

# Nicholas W. Landry

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## Education

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

## Experience

### Research

<b>University of Vermont</b> <i>TGIR Postdoctoral Research Fellow</i>	<b>Burlington, VT</b> 2022–Present
<b>University of Colorado Boulder</b> <i>Research Assistant</i>	<b>Boulder, CO</b> 2019–2022
<b>University of New Hampshire</b> <i>Research Assistant</i>	<b>Durham, NH</b> 2013–2015

### Industry

<b>Pacific Northwest National Laboratory</b> <i>PhD Intern in the Data Sciences and Analytics Group</i>	<b>Seattle, WA</b> Summer 2021
<b>Turbocam International</b> <i>Manufacturing Engineer</i>	<b>Barrington, NH</b> 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

- **Nicholas W. Landry**, Juan G. Restrepo, *The polarizability of hypergraphs with community structure*, In Preparation, 2022
- **Nicholas W. Landry**, jimi adams, *On limitations of uniplex networks for modeling multiplex diffusion*, Preprint, 2022. arXiv:2204.12348
- **Nicholas W. Landry**, Juan G. Restrepo, *Hypergraph assortativity: a dynamical systems perspective*, Chaos, 2022. DOI: 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
- **Nicholas W. Landry**, Juan G. Restrepo, *The effect of heterogeneity on hypergraph contagion models*, Chaos, 2020. DOI: 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
- 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
- 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

## Presented Work

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### Invited Talks

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

## Software

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- **CompleX Group Interactions (XGI):** Creator and Core Developer
- **HyperContagion:** Creator and Core Developer
- **HyperNetX:** Contributor

## Awards

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- 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.....

**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** **Boulder, CO**  
*Co-chair* August 10-12, 2022

**CU Boulder Applied Math Department** **Boulder, CO**  
*Joint coordinator of the Dynamical Systems seminar* Spring 2021, 2022

## Reviewer.....

### Journals

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

### Conferences

Algorithm Engineering and Experiments (2022)

## Teaching

**University of Colorado Boulder** **Boulder, CO**  
*Instructor* 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

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- *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 SISMID summer school* June 2020  
Participant Online
- *Understanding and Exploring Network Epidemiology in the Time of Coronavirus* April 2020  
Participant Online

## Certifications

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### Certificate in College Teaching

**Boulder, CO**

Graduate Teacher Program

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

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- *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

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- Society for Industrial and Applied Mathematics (SIAM)
- The Network Science Society
- International Network for Social Network Analysis

## Media

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- *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