

# Curriculum Vitae

Jordan Snyder

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## Areas of Interest

- Phase transitions and critical phenomena on networks
- Collective phenomena and self-organization
- Dynamical systems
- Information theory

## Education

- Ph.D. in Applied Mathematics, UC Davis. *Expected June 2018*
- M.S. in Applied Mathematics, UC Davis, *March 2016*
- B.S. in Physics and Mathematics Cum Laude, Rensselaer Polytechnic Institute, Troy, NY. *May 2013*

## Employment and Experience

- Teaching Assistant, UC Davis
  - Fall 2013: MAT-17A, Calculus for Biological Sciences
  - Winter 2014: MAT-21B, Calculus
  - Spring 2014: MAT-21D, Vector Analysis
  - Fall 2015: MAT-67, Abstract Linear Algebra
  - Winter 2017: MAT-21D, Vector Analysis
- Associate Instructor, UC Davis
  - Summer Session I 2014 and Summer Session II 2015: MAT-22B, Differential Equations
- Graduate Student Researcher, UC Davis, *academic year 2015-2016*
- Research Intern, Center for Nonlinear Studies at Los Alamos National Lab, *Summers 2016-2017*

## Projects

- *Entrainment of Coupled Oscillators*, research project at Los Alamos National Lab, *Summer 2016-2017*
  - Developed a model of coupled phase oscillators subject to common forcing, and derived analytic results capturing the trade-offs between coupling and forcing. Corroborated analysis with numerical simulation, including numerical continuation using AUTO software. Work done in collaboration with staff scientists Anatoly Zlotnik and Aric Hagberg.
  - Submitted (under review) (<http://arxiv.org/abs/1707.01599>)
- *Mean-field limits for interacting diffusions*, group project at CRITICS Summer School, Kulhuse, Denmark, *September 2016*
  - Studied a system of attractively coupled particles in a bistable potential using a nonlinear Fokker-Planck equation, with support from numerical simulation.
- *Computing Geometric Integrated Information*, class project for Numerical Optimization (MAT-258A), *Fall 2015*
  - Implemented an optimization algorithm to compute an information measure which quantifies the extent of causal interactions between components of a stochastic process, and applied this algorithm to primate social network data.
- *Pathwise Information Theory in Two Dimensions*, class project for Natural Computation (PHY-256B), *Spring 2014*
  - Studied information-theoretic signatures of spatial pattern formation by sampling two-dimensional synthetic data along self-avoiding paths.
- Reading in Classical and Quantum Statistical Mechanics with Prof. Bruno Nachtergaele, *Summer 2014 - Winter 2015*
  - Studied representation of quantum spin system partition functions by random loops.

## Publications

- *Stability of Entrainment of a Continuum of Coupled Oscillators*, with Anatoly Zlotnik and Aric Hagberg (under review, <http://arxiv.org/abs/1707.01599>)

## Relevant Coursework

- CRITICS Summer School and Workshop, Kulhuse, Denmark, *September 2016*
  - Mathematical theory of critical transitions in complex systems: center manifold reduction, bifurcation theory and its extension to non-autonomous and random dynamical systems, and associated statistical issues. Applications to climate systems, ecology, and economics.

- Stochastic Population Dynamics, *PBG 298, Spring 2016, Spring 2017*
  - Rigorous results for discrete-time population models under demographic and environmental stochasticity. Random Perron-Frobenius theorem.
  - Probability generating functions, asymptotics for Markov chains with and without absorbing states
- Stochastic Dynamics, *MAT 236A, Fall 2014*
  - Brownian motion, Itô calculus, Fokker-Planck equations, martingales. Applications to finance.
- Probability Theory, *MAT 235A-B, Fall 2014 - Winter 2015*
  - Measure-theoretic foundations, convergence of probability measures, conditional probability
- Natural Computation and Self-Organization, *PHY 256A-B, Winter - Spring 2014*
  - Information theory, inference of causal architecture for discrete stochastic processes
- Applied Math, *MAT 207A,B,C, academic year 2013-2014*
  - Three-quarter sequence covering dynamical systems, bifurcation theory, calculus of variations, Fourier series, basics of PDE, and asymptotic methods

## Service

- Mx16 Conference on Multilayer Networks Co-Organizer, *Spring 2016*
  - International student-run conference featuring Alex Arenas, Lada Adamic, Matt Brashears, Francesco Sorrentino, and Mikko Kivelä
  - Link: <http://multinets.ucdavis.edu/>
- Galois Group (Math grad student association)
  - Vice President, *academic year 2015-2016*
  - President, *academic years 2016-2018*
- Davis Math Conference Co-Organizer, *Fall 2015*

## Presentations

### Poster

- *Entrainment of Coupled Oscillators*, CRITICS Workshop, Kulhuse, Denmark, *September 2016*
- *Stability of Entrainment in Coupled Oscillators*
  - Dynamics Days 2017, Silver Spring, MD, *January 2017*
  - 2017 SIAM Conference on Dynamical Systems, Snowbird, UT, *May 2017*
  - International Physics of Living Systems (iPoLS) 2017 Annual Meeting, Paris, France, *June 2017*

## Honors and Awards

- Math Department Travel Award, *January 2017*
- Graduate Assistance in Areas of National Need (GAANN) Fellowship, *academic year 2014-2015*
- Rensselaer Dean's List, *Fall 2009 - Spring 2013*

## Skills

- Programming
  - Python (packages: NumPy, SciPy, NetworkX, CMPy)
  - AUTO-07p software for continuation and bifurcation problems in ordinary differential equations
  - MATLAB
  - Julia