

Nicholas W. Landry

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Education

University of Colorado Boulder <i>PhD in Applied Mathematics</i> Advisor: Juan G. Restrepo Dissertation: "Contagion on Complex Systems: Structure and Dynamics"	Boulder, CO 2017–2022
University of Colorado Boulder <i>MS in Applied Mathematics</i>	Boulder, CO 2017–2020
University of New Hampshire <i>BS in Mechanical Engineering</i> University Honors, Summa Cum Laude	Durham, NH 2010–2014

Experience

Research.....	
University of Vermont <i>TGIR Postdoctoral Research Fellow</i>	Burlington, VT 2022–Present
University of Colorado Boulder <i>Research Assistant</i>	Boulder, CO 2019–2022
University of New Hampshire <i>Research Assistant</i>	Durham, NH 2013–2015
Industry.....	
Pacific Northwest National Laboratory <i>PhD Intern in the Data Sciences and Analytics Group</i>	Seattle, WA Summer 2021
Turbocam International <i>Manufacturing Engineer</i>	Barrington, NH 2014–2017

Funding

- NSF Award 2224051, "Conference: Computational Approaches for Contagion on Complex Social Systems," \$34,770 2022
Co-writer with Juan G. Restrepo (PI; University of Colorado Boulder)
- NSF Award 2121905, "HNDS-I: Developing a software library for the analysis and visualization of spreading processes on social hypergraphs," \$80,193 2021–2022
Co-writer with Juan G. Restrepo (PI; University of Colorado Boulder)

Publications

- Journal Articles and Conference Proceedings.....
- **Nicholas W. Landry**, jimi adams, *On limitations of uniplex networks for modeling multiplex contagion*, PLoS ONE, 2023. DOI: [10.1371/journal.pone.0279345](https://doi.org/10.1371/journal.pone.0279345)
 - **Nicholas W. Landry**, Juan G. Restrepo, *Hypergraph assortativity: a dynamical systems perspective*, Chaos, 2022. DOI: [10.1063/5.0086905](https://doi.org/10.1063/5.0086905)

- **Nicholas W. Landry**, *Effect of time-dependent infectiousness on epidemic dynamics*, Physical Review E, 2021. DOI: [10.1103/PhysRevE.104.064302](https://doi.org/10.1103/PhysRevE.104.064302)
- **Nicholas W. Landry**, Juan G. Restrepo, *The effect of heterogeneity on hypergraph contagion models*, Chaos, 2020. DOI: [10.1063/5.0020034](https://doi.org/10.1063/5.0020034)
- **Nicholas W. Landry**, Marko Knezevic, *Delineation of First-Order Elastic Property Closures for Hexagonal Metals Using Fast Fourier Transforms*, Materials, 2015. DOI: [10.3390/ma8095303](https://doi.org/10.3390/ma8095303)
- Marko Knezevic, **Nicholas W. Landry**, *Procedures for reducing large datasets of crystal orientations using generalized spherical harmonics*, Mechanics of Materials, 2015. DOI: [10.1016/j.mechmat.2015.04.014](https://doi.org/10.1016/j.mechmat.2015.04.014)
- Marko Knezevic, Daniel J. Savage, **Nicholas W. Landry**, *Towards Computationally Tractable Simulations of Metal Forming Processes With Evolving Microstructures*, Proceedings of the ASME International Manufacturing Science and Engineering Conference, 2014. DOI: [10.1115/MSEC2014-3984](https://doi.org/10.1115/MSEC2014-3984)

Preprints.....

- **Nicholas W. Landry** and Juan G. Restrepo, *Polarization in hypergraphs with community structure*, Preprint, 2023. [arXiv:2302.13967](https://arxiv.org/abs/2302.13967)
- **Nicholas W. Landry**, Maxime Lucas, Iacopo Iacopini, Giovanni Petri, Alice C. Schwarze, Alice Patania, and Leo Torres, *XGI: A Python package for higher-order interaction networks*, under review at the Journal of Open Source Software

Presented Work

Invited Talks.....

