

# Nicholas W. Landry

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## Education

<b>University of Colorado Boulder</b> <i>PhD in Applied Mathematics</i> Advisor: Juan G. Restrepo Dissertation: "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

## Professional 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 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

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### Journal articles.....

- **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)

### Preprints.....

- **Nicholas W. Landry**, Jean-Gabriel Young, and Nicole Eikmeier, *The simpliciality of higher-order networks*, Preprint, 2023. [arXiv:2308.13918](https://arxiv.org/abs/2308.13918)
- **Nicholas W. Landry**, Ilya Amburg, Mirah Shi, and Sinan G. Aksoy, *Filtering higher-order datasets*, Preprint, 2023. [arXiv:2305.06910](https://arxiv.org/abs/2305.06910)

## Software

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

## Presented work

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### Invited talks.....

- *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  
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.....

- *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

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### Experience.....

#### 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

## 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

## 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

Master's student in the Vermont Complex Systems Center

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

Burlington, VT

2022-

### Erik Weis

Master's student in the Vermont Complex Systems Center

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

Burlington, VT

2022-

### Beckett Hyde

Undergraduate student in Applied Mathematics at CU Boulder

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

Co-mentored with Juan G. Restrepo

Boulder, CO

2022

### Emerson McMullen and Arjun Asija

Undergraduate students at Harvey Mudd College

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

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

Boulder, CO

2022

## Service

### Leadership and mentoring

### University of Colorado Boulder

Graduate Peer Mentor

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

Boulder, CO

2020-2021

<b>CU Boulder Applied Math Department</b>	<b>Boulder, CO</b>
<i>Lead Teaching Assistant</i>	<i>2018–2019</i>

- 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

<b>CU Boulder Applied Math Department</b>	<b>Boulder, CO</b>
<i>Graduate Student Representative</i>	<i>2018–2019</i>

- 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

<b>I Have a Dream Foundation of Boulder County</b>	<b>Lafayette, CO</b>
<i>Tutoring Volunteer</i>	<i>2018</i>

Tutored students in the local school district in math and science

<b>University of New Hampshire</b>	<b>Durham, NH</b>
<i>Vice President of UNH Chapter of Pi Mu Epsilon</i>	<i>2012–2013</i>

#### Conferences and seminars organized.....

<b>TalkbOctopus seminar series</b>	<b>Burlington, VT</b>
<i>Co-organizer</i>	<i>Fall 2022 - present</i>

<b>Contagion on Complex Social Systems Workshop (CCSS)</b>	<b>Burlington, VT</b>
<i>Co-chair</i>	<i>August 14–16, 2023</i>

<b>TopoNets satellite conference at NetSci</b>	<b>Vienna, Austria</b>
<i>Co-organizer</i>	<i>July 10, 2023</i>

<b>Models and Methods for Sparse (Hyper) Network Science at JMM</b>	<b>Boston, MA</b>
<i>Co-organizer</i>	<i>January 6, 2023</i>

<b>TopoNets symposium at the Conference on Complex Systems</b>	<b>Palma, Spain</b>
<i>Co-organizer</i>	<i>October 20, 2022</i>

<b>Contagion on Complex Social Systems Workshop (CCSS)</b>	<b>Boulder, CO</b>
<i>Co-chair</i>	<i>August 10–12, 2022</i>

<b>CU Boulder Applied Math Department</b>	<b>Boulder, CO</b>
<i>Joint coordinator of the Dynamical Systems seminar</i>	<i>Spring 2021, 2022</i>

#### Program committees.....

<b>Workshop on Modelling and Mining Networks</b>	<b>Warsaw, Poland</b>
<i>Program committee member</i>	<i>June 3–7, 2024</i>

#### 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

##### Conferences

Algorithm Engineering and Experiments (2022)

## Other professional activities

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### 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 SISIMID 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

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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