

Nicholas W. Landry

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Education

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| 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

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| 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**, Ilya Amburg, Mirah Shi, and Sinan G. Aksoy, *Filtering higher-order datasets*, Preprint, 2023. [arXiv:2305.06910](https://arxiv.org/abs/2305.06910)
- **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.....

- *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

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

Software

- **ComplexX 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

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| Contagion on Complex Social Systems Workshop (CCSS) <i>Co-chair</i> | Burlington, VT <i>August 14-16, 2022</i> |
| TopoNets satellite conference at NetSci <i>Co-organizer</i> | Vienna, Austria <i>July 10, 2023</i> |
| 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> |

[Reviewer.....](#)

Journals

Nature Communication Physics; Nature Communications; Physical Review Research; Scientific Reports; Physical Review E; Chaos, Solitons, and Fractals; Science Advances

Conferences

Algorithm Engineering and Experiments (2022)

Teaching

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| University of Colorado Boulder <i>Instructor</i> | Boulder, CO <i>Summer 2020</i> |
| 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 <i>Teaching Assistant</i> | Boulder, CO <i>2017-Present</i> |
| <ul style="list-style-type: none"> ○ 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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| ○ <i>MRC: Complex Social Systems</i> Participant | <i>June 2023</i> Buffalo, NY |
| ○ <i>Modeling Pandemic Intervention Acceptance for Disease Mitigation</i> Participant | <i>April 2023</i> Online |
| ○ <i>JSMF-SFI Postdocs in Complexity Conference X</i> Participant | <i>March 2023</i> Santa Fe, NM |
| ○ <i>MRC: Models and Methods for Sparse (Hyper) Network Science</i> Participant | <i>June 2022</i> Buffalo, NY |
| ○ <i>Complex Networks Winter Workshop (CNWW)</i> Participant | <i>January 2021</i> Online |
| ○ <i>Statistics and Modeling with Novel Data Streams at the SISIMID summer school</i> Participant | <i>June 2020</i> Online |
| ○ <i>Understanding and Exploring Network Epidemiology in the Time of Coronavirus</i> Participant | <i>April 2020</i> 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