Matthew J. Heiner

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EDUCATION

University of California, Santa Cruz, Santa Cruz, CA

Ph.D., Statistical Science   August 2019

Thesis: Bayesian Mixture Modeling and Order Selection for Markovian Time Series
Committee: Athanasios Kottas (chair), Stephan Munch, Raquel Prado, and Abel Rodríguez

Brigham Young University, Provo, UT

M.S., Statistics   April 2014

Project: An Absorbing Markov Chain Model for Skill Importance in Women's Soccer
Committee: Gilbert Fellingham (chair), David Dahl, and Candace Berrett

B.S., Statistics: Actuarial Science Emphasis   April 2014

Minor in Mathematics
magna cum laude

EXPERIENCE

Assistant Professor, *Brigham Young University*   Aug. 2019 – Present

Graduate Pedagogy Mentor, *UC, Santa Cruz*   June – Aug. 2018

Online Course Developer/Instructor, *UC, Santa Cruz*   March 2016 – April 2017

Student Intern, *Lawrence Livermore National Laboratory*   June – Aug. 2015, 2016

Statistician Intern, *Savvysherpa Inc.*   May – Sept. 2014

R Programmer/Intern, *Acxiom Corporation*   Dec. 2012 – Nov. 2013

Actuarial Intern, *Aon Hewitt*   May – Aug. 2011

PUBLICATIONS

PEER-REVIEWED PUBLICATIONS

4. **Heiner, M.** and Kottas, A. (2021), "Autoregressive Density Modeling with the Gaussian Process Mixture Transition Distribution," *Journal of Time Series Analysis*. In press. link

3. **Heiner, M.**, Kottas, A., and Munch, S. (2019), "Structured priors for sparse probability vectors with application to model selection in Markov chains," *Statistics and Computing*, 29, 1077-1093. link

2. Lamas, L., Santana, F., **Heiner, M.**, Ugrinowitsch, C., and Fellingham, G. (2015), "Modeling the Offensive-Defensive Interaction and Resulting Outcomes in Basketball," *PloS one*, 10, e0144435. link

1. **Heiner, M.**, Fellingham, G. W., and Thomas, C. (2014), "Skill importance in women's soccer," *Journal of Quantitative Analysis in Sports*, 10, 287–302. link

Under Review

3. **Heiner, M.** and Kottas, A. (2021+), "Estimation and selection for high-order Markov chains with Bayesian mixture transition distribution models," *arXiv preprint arXiv:1906.10781.* link

2. **Heiner, M.** and Kottas, A. (2021+), "Bayesian Nonparametric Density Autoregression with Lag Selection," *arXiv preprint arXiv:2003.09759.* link

1. **Heiner, M.**, Heaton, M., Abbott, B., White, P., Minaudo, C., Dupas, R. (2021+), "Model-based Clustering of Trends and Cycles of Nitrate Concentrations in Rivers Across France."

In Preparation

2. **Heiner, M.**, Grimm, T.[1], Smith, H., Leavitt, S., Christensen, W., Carling, G., St. Clair, L. (2021+), "Multivariate Receptor Modeling with Widely Dispersed Lichens as Bioindicators of Air Quality."

1. Gilman, J., Gill, R., **Heiner, M.**, Hansen, N., (2021+), "Trophic interactions, climate change and secondary wildfire interact to control soil water availability after wildfire."

Presentations

"Model-based Clustering of Trends and Cycles of Nitrate Concentrations in Rivers Across France"
- Joint Statistical Meetings, virtual, August 2021. (invited)

"Estimation and Selection for High-order Markov chains with Mixture Transition Distribution Models"
- ISBA World Meeting, virtual, June 2021.
- BYU/USU Applied Math Seminar, virtual, November 2020. (invited)
- NBER-NSF SBIES Conference, virtual, August 2020.

"Bayesian Nonparametric Density Autoregression with Lag Selection"
- 13th International Conference of the ERCIM WG on Computational and Methodological Statistics, virtual, December 2020. (invited)
- Joint Statistical Meetings, virtual, August 2020.
- Statistics Department Seminar, Brigham Young University, Provo, UT, September 2019.

"Bayesian Model Selection for Markov Chains Using Sparse Probability Vectors."
- Joint Statistical Meetings, Vancouver, BC, Canada, July 2018.
- Chapter Meeting, San Francisco Chapter of the American Statistical Association, San Francisco, CA, June 2018.
- Poster at the Graduate Research Symposium, University of California, Santa Cruz, Santa Cruz, CA, April 2018.

