Nicholas W. Landry

✉ nicholas.landry@virginia.edu   •   🌐 nwlandry.com   •   🐦 nwlandry
🐙 nwlandry

Education

University of Colorado Boulder   **Boulder, CO**
PhD in Applied Mathematics   *2017–2022*
Advisor: Juan G. Restrepo
Dissertation: "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

Professional experience

Academic

University of Virginia   **Charlottesville, VA**
Assistant Professor of Biology   *August 2024–*

University of Virginia   **Charlottesville, VA**
Assistant Professor of Data Science (courtesy appointment)   *January 2025–*

Vermont Complex Systems Institute at the University of Vermont   **Burlington, VT**
External Faculty   *August 2024–*

University of Vermont   **Burlington, VT**
TGIR Postdoctoral Research Fellow   *2022–August 2024*

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**
Product Engineer   *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*

Publications

Journal articles

○ **Nicholas W. Landry**, Will Thompson, Laurent Hébert-Dufresne, and Jean-Gabriel Young, *Reconstructing networks from simple and complex contagions*, Physical Review E, 2024.
DOI: 10.1103/PhysRevE.110.L042301

○ **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

○ **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

○ **Nicholas W. Landry** and Juan G. Restrepo, *Opinion disparity in hypergraphs with community structure*, Physical Review E, 2023. DOI: 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

○ **Nicholas W. Landry** and jimi adams, *On limitations of uniplex networks for modeling multiplex contagion*, PLoS ONE, 2023. DOI: 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

○ **Nicholas W. Landry**, *Effect of time-dependent infectiousness on epidemic dynamics*, Physical Review E, 2021. DOI: 10.1103/PhysRevE.104.064302

○ **Nicholas W. Landry** and Juan G. Restrepo, *The effect of heterogeneity on hypergraph contagion models*, Chaos, 2020. *(Editor's Choice)* DOI: 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

○ 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

Preprints

○ Laurent Hébert-Dufresne, **Nicholas W. Landry**, Juniper Lovato, Jonathan St-Onge, Jean-Gabriel Young, Marie-Ève Couture-Ménard, Stéphane Bernatchez, Catherine Choquette, and Alan A. Cohen, *Governance as a complex, networked, democratic, satisfiability problem*, Preprint, 2024. arXiv:2412.03421

○ **Nicholas W. Landry**, Beckett R. Hyde, Jake C. Perez, Sean E. Shaheen, and Juan G. Restrepo, *A theoretical framework for reservoir computing on networks of organic electrochemