

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

Professional experience

Academic

University of Virginia <i>Assistant Professor of Biology</i>	Charlottesville, VA August 2024–
University of Vermont <i>TGIR Postdoctoral Research Fellow</i>	Burlington, VT 2022–August 2024
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 2309867](#), "Conference: Contagion on Complex Social Systems 2023,"
Co-writer with Jean-Gabriel Young (PI; University of Vermont) \$47,838
2023
- [NSF Award 2224051](#), "Conference: Computational Approaches for Contagion on Complex Social Systems"
Co-writer with Juan G. Restrepo (PI; University of Colorado Boulder) \$34,770
2022
- [NSF Award 2121905](#), "HNDS-I: Developing a software library for the analysis and visualization of spreading processes on social hypergraphs"
Co-writer with Juan G. Restrepo (PI; University of Colorado Boulder) \$80,193
2021–2022

Publications

Journal articles.....

- **Nicholas W. Landry**, Jean-Gabriel Young, and Nicole Eikmeier, *The simpliciality of higher-order networks*, EPJ Data Science, 2024. DOI: [10.1140/epjds/s13688-024-00458-1](https://doi.org/10.1140/epjds/s13688-024-00458-1)
- **Nicholas W. Landry**, Ilya Amburg, Mirah Shi, and Sinan G. Aksoy, *Filtering higher-order datasets*, Journal of Physics: Complexity, 2024. DOI: [10.1088/2632-072X/ad253a](https://doi.org/10.1088/2632-072X/ad253a)
- **Nicholas W. Landry** and Juan G. Restrepo, *Opinion disparity in hypergraphs with community structure*, Physical Review E, 2023. DOI: [10.1103/PhysRevE.108.034311](https://doi.org/10.1103/PhysRevE.108.034311)
- **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*, Journal of Open Source Software, 2023. DOI: [10.21105/joss.05162](https://doi.org/10.21105/joss.05162)
- **Nicholas W. Landry** and 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** and 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** and 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** and 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 and **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)

Preprints.....

- **Nicholas W. Landry**, Will Thompson, Laurent Hébert-Dufresne, and Jean-Gabriel Young, *Complex contagions can outperform simple contagions for network reconstruction with dense networks or saturated dynamics*, Preprint, 2024. [arXiv:2405.00129](https://arxiv.org/abs/2405.00129)

Conference proceedings.....

- 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)

Software

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

Presented work

Invited talks.....

- *Realistically modeling diseases: From data to models and back again* April 2024
WINQ Program on Complex and Quantum Systems Stockholm, Sweden
- *Higher-order structure is more complex than current measures and models* April 2024
Network Seminar Series of the CRI, LPI Paris
- *Modeling contagion processes with higher-order networks* February 2024
University of Virginia
- *Modeling contagion processes with higher-order networks* January 2024
Worcester Polytechnic Institute
- *Modeling contagion processes with higher-order networks* January 2024
University at Buffalo
- *Limitations and opportunities from simple higher-order structural and contagion models*
September 2023
Vermont-KIAS Workshop: Group Interactions in Network Science Burlington, VT
- *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
Joint Mathematics Meetings
- *Hypergraph assortativity: A dynamical systems perspective* March 2022
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.....

- *Learnability of complex structure from contagion of various complexities* March 2024
APS March Meeting Minneapolis, MN
- *XGI: A Python package for higher-order interaction networks* July 2023
NetSci Vienna, Austria
- *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

Tutorials.....

- *GSNP Short Course on Higher Order Network Science* March 2024
APS March Meeting Minneapolis, MN

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

Teaching

Experience

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 **Boulder, CO**
Teaching Assistant *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

Certifications

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

Awards

- Zachary Karate Club Award 2024
- 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

Students mentored

Adeline Southard **Burlington, VT**
Undergraduate student at UVM *2024*
 Project title: "Is *C. difficile* a network-mediated contagion?"
 Co-mentored with Jean-Gabriel Young

Yifei (Bell) Luo **Middlebury, VT**
Undergraduate student at Middlebury College *2024*

Project title: "Efficient sampling of configuration model random hypergraphs"
Co-mentored with Phil Chodrow