- *Higher-order interaction networks: structure, dynamics, and inference* May 2023
Workshop on Modelling and Mining Complex Networks as Hypergraphs Toronto, Canada
- *Higher-order models for social and epidemiological contagion* January 2023
Network Science Institute at Northeastern Boston, MA
- *Community structure in hypergraphs and the emergence of polarization* October 2022
AMS Fall Eastern Sectional Meeting Amherst, MA
- *Hypergraph dynamics: assortativity and the expansion eigenvalue* April 2022
Special Session on Combinatorial Approaches to Topological Structures and Applications at the Joint Mathematics Meetings
- *Hypergraph assortativity: A dynamical systems perspective* March 2022
Higher-Order Interactions: The Next Frontier of Complex Systems at the APS March Meeting
- *Contagion on Complex Systems: Structure and Dynamics* January 2022
Harvard Center for Communicable Disease Dynamics
- *Contagion on Complex Systems: Structure and Dynamics* January 2022
University of Vermont
- *Contagion on Complex Systems: Structure and Dynamics* January 2022
Dartmouth College
- *Contagion on Complex Systems: Structure and Dynamics* January 2022
CU Boulder Applied Mathematics Dynamics Seminar
- *Hypergraph dynamics: a dynamical systems perspective* December 2021
Graph Theory and its Applications session at the 2021 Winter Canadian Mathematical Society (CMS) Meeting
- *The effect of contact structure on hypergraph contagion models* May 2021
Dynamics on Networks with Higher Order Interactions Minisymposium, SIAM Dynamical Systems Conference

- *The effect of heterogeneity on hypergraph contagion models* October 2020
Fundamentos y Enseñanza de la Física y los Sistemas Dinámicos, Universidad de Antioquia
- *The effect of heterogeneity on hypergraph contagion models* September 2020
CU Boulder Applied Mathematics Dynamics Seminar
- *Hypergraph Contagion* February 2020
Colorado Chapter of Society of Young Network Scientists

Contributed Talks.....

- *Hypergraph community structure and the emergence of polarization* October 2022
Conference on Complex Systems
Palma, Spain
- *Hypergraph community structure and the emergence of polarization* September 2022
SIAM Network Science Workshop
- *Hypergraph community structure and the emergence of polarization* July 2022
NetSci
- *Hypergraph community structure and the emergence of polarization* March 2022
Northeast Regional Conference on Complex Systems (Best Oral Presentation)
- *Hypergraph dynamics: assortativity and the expansion eigenvalue* November 2021
International Conference on Complex Networks and their Applications
- *On limitations of uniplex networks for modeling multiplex diffusion* July 2021
Networks
- *Hypergraph community structure and the emergence of polarization* June 2021
TopoNets: Networks Satellite
- *The effect of time-dependent infectiousness on epidemic dynamics* March 2021
Front Range Applied Mathematics Student Conference
- *The effect of heterogeneity on hypergraph contagion models* September 2020
TopoNets: NetSci Satellite Conference
- *Improvisatory Elements of Teaching* February 2019
Workshop for the Graduate Teacher Program
Boulder, CO
- *So You Think You're Bad at Math* January 2019
Ignite Talk for the Graduate Teacher Program's Spring Conference
Boulder, CO
- *Music Data Mining: Finding Structure in Song* Fall 2018
Statistics, Optimization, and Machine Learning Seminar, Applied Math
Boulder, CO

Posters.....

- *Community structure in hypergraphs and the emergence of polarization* January 2022
Dynamics Days
- *The effect of time-dependent infectiousness on epidemic dynamics* March 2021
Northeastern Regional Conference on Complex Systems
- *The effect of heterogeneity on hypergraph contagion models* August 2020
Dynamics Days Digital
- *The effect of simplex and network degree distribution on simplicial contagion models* January 2020
Dynamics Days
Hartford, CT

Software Demonstrations.....

- *XGI* May 2023
Workshop on Modelling and Mining Complex Networks as Hypergraphs
Toronto, Canada
- *XGI* October 2022
TopoNets Satellite Conference of the Conference on Complex Systems
Palma, Spain

- *XGI* Higher-Order Models in Network Science Satellite Conference of NetSci July 2022
Online
- *XGI and HyperContagion* Contagion on Complex Social Systems Workshop August 2022
Boulder, CO

Software

- **Complex Group Interactions** (XGI): Creator and Core Developer *NumFOCUS* affiliated
- **HyperContagion**: Creator and Core Developer
- **HyperNetX**: Contributor

Awards

- Chief Student Marshal for UNH Commencement 2014 based on GPA and contributions to the college 2014
- Mechanical Engineering Faculty Choice Award for Poster at UNH Undergraduate Research Conference 2014
- Nominee for the Goldwater Scholarship; 1 of 4 students representing UNH 2012
- Eagle Scout 2008

