MELISSA JAY

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EDUCATION

PhD	University of Iowa, Biostatistics Advisor: Dr. Jacob Oleson	2018 – Present
MS	University of Iowa, Biostatistics	2018 – 2019
PhD Student	Harvard University, Biostatistics	2017 – 2018
BA	Colorado College, Mathematics *Cum Laude,* Distinction in Mathematics	2012 – 2016

RESEARCH INTERESTS

Methodological:

- Bayesian hierarchical modeling
- Spatio-temporal statistics
- Survival analysis

Applied:

- Cancer epidemiology
- Population health
- Neurology

PROFESSIONAL EXPERIENCE

University of Iowa, Iowa City, IA
- NSF Graduate Research Fellow, Department of Biostatistics — 2020 – Present
- Graduate Research Assistant, Department of Biostatistics — 2019 – 2020
- Graduate Teaching Assistant, Iowa Summer Institute in Biostatistics — 2019
- NSF Graduate Research Fellow, Department of Biostatistics — 2018 – 2019

Harvard University, Boston, MA
- Graduate Student Trainee in Quantitative Sciences for Cancer Research, Department of Biostatistics — 2017 – 2018

Dascena, Hayward, CA
- Technical Writing Lead — 2017
- Junior Statistician — 2015 – 2017

Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong
- Student Researcher, Research in Industrial Projects for Students — 2016

Colorado College, Colorado Springs, CO
- Peer Tutor, Quantitative Reasoning Center — 2014 – 2016

Cigna, Greenwood Village, CO
- Actuarial Intern — 2015

University of Iowa, Iowa City, IA
Student Researcher, Iowa Summer Institute in Biostatistics 2014

HONORS AND AWARDS

- Lester R. Curtin Award, American Statistical Association, 2020.
- Delta Omega Honorary Society in Public Health (inducted), University of Iowa College of Public Health, 2020.
- Advancing Graduate Student Success Award (travel funding to present at the 2020 ENAR Spring Meeting), University of Iowa College of Public Health, 2020.
- NSF Graduate Research Fellowship, National Science Foundation, 2017.
- Florian Cajori Award (for outstanding achievement in mathematics), Colorado College Department of Mathematics & Computer Science, 2016.
- Sophie Germain Award (for demonstrating an unusual passion and dedication to the study of mathematical sciences), Colorado College Department of Mathematics & Computer Science, 2016.
- Outstanding Winner in the Mathematical Contest in Modeling (top 10 out of 7,636 paper submissions), Consortium for Mathematics and its Applications, 2015. In addition to the Outstanding Winner designation, my team received the following awards:
    - INFORMS Prize (for the teams in the COMAP Mathematical Contest in Modeling whose modeling and analyses best exemplify the style and content reflected in the INFORMS membership's professional practice), Institute for Operations Research and the Management Sciences, 2015.
    - Colorado Mathematics Award (for the top-performing Colorado teams in the COMAP Mathematical Contest in Modeling), Colorado Mathematics Awards Committee, 2015.
- Barry M. Goldwater Scholar, Barry Goldwater Scholarship and Excellence in Education Program, 2015.
- Euclid Scholarship (for first and second-year students who show outstanding promise in mathematics), 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. In addition to the Finalist Winner designation, my team received the following award:
    - Colorado Mathematics Award (for the top-performing Colorado team in the COMAP Mathematical Contest in Modeling), Colorado Mathematics Awards Committee, 2014.
- SIAM Student Chapter Certificate of Recognition, Society for Industrial and Applied Mathematics, 2014.
- Sharon Credit Union Scholarship, Sharon Credit Union, 2012.

PUBLICATIONS

Journal Publications

1. **Jay M**, Betensky RA. Displaying survival of patient groups defined by covariate paths: Extensions of the Kaplan-Meier estimator. To appear in *Statistics in Medicine*.
2. Sewell DK, Penney J, **Jay M**, Zhang Y, Paulsen JS. Predicting an optimal composite outcome variable for Huntington's disease clinical trials. To appear in *Journal of Applied Statistics*.
3. Mao Q, **Jay M**, Hoffman JL, Calvert J, Barton C, Shimabukuro D, Shieh L, Chettipally U, Fletcher G, Kerem Y, Zhou Y, Das R. 2018. Multicentre validation of a sepsis prediction algorithm using only vital sign data in the emergency department, general ward and ICU. *BMJ Open*. 8:e017833.
4. Desautels T, Calvert J, Hoffman J, Mao Q, **Jay M**, Fletcher G, Barton C, Chettipally UK, Kerem Y, Das R. 2017. Using transfer learning for improved mortality prediction in a data-scarce hospital setting. *Biomedical Informatics Insights*. 9:1-8.
5. Calvert J, Hoffman J, Barton C, Shimabukuro D, Ries M, Chettipally U, Kerem Y, **Jay M**, Mataraso S, Das R. 2017. Cost and mortality impact of an algorithm-driven sepsis prediction system. *Journal of Medical Economics*. 1-6.
6. Desautels T, Calvert J, Hoffman J, **Jay M**, Kerem Y, Shieh L, Shimabukuro D, Chettipally U, Feldman MD, Barton C, Wales DJ, Das R. 2016. Prediction of sepsis in the Intensive Care Unit with minimal electronic health record data: a machine learning approach. *JMIR Medical Informatics*. 4.3:e28.
7. Calvert J, Mao Q, Hoffman J, **Jay M**, Desautels T, Mohamadlou H, Chettipally U, Das R. 2016. Using electronic health record collected clinical variables to predict medical intensive care unit mortality. *Annals of Medicine and Surgery*. 11:52-57.
8. Calvert J, Desautels T, Chettipally U, Barton C, Hoffman J, **Jay M**, Mao Q, Mohamadlou H, Das R. 2016. High-performance detection and early prediction of septic shock for alcohol-use disorder patients. *Annals of Medicine and Surgery*. 8:50-55.
9. Calvert J, Mao Q, Rogers AJ, Barton C, **Jay M**, Desautels T, Mohamadlou H, Jan J, Das R. 2016. A computational approach to mortality prediction of alcohol use disorder inpatients. *Computers in Biology and Medicine*. 75:74-79.
10. Calvert JS, Price DA, Chettipally U, Barton CW, Feldman MD, Hoffman JL, **Jay M**, Das R. 2016. A computational approach to early sepsis detection. *Computers in Biology and Medicine*. 74:69-73.
11. **Jay M***, Mankovich N*, Campbell E*. 2015. Searching for a lost plane: a neighborhood-based probabilistic model. *UMAP Journal*. 36.3:149-168.
12. **Jay M***, Karapakula VG*, Krakoff E*. 2015. Determining the top all-time college coaches through Markov chain-based rank aggregation. *SIAM Undergraduate Research Online*. 8:12-27.

