Nicholas W. Landry

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nwlandry

Education

University of Colorado Boulder — **Boulder, CO**
PhD in Applied Mathematics — *2017–2022*
Advisor: Juan G. Restrepo
"Contagion on Complex Systems: Structure and Dynamics"

University of Colorado Boulder — **Boulder, CO**
MS in Applied Mathematics — *2017–2020*

University of New Hampshire — **Durham, NH**
BS in Mechanical Engineering — *2010–2014*
University Honors, Summa Cum Laude

Experience

Research

University of Vermont — **Burlington, VT**
TGIR Postdoctoral Research Fellow — *2022–Present*

University of Colorado Boulder — **Boulder, CO**
Research Assistant — *2019–2022*

University of New Hampshire — **Durham, NH**
Research Assistant — *2013–2015*

Industry

Pacific Northwest National Laboratory — **Seattle, WA**
PhD Intern in the Data Sciences and Analytics Group — *Summer 2021*

Turbocam International — **Barrington, NH**
Manufacturing Engineer — *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** and Juan G. Restrepo, *Polarization in hypergraphs with community structure*, Preprint, 2023. arXiv: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
- **Nicholas W. Landry**, jimi adams, *On limitations of uniplex networks for modeling multiplex contagion*, PLoS ONE, 2023. DOI: 10.1371/journal.pone.0279345

- **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

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

- *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

- CompleX 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*

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, Physical Review E

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 **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

Workshops

- *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

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

- *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 Network Science Society
- International Network for Social Network Analysis

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