Leadership, Mentoring, and Service

University of Colorado Boulder **Boulder, CO**
Graduate Peer Mentor 2020-2021

Met with students over the course of the semester to check in and offer support

CU Boulder Applied Math Department **Boulder, CO**
Lead Teaching Assistant 2018-2019

- Led a weekly seminar for 15 first year students
- Facilitated video consultations to student TAs to help develop effective teaching skills
- Informed students about important topics, like obtaining residency, finding a research advisor, summer opportunities, and succeeding as a grad student

CU Boulder Applied Math Department **Boulder, CO**
Graduate Student Representative 2018-2019

- Gathered student input through polls and meetings
- Met with the Applied Mathematics graduate committee to voice student concerns
- Collaborated with students and faculty to help create policies agreeable to both parties

I Have a Dream Foundation of Boulder County **Lafayette, CO**
Tutoring Volunteer 2018

Tutored underprivileged students in the local school district in math and science

University of New Hampshire **Durham, NH**
Vice President of UNH Chapter of Pi Mu Epsilon 2012-2013

Organizer.....

TalkbOctopus seminar series **Burlington, VT**
Co-organizer Fall 2022 - present

Models and Methods for Sparse (Hyper) Network Science at JMM **Boston, MA**
Co-organizer January 6, 2023

TopoNets symposium at the Conference on Complex Systems **Palma, Spain**
Co-organizer October 18-19, 2022

Contagion on Complex Social Systems Workshop
Co-chair

Boulder, CO
August 10-12, 2022

CU Boulder Applied Math Department
Joint coordinator of the Dynamical Systems seminar

Boulder, CO
Spring 2021, 2022

Reviewer.....

Journals

Nature Communication Physics, Nature Communications, Physical Review Research, Scientific Reports, Physical Review E

Conferences

Algorithm Engineering and Experiments (2022)

Teaching

University of Colorado Boulder
Instructor

Boulder, CO
Summer 2020

Taught Calculus 1 for Engineers to 20 students five days a week in a remote learning setting; managed a teaching assistant, presented concepts, and developed course material and exams.

University of Colorado Boulder
Teaching Assistant

Boulder, CO
2017-Present

- Calculus 1 for Engineers (APPM 1350): Fall 2017
- Calculus 2 for Engineers (APPM 1360): Spring 2018, Summer 2019, Fall 2019
- Calculus 3 for Engineers (APPM 2350): Fall 2018
- Differential Equations and Linear Algebra (APPM 2360): Spring 2019, Fall 2020, Spring 2021
- Matrix Methods (APPM 3310): Spring 2020

Workshops

- *MRC: Models and Methods for Sparse (Hyper) Network Science* *June 2022*
Participant *Buffalo, NY*
- *Complex Networks Winter Workshop (CNWW)* *January 2021*
Participant *Online*
- *Statistics and Modeling with Novel Data Streams at the SISIMID summer school* *June 2020*
Participant *Online*
- *Understanding and Exploring Network Epidemiology in the Time of Coronavirus* *April 2020*
Participant *Online*

Certifications

Certificate in College Teaching
Graduate Teacher Program

Boulder, CO
November 2018

- Attended 20 hours of teaching-related workshops
- Observed by a faculty member to vouch for my teaching
- Participated in 2 consultations using video footage from my class
- Attended 20 hours of discipline-specific teaching workshops.
- Wrote a teaching portfolio, outlining my teaching experience, skills, and philosophy

Travel Grants

- *CU Boulder Graduate School Student Travel Grant* *2020, 2022*
- *2022 JMM Grad Student Travel Grant* *2022*
Awarded a \$1,300 travel grant

- *Networks 2021 Registration Waiver* 2021
Awarded a registration waiver for Networks 2021 which is being held virtually
- *SIAM Student Travel Award* 2021
Awarded a registration waiver for SIAM DS 2021 which is being held virtually

Organizations and Affiliations

- Society for Industrial and Applied Mathematics (SIAM)
- The American Mathematical Society (AMS)
- The Network Science Society
- The Complex Systems Society

Media

- *Interactions Within Larger Social Groups Can Cause Tipping Points in Contagion Flow*
AIP Press Release October 20th, 2020
- *Contagion on Complex Networks* February 3rd, 2020
Radio, Season 3 Episode 13, Probably Novel at University of Colorado Boulder