"The Interaction of Arctic Sea Ice and Global temperature, and Their Bias in Climate Simulation Experiments."
- Engineering Summer Intern Seminar, Lawerence Livermore National Laboratory, Livermore, CA, August 2016.

"Characterizing Natural Climate Variability of Mean Global Temperature in CMIP-5 Models."
- Applied Statistics Group Seminar, Lawerence Livermore National Laboratory, Livermore, CA, September 2015.

"Skill Importance in Women's Soccer."
- Student Research Conference, Brigham Young University, Provo, UT, March 2013.

"Bayesian Analysis of Diet Intervention in Young Adults."
- Student Research Conference, Brigham Young University, Provo, UT, March 2012.

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[1]Mentored student co-authors are underlined.

Recognitions

JSM Student Travel Award, San Francisco Chapter of the American Statistical Association (3rd place), May 2018.

Chancellor's Fellowship, Applied Mathematics and Statistics, UC Santa Cruz, 2014 – 2015.

Brigham Young Scholarship, 2006–2007, 2010 – 2013.

Section Award, Student Research Conference, Brigham Young University, March 2013.

Teaching Experience

Instructor, *Brigham Young University*

Stat 240 – Probability and Inference 1	F 2019, W 2021
Stat 201 – Statistics for Engineers and Scientists	W 2020, F 2020

Online Course Developer/Instructor, *UC, Santa Cruz*   March 2016 – April 2017

Coursera – Bayesian Statistics: Techniques and Models

Rated 4.8/5 (379 ratings); 40,000+ cumulative enrollment as of December 2020.

Coursera – Bayesian Statistics: From Concept to Data Analysis (assistant to Herbert Lee)

Rated 4.6/5 (2,570 ratings); 111,000+ cumulative enrollment as of December 2020.

Graduate Student Instructor, *UC, Santa Cruz*

AMS 7 – Statistical Methods for the Biological, Environmental, and Health Sciences

Su 2017, W 2018, Su 2018, W 2019

AMS 7L – Biostatistics Lab

F 2017, F 2018, Su 2019

Teaching Assistant, *UC, Santa Cruz*

AMS 131 – Introduction to Probability Theory	F 2015, Sp 2018
AMS 7 – Stat. Methods for the Bio., Env., and Health Sciences	Sp 2017
AMS 80A – Gambling and Gaming	W 2016

Teaching Assistant, *Brigham Young University*

Stat 497R – Introduction to Research: Sports Analytics	W 2014
Stat 340 – Statistical Inference	W 2012
Stat 301 – Statistics and Probability for Secondary Educators	Su 2012
Stat 240 – Discrete Probability	W 2012
Stat 230 – Analysis of Variance	F 2012
Stat 201 – Statistics for Engineers and Scientists	Su 2012

Student Advising

Year	Student	Role	Position Following Graduation
2021-23	Joshua Christensen	MS Committee Chair	
2020-22	Hong Ni Mui	MS Committee Chair	
2021	Joseph Arnesen	Undergrad. Research Mentor	
2021	Megan Louder	MS Committee Member	Statistician at Ancestry.com
2021	Angela Larkin	MS Committee Member	
2021	Thomas Jensen	MS Committee Member	Statistician at Berry Consultants
2020-21	Taylor Grimm	Undergrad. Research Mentor	Ph.D. Student in Statistics at Baylor U
2020-21	Hayden Smith	Undergrad. Research (co-)Mentor	Medical Student at Vanderbilt
2020	Brittany Russell	MS Committee Member	Freelance Online Tutor in Statistics
2020	Matthew Drewes	MS Committee Member	Medical Student at U of Miami

SERVICE

PROFESSION

Secretary, Utah Chapter of the American Statistical Association	August 2020 – Present
Referee, *Journal of Machine Learning Research*	June 2021
Referee, *Journal of Forecasting*	May 2021
Referee, *IMA Journal of Management Mathematics* (sp. issue on sports)	Feb., Dec. 2020

DEPARTMENT

Fulfillment Committee for Data Science Minor Course Design, Member	May 2021 – Present
Strategic Planning Committee for Online Courses, Member	September 2019 – Present

STUDENT

President, Mu Sigma Rho, Utah BYU Chapter	2012 – 2013
Full-time Volunteer Representative for The Church of Jesus Christ of Latter-day Saints, Queens, NY	2007 – 2009

MEMBERSHIPS

International Society for Bayesian Analysis	2013 – Present
American Statistical Association - Section on Bayesian Statistical Science	2011 – Present
Mu Sigma Rho	2010 – 2014