Kelly Spendlove

Postdoctoral Researcher · University of Oxford

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Employment

University of Oxford — *Oxford UK*

Postdoctoral Researcher, Mathematics — *2019 - 2022*

Education

Rutgers University — *New Brunswick, NJ*

Ph.D. in Mathematics — *2013 - 2019*

Montana State University — *Bozeman, MT*

M.S. + B.S. in Mathematics — *2007 - 2013*

- highest honors

Selected Honors & Awards

2017 **NSF Graduate Research Opportunities Worldwide (GROW),** Vrije Universiteit (VU) Amsterdam

2014 **NSF Graduate Research Fellowship,** Rutgers University

2013 **NSF East Asia and Pacific Summer Institutes (EAPSI) Fellowship,** Kyoto University

Publications

Morse theoretic templates for high dimensional homology computation
- with S Harker and K Mischaikow
- Submitted. arXiv:2105.09870 [math.AT] (2021).

Homology of configuration spaces of hard squares in a rectangle
- with H Alpert, U Bauer, M Kahle, and R MacPherson
- To appear in Algebraic and Geometric Topology (2022).

Exploration-Exploitation in Multi-Agent Competition: Convergence with Bounded Rationality
- with S Leonardos, and G Piliouras
- Advances in Neural Information Processing Systems 34 (2021)

A computational framework for connection matrix theory
- with S Harker and K Mischaikow
- Journal of Applied and Computational Topology, 5, 459–529 (2021).

On the efficacy of state space reconstruction methods in determining causality
- with B Cummins and T Gedeon
- SIAM Journal on Applied Dynamical Systems 14 (1), 335-381 (2015)

Predicting high-codimension critical transitions in dynamical systems using active learning
- with J. Berwald and T. Gedeon
- Mathematical and Computer Modelling of Dynamical Systems 19 (6), 557-574 (2013)

Recent Talks

Morse, Conley, and Computation — *Virtual*

Jagiellonian Computational Mathematics Seminar — *Nov 2020*

Conley Theory and the Global Dynamics of Games — *Virtual*

Second Fields Institute Symposium on Machine Learning and Dynamical Systems — *Sep 2020*

From Dynamics to Combinatorics and Back Again — *Virtual*

Oxford Applied Topology Seminar — *May 2020*

Computational Connection Matrix Theory: New Tools in Applied Topology — *Oxford*
Oxford Centre for TDA SPIRES 2019 — *Sep 2019*

Morse, Conley, and Computation — *Montreal*
Centre de Recherches Mathematiques Workshop on Data Driven Dynamics — *Apr 2019*

Morse, Conley, and Computation — *SUNY Albany*
SUNY Albany Algebra/Topology Seminar — *Apr 2019*

Computational Connection Matrix Theory: New Tools in Applied Topology — *ICMC, Sao Carlos*
ICMC Summer Meeting on Differential Equations 2019 — *Feb 2019*

Computational Connection Matrix Theory: New Tools in Applied Topology — *Kyoto University*
Kyoto Workshop on Applied Topology 2019 — *Jan 2019*

Morse, Conley, and Computation — *UPenn*
UPenn Applied Topology Seminar — *Nov 2018*

Morse, Conley, and Computation — *Rutgers University*
IAS-Penn-Rutgers Workshop: Identifying Order in Complex Systems — *Nov 2018*

Computational Connection Matrix Theory: New Tools in Applied Topology — *Newark DE*
AMS Eastern Sectional Meeting — *Sep 2018*

A Computational Framework for Connection Matrices — *Bozeman MT*
Algebraic Topology in Dynamics and Data (ATDD) — *Jul 2018*

A Computational Framework for Connection Matrices — *IST Austria*
Algebraic Topology: Methods, Computation, and Science (ATMCS 8) — *Jun 2018*

A Computational Framework for Connection Matrices — *Bedlewo Poland*
Dynamics, Topology and Computations (DyToComp) — *Jun 2018*

Computing Connection Matrices — *Hokkaido Japan*
Applied Algebraic Toplogy Conference — *Aug 2017*

Toward a Computational Homology Theory of Dynamics — *The Ohio State University*
MBI Visitor Series Seminar — *Dec 2016*

Teaching

Spring 2019	**TA for Differential Equations.**, Rutgers University
Fall 2018	**TA for Calculus I for the Mathematical and Physical Sciences**, Rutgers University
Spring 2018	**TA for Calculus II**, VU University Amsterdam
Spring 2018	**TA for Linear Algebra for Business Analytics**, VU University Amsterdam
Fall 2017	**TA for Differential Equations for Engineering and Physics**, Rutgers University
Summer 2017	**Instructor for Introduction to Abstract Algebra**, Rutgers Univeristy
Fall 2012	**Instructor for College Algebra**, Montana State University

Research Visits

2018	**VU Amsterdam**, GROW Fellow, (R. Vandervorst)
Fall 2016	**Mathematical Biosciences Institute (MBI), The Ohio State University**, Long Term Visitor, (Emphasis Semester on Analysis of Complex Data in Biological Systems)
Summer 2015	**INRIA Geometrica (Datashape), Ècole Polytechnique**, (F Chazal)
Summer 2013	**Kyoto University**, EAPSI Fellow (H Kokubu)
Summer 2012	**The College of William & Mary**, (S Day)

Honors & Awards

Honors

2013	**GAANN Fellowship**, BioMaPS, Rutgers University
2012	**Meritorius Graduate Fellowship**, Montana State University
2011-2012	**Hughes Scholar Research & Outreach Fellowship**, Howard Hughes Medical Institute, Montana State University
2011	**IDeA Networks of Biomedical Research Excellence Fellowship**, Applied Algorithms Laboratory, Montana State University

Awards

2016	**NSF-CBMS Conference Travel Award**, UT Austin
2015	**NSF Data Science Workshop Travel Award**, University of Washington
2014	**IMA Travel Award**, Institute for Mathematics and its Applications, University of Minnesota
2013	**Bill Stannard Award for Excellence in Graduate Student Professional Presentations**, Department of Mathematical Sciences, Montana State University
2012	**Outstanding Graduating Senior with Distinction**, Department of Mathematical Sciences, Montana State University

Service and Outreach

Fall 2021	**Viva Examiner for DPhil at Mathematical Institute**, University of Oxford
Spring 2021	**Assessor of Part C mini projects for Computational Algebraic Topology**, University of Oxford
2018-2019	**Organizer for Directed Reading Program**, Rutgers University
Fall 2017	**Mentor for Directed Reading Program**, Directed undergraduate in combinatorial Hodge theory project
Feb 2013	***'How to Be Successful in a Math Course'***, Organized popular workshop at Montana State University for
Oct 2012	incoming first-year students concerning how to prepare for college math courses