Will Thompson

Burlington, VT

Master's student in the Vermont Complex Systems Center

2023-2024

Project title: "Complex contagions can outperform simple contagions for network reconstruction with dense networks or saturated dynamics"

Erik Weis

Burlington, VT

Master's student in the Vermont Complex Systems Center

2022-2023

Project title: "Inferring global rankings from group-level local rankings"

Beckett Hyde

Boulder, CO

Undergraduate student in Applied Mathematics at CU Boulder

2022-2024

Project title: "A theoretical framework for neuromorphic computing on networks of organic electrochemical transistors"

Co-mentored with Juan G. Restrepo

Emerson McMullen and Arjun Asija

Boulder, CO

Undergraduate students at Harvey Mudd College

2022

Project title: "The stability of Supreme Court ideology and resistance to court-packing"

Co-mentored with Juan G. Restrepo and Heather Zinn Brooks

Service

Leadership and mentoring.....

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 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

Conferences and seminars organized.....

Talkbocotopus seminar series

Burlington, VT

Co-organizer

Fall 2022 - present

Contagion on Complex Social Systems Workshop (CCSS)

Burlington, VT

Co-chair

August 14-16, 2023

TopoNets satellite conference at NetSci

Vienna, Austria

Co-organizer

July 10, 2023

Models and Methods for Sparse (Hyper) Network Science at JMM <i>Co-organizer</i>	Boston, MA <i>January 6, 2023</i>
TopoNets symposium at the Conference on Complex Systems <i>Co-organizer</i>	Palma, Spain <i>October 20, 2022</i>
Contagion on Complex Social Systems Workshop (CCSS) <i>Co-chair</i>	Boulder, CO <i>August 10-12, 2022</i>
CU Boulder Applied Math Department <i>Joint coordinator of the Dynamical Systems seminar</i>	Boulder, CO <i>Spring 2021, 2022</i>

Program committees.....

NetSci 2024 <i>Program committee member</i>	Quebec City, Quebec, Canada <i>June 16-21, 2024</i>
Workshop on Modelling and Mining Networks <i>Program committee member</i>	Warsaw, Poland <i>June 3-7, 2024</i>

Peer review.....

Journals

BMC Bioinformatics; Chaos; Chaos, Solitons, and Fractals; Journal of Machine Learning Research; Journal of Open Source Software; Journal of Statistical Physics; Nature Communications; Nature Communication Physics; npj Complexity; Physical Review E; Physical Review Research; PLoS ONE; Science Advances; Scientific Reports

Conferences

Algorithm Engineering and Experiments (2022)

Other professional activities

Workshops attended.....

○ WINQ Program on Complex and Quantum Systems Participant	<i>April 2024</i> Stockholm, Sweden
○ Complex Networks Winter Workshop Participant	<i>December 2023</i> Quebec City, Quebec, Canada
○ MRC: Complex Social Systems Participant	<i>June 2023</i> Buffalo, NY
○ Modeling Pandemic Intervention Acceptance for Disease Mitigation Participant	<i>April 2023</i> Online
○ JSMF-SFI Postdocs in Complexity Conference X Participant	<i>March 2023</i> Santa Fe, NM
○ MRC: Models and Methods for Sparse (Hyper) Network Science Participant	<i>June 2022</i> Buffalo, NY
○ Complex Networks Winter Workshop (CNWW) Participant	<i>January 2021</i> Online
○ Statistics and Modeling with Novel Data Streams at the SISMIID summer school Participant	<i>June 2020</i> Online
○ Understanding and Exploring Network Epidemiology in the Time of Coronavirus Participant	<i>April 2020</i> Online

Organizations and affiliations.....

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

Media.....

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

Travel Grants

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|---|------------|
| ○ <i>CU Boulder Graduate School Student Travel Grant</i> | 2020, 2022 |
| ○ <i>2022 JMM Grad Student Travel Grant</i>
Awarded a \$1,300 travel grant | 2022 |
| ○ <i>Networks 2021 Registration Waiver</i>
Awarded a registration waiver for Networks 2021 which is being held virtually | 2021 |
| ○ <i>SIAM Student Travel Award</i>
Awarded a registration waiver for SIAM DS 2021 which is being held virtually | 2021 |