* Indicates equal contributions from all authors.

Journal Articles Under Review

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.

PRESENTATIONS

Invited Presentations

1. 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.

Conference Presentations

1. 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 (*virtual due to COVID-19 pandemic). 2020.
2. Estimating lung cancer mortality rates in U.S. counties using Bayesian spatial models. Midwest Rural Agricultural Safety and Health Conference. Marshalltown, IA. 2019.
3. Creating small-area cancer risk estimates to promote cancer control activities in rural areas. Women in Statistics and Data Science Conference. Bellevue, WA. 2019.
4. A probabilistic, neighborhood-based model for locating lost transoceanic flights. Gulf Coast Undergraduate Research Symposium. Houston, TX. 2015.
5. Determining the top all-time college coaches through Markov chain-based rank aggregation. Front Range Applied Mathematics Student Conference. Denver, CO. 2015.
6. 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

1. Colorado College SIAM Student Chapter graduate school panel (panelist). Virtual panel. 2020.
2. Modeling age-adjusted rates from spatio-temporal datasets with excess zero counts. University of Iowa Biostatistics Student Organization Student Seminar. Virtual presentation. 2020.
3. 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.
4. Opportunities in biostatistics. Colorado College SIAM Student Chapter. Virtual presentation. 2019.
5. Goldwater Scholarship graduate school webinar (panelist). Virtual panel. 2018.

6. Displaying survival of groups defined by covariate paths. Harvard University Cancer Working Group. Boston, MA. 2018.
7. Use of time-varying covariates in Kaplan-Meier estimators. Harvard University Cancer Working Group. Boston, MA. 2017.
8. 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.
9. Predicting student drop-out in massive open online courses. University of Macau Math Department Presentations. Taipa, Macau. 2016.
10. Priority queueing models for kidney transplant allocation. Colorado College Capstone Presentations. Colorado Springs, CO. 2016.
11. 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.
12. 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.
13. 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

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

TEACHING EXPERIENCE

Graduate Teaching Assistant, University of Iowa, Iowa City, IA
- BIOS:4110 General Biostatistics, Iowa Summer Institute in Biostatistics (Summer 2019)

Volunteer Tutor, Warren Village, Denver, CO
- Introductory Statistics (Fall 2016)

Learning Assistant, Colorado College Quantitative Reasoning Center, Colorado Springs, CO
- MA117 Probability and Statistics (Spring 2015, Fall 2015)
- MA217 Probability and Statistical Modeling (Fall 2014, Spring 2015)

Peer Tutor, Colorado College Quantitative Reasoning Center, Colorado Springs, CO
- Tutored students on an individual basis and during QRC drop-in hours in calculus, probability and statistics, linear algebra, and other math courses (2014 – 2016)
- Led math essentials review sessions for 200-level physics students (2014 – 2016)

LEADERSHIP AND SERVICE

- Competitive Scholarships Mentor, Dear Future Colleague, 2020 – Present

- Mentor, Biostatistics Student Organization Mentorship Program, University of Iowa, 2020 – Present
- President, Biostatistics Student Organization, University of Iowa, 2020 – Present
- Mentorship Program Committee Member, Goldwater Scholar Community Council, 2020 – Present
- Student Advisory Committee Member, Department of Biostatistics, University of Iowa, 2019 – 2020
- Curriculum Committee Student Representative, College of Public Health, University of Iowa, 2019 – 2020
- Professional Development Activities Coordinator, Biostatistics Student Organization, University of Iowa, 2019 – 2020
- Graduate Student Ambassador, College of Public Health, University of Iowa, 2018 – 2019
- Service Coordinator, Biostatistics Student Organization, University of Iowa, 2018 – 2019
- Mentor, Women in STEM Mentorship Program, Harvard College, 2017 – 2018
- Treasurer, Society for Industrial and Applied Mathematics Student Chapter, Colorado College, 2015 – 2016
- President, Society for Industrial and Applied Mathematics Student Chapter, Colorado College, 2013 – 2015
- Student Founder, Society for Industrial and Applied Mathematics Student Chapter, Colorado College, 2013

PROFESSIONAL MEMBERSHIPS

- American Statistical Association, 2019 – Present