8:12-27.

Non-peer reviewed:

1. **Jay M***, Mankovich N*, Campbell E*. Searching for a lost plane: a neighborhood-based probabilistic model. *UMAP Journal*. 2015;36.3:149-168.

Submitted:

1. **Smith MJ**, Charlton ME, Oleson JJ. Bayesian mediation analysis with areal health outcome data: a counterfactual-based approach. Submitted to *Statistical Modelling*.

2. **Smith MJ**, Charlton ME, Oleson JJ. Causal decomposition maps: an exploratory tool for designing area-level interventions aimed at reducing health disparities. Submitted to *Biometrical Journal*.

Indicates equal contributions from all authors

PRESENTATIONS

Invited presentations:

- A Bayesian method for mediation analyses with areal health outcome data. New England Statistics Society (NESS) Symposium. Storrs, CT and virtual. 2022.
- Bayesian methods for estimation and mediation in disease mapping applications. University of Alabama at Birmingham Department of Biostatistics Seminar. Birmingham, AL. 2021.
- Bayesian methods for estimation and mediation in disease mapping applications. University of Florida Department of Biostatistics Seminar. Virtual seminar. 2021.
- Bayesian methods for estimation and mediation in disease mapping applications. University of Utah Statistics and Epidemiology Seminar. Virtual seminar. 2021.
- A Bayesian approach for estimating age-adjusted rates for low-prevalence diseases over space and time. Western North American Region International Biometric Society Annual Meeting. Virtual conference. 2021.
- Understanding "how" in a study of cause and effect: An introduction to mediation analysis in epidemiology. University of Iowa INFORMS Student Chapter Knowledge Cafe. Virtual presentation. 2020.

Contributed presentations:

- A Bayesian method for mediation analyses with areal health outcome data. Women in Statistics and Data Science Conference. St. Louis, MO. 2022.
- Modeling age-adjusted rates from spatio-temporal data sets with excess zero counts. Conference on Statistical Practice. Virtual meeting. 2021.
- Displaying survival of patient groups defined by covariate paths: Extensions of the Kaplan-Meier estimator. Eastern North American Region International Biometric Society Spring Meeting. Virtual meeting. 2020.
- Estimating lung cancer mortality rates in U.S. counties using Bayesian spatial models. Midwest Rural Agricultural Safety and Health Conference. Marshalltown, IA. 2019.

- Creating small-area cancer risk estimates to promote cancer control activities in rural areas. Women in Statistics and Data Science Conference. Bellevue, WA. 2019.
- A probabilistic, neighborhood-based model for locating lost transoceanic flights. Gulf Coast Undergraduate Research Symposium. Houston, TX. 2015.
- Determining the top all-time college coaches through Markov chain-based rank aggregation. Front Range Applied Mathematics Student Conference. Denver, CO. 2015.
- Speech intelligibility index model: A key aspect to a child's development of speech and language. Nebraska Conference for Undergraduate Women in Mathematics. Lincoln, NE. 2015.

Other presentations:

- Goldwater Scholar Community NSF GRFP webinar (panelist). Virtual panel. 2021.
- Colorado College SIAM Student Chapter graduate school panel (panelist). Virtual panel. 2020.
- Modeling age-adjusted rates from spatio-temporal data sets with excess zero counts. University of Iowa Biostatistics Student Organization Student Seminar. Virtual presentation. 2020.
- Estimating lung cancer mortality rates in U.S. counties using Bayesian hierarchical Poisson regression models. University of Iowa Department of Biostatistics Seminar. Iowa City, IA. 2019.
- Opportunities in biostatistics. Colorado College SIAM Student Chapter. Virtual presentation. 2019.
- Goldwater Scholarship graduate school webinar (panelist). Virtual panel. 2018.
- Displaying survival of groups defined by covariate paths. Harvard University Cancer Working Group. Boston, MA. 2018.
- Use of time-varying covariates in Kaplan-Meier estimators. Harvard University Cancer Working Group. Boston, MA. 2017.
- Predicting student drop-out in massive open online courses. Hong Kong University of Science and Technology RIPS Research Symposium. Clear Water Bay, Hong Kong. 2016.
- Predicting student drop-out in massive open online courses. University of Macau Math Department Presentations. Taipa, Macau. 2016.
- Priority queueing models for kidney transplant allocation. Colorado College Capstone Presentations. Colorado Springs, CO. 2016.
- Searching for a lost plane: a probabilistic, neighborhood-based model for locating lost transoceanic flights. Colorado College Mathematics and Computer Science Poster Session. Colorado Springs, CO. 2015.
- Speech intelligibility index model: A key aspect to a child's development of speech and language. Colorado College Mathematics and Computer Science Poster Session. Colorado Springs, CO. 2014.
- Speech intelligibility index model: A key aspect to a child's development of speech and language. University of Iowa ISIB Research Symposium. Iowa City, IA. 2014.

