

Dmitry Shemetov

Mathematics Department
University of California, Davis
One Shields Avenue, Davis, CA 95616

Research interests

Applied mathematics Ph.D. candidate interested in the interface of statistics, information theory, and computation. Currently working on the statistical limits of distributed systems. Combining theory with computational work.

Research interests statistical inference, machine learning, information theory, stochastic processes

Education

- 2013 - 2019 **Ph.D. in Applied Mathematics**, *University of California, Davis*, Davis, CA.
- 2013 - 2018 **Masters in Applied Mathematics**, *University of California, Davis* (expected: August 2018), Davis, CA.
- 2008 - 2012 **B.S. in Pure Mathematics**, *Florida State University*, Tallahassee, FL.
Graduated Magna Cum Laude with minors in physics and computer science

Employment and Experience

- 2017 **Research Intern**, *Center for Nonlinear Studies at Los Alamos*.
- 2015 - present **Graduate Student Researcher**, *Math Department at UC Davis*.
- 2013 - present **Teaching Assistant**, *Math Department at UC Davis*.

Research projects

- 2018-present **Statistical Limits of Hierarchical Communication**, *University of California, Davis*, Davis, CA.
Studied the statistical limits imposed by hierarchical communication structures with bitrate limits. Work in progress with James Sharpnack.
- 2017 **Online Estimation of Power Transmission Parameters**, *Los Alamos*, Los Alamos, NM.
Studied statistical algorithms for online estimation of power transmission models. Performed extensive simulations in Julia and used the optimization package JuliaOpt to perform sparse and low-rank constrained optimization. Joint work with Mark Vuffray and Andrey Lokhov (accepted for publication at the PSCC 2018 conference).
- 2016 **Mutual Information Functions versus Correlation Functions**, *University of California, Davis*, Davis, CA.
Studied the utility of using mutual information to understand the time-dependence structure of stochastic processes. Class project for a time series analysis course with Alexander Aue.

2016-2017 **Hidden Markov Model Distance Measures**, *University of California, Davis*, Davis, CA.

Investigated a number of approaches to measuring the distance between Hidden Markov Models, using probability metrics, information theoretic metrics, and computational mechanics.

2015-2017 **Inferring Memoryful Stochastic Processes**, *University of California, Davis*, Davis, CA.

Studied inference of stochastic processes using Bayesian Structural Inference. Joint project with Jim Crutchfield.

Publications

2017 Andrey Lokhov, Marc Vuffray, Dmitry Shemetov, Deepjyoti Deka, Michael Chertkov, "Online Learning of Power Transmission Dynamics", PSCC2018 Accepted

Relevant Coursework

Spring 2018 Mathematical Statistics with Miles Lopes

Spring 2016 Time Series Analysis with Alexander Aue

Spring 2016 Network Theory with Raissa D'Souza

Fall 2016 Numerical Optimization with Michael Friedlander

Fall 2015 Probability Theory with Ethan Anderes

Fall 2015 Stochastic Dynamics with Albert Fannjiang

Teaching

2013 - **Teaching Assistant**, *University of California, Davis*, Davis, CA.

present Held weekly discussion sections and assisted in student advising for a number of courses, including:

- o MAT17C, MAT21A Calculus and Calculus for Biology Majors
- o MAT22A, MAT22B Linear Algebra and Differential Equations
- o MAT125A, MAT129 Real Analysis and Fourier Analysis
- o MAT135A, MAT135B Probability Theory and Stochastic Processes

Service

January 2017 **Co-organizer**: Davis Math Conference 2017

Software

2016 BaumWelchEstimation (*privately hosted*): A Python library implementing the Baum Welch Estimation algorithm for edge-labeled Hidden Markov Models. Supports finite-valued time series and interfaces with the privately hosted CMPy (Computational Mechanics Python) package.

Professional Memberships

2018 Society of Industrial and Applied Mathematics (SIAM)

References

James Sharpnack, Statistics Department, University of California, Davis
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