

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

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 2309867](#), "Conference: Contagion on Complex Social Systems 2023," \$47,838
Co-writer with Jean-Gabriel Young (PI; University of Vermont) 2023
- [NSF Award 2224051](#), "Conference: Computational Approaches for Contagion on Complex Social Systems" \$34,770
Co-writer with Juan G. Restrepo (PI; University of Colorado Boulder) 2022
- [NSF Award 2121905](#), "HNDS-I: Developing a software library for the analysis and visualization of spreading processes on social hypergraphs" \$80,193
Co-writer with Juan G. Restrepo (PI; University of Colorado Boulder) 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**, 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)

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.....

- *TBD* *April 2024*
WINQ Program on Complex and Quantum Systems Stockholm, Sweden
- *TBD* *April 2024*
Network Seminar Series of the CRI, LPI Paris

- *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

- 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

Will Thompson

Burlington, VT

Master's student in the Vermont Complex Systems Center

2022-

Project title: "Inferring network structure from the spread of complex contagion"

Erik Weis

Burlington, VT

Master's student in the Vermont Complex Systems Center

2022-

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

Beckett Hyde

Boulder, CO

Undergraduate student in Applied Mathematics at CU Boulder

2022

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 <i>Graduate Peer Mentor</i> Met with students over the course of the semester to check in and offer support	Boulder, CO 2020-2021
CU Boulder Applied Math Department <i>Lead Teaching Assistant</i> <ul style="list-style-type: none">○ 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	Boulder, CO 2018-2019
CU Boulder Applied Math Department <i>Graduate Student Representative</i> <ul style="list-style-type: none">○ 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	Boulder, CO 2018-2019
I Have a Dream Foundation of Boulder County <i>Tutoring Volunteer</i> Tutored students in the local school district in math and science	Lafayette, CO 2018
University of New Hampshire <i>Vice President of UNH Chapter of Pi Mu Epsilon</i>	Durham, NH 2012-2013

Conferences and seminars organized.....

Talkbocotopus seminar series <i>Co-organizer</i>	Burlington, VT Fall 2022 - present
Contagion on Complex Social Systems Workshop (CCSS) <i>Co-chair</i>	Burlington, VT August 14-16, 2023
TopoNets satellite conference at NetSci <i>Co-organizer</i>	Vienna, Austria July 10, 2023
Models and Methods for Sparse (Hyper) Network Science at JMM <i>Co-organizer</i>	Boston, MA January 6, 2023
TopoNets symposium at the Conference on Complex Systems <i>Co-organizer</i>	Palma, Spain October 20, 2022
Contagion on Complex Social Systems Workshop (CCSS) <i>Co-chair</i>	Boulder, CO August 10-12, 2022
CU Boulder Applied Math Department <i>Joint coordinator of the Dynamical Systems seminar</i>	Boulder, CO Spring 2021, 2022

Program committees.....

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

Peer review.....

Journals

Nature Communication Physics; Nature Communications; Physical Review Research; Scientific Reports; Physical Review E; Chaos, Solitons, and Fractals; Science Advances; Journal of Statistical Physics; Chaos; npj Complexity

Conferences

Algorithm Engineering and Experiments (2022)

Other professional activities

Workshops attended.....

- *WINQ Program on Complex and Quantum Systems* April 2024
Participant Stockholm, Sweden
- *Complex Networks Winter Workshop* December 2023
Participant Quebec City, Quebec, Canada
- *MRC: Complex Social Systems* June 2023
Participant Buffalo, NY
- *Modeling Pandemic Intervention Acceptance for Disease Mitigation* April 2023
Participant Online
- *JSMF-SFI Postdocs in Complexity Conference X* March 2023
Participant Santa Fe, NM
- *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 SIS MID summer school* June 2020
Participant Online
- *Understanding and Exploring Network Epidemiology in the Time of Coronavirus* April 2020
Participant Online

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*
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

- *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