Podcast episodes:

- Using statistics to understand cancer. Goldwater Scholar Highlights Podcast. 2019.

Teaching

University of Iowa:

- BIOS: 4110 General Biostatistics, Iowa Summer Institute in Biostatistics
    Role: Lab Instructor, Terms: Su19, Su21
- BIOS: 4110 General Biostatistics, Iowa Summer Institute in Biostatistics
    Role: Guest Lecturer, Terms: Su19, Su21

- STAT: 5101 Statistical Inference II
  Role: Tutor, Term: S21

<u>Colorado College:</u>

- MA: 217 Probability and Statistical Modeling
  Role: Learning Assistant, Terms: F14, S15
- MA: 117 Probability and Statistics
  Role: Learning Assistant, Terms: F15

ADVISING

<u>Dissertation committees:</u>

- Andrew Sims, Department of Biostatistics (committee member)

FORMAL MENTORSHIP

- Mentored students through the following organizations: Dear Future Colleague, Goldwater Scholar Community Mentorship Program, Harvard College's Women in STEM Mentorship Program, Iowa Summer Institute in Biostatistics Research Project, Project SHORT, University of Iowa Biostatistics Student Organization, Goldwater Ambassadors Program.
- Member, Goldwater Scholarship Community Mentorship Committee, 2020–2021.

SERVICE

<u>Professional:</u>

- Social Media Co-Chair, Council for Emerging and New Statisticians (CENS), Eastern North American Region International Biometric Society (ENAR), 2022–Present.
- Member, Council for Emerging and New Statisticians (CENS), Eastern North American Region International Biometric Society (ENAR), 2022–Present.

<u>University of Alabama at Birmingham:</u>

- Member, Biostatistics Department Chair Search Committee, School of Public Health, 2022–Present.
- Member, Biostatistics MS Program Review Committee, Department of Biostatistics, 2022–Present.
- Member, Janet L. Norwood Award Committee, Department of Biostatistics, 2022.

<u>University of Iowa:</u>

- Student Ambassador, Department of Biostatistics, 2021–2022.
- Student Representative, Administrative Committee, Department of Biostatistics, 2020–2021.
- President, Biostatistics Student Organization, 2020–2021.
- Member, Student Advisory Committee, Department of Biostatistics, 2019–2020.
- Student Representative, Curriculum Committee, College of Public Health, 2019–2020.
- Professional Development Activities Coordinator, Biostatistics Student Organization, 2019–2020.
- Graduate Student Ambassador, College of Public Health, 2018–2019.
- Service Coordinator, Biostatistics Student Organization, 2018–2019.

<u>Colorado College:</u>

- President & Student Founder, SIAM Student Chapter, 2013–2015.

Peer Review

Peer reviewer for the following journals:

- BMC Emergency Medicine
- BMC Medical Research Methodology
- BMC Pediatrics
- Journal of Speech, Language, and Hearing Research
- Pharmaceutical Statistics
- Scientific Reports

Professional Development

Certificates:

- Engaging Across Cultures Certificate, University of Iowa International Programs Office, 2021.

Short Courses Attended:

- Navigating Tough Conversations in Statistical Collaboration, Conference on Statistical Practice, 2021.
- Mixed Models: A Critical Tool for Dependent Observations, Conference on Statistical Practice, 2021.

Professional Memberships

- Caucus for Women in Statistics, 2022–Present.
- Eastern North American Region International Biometric Society, 2021–Present.
- American Statistical Association, 2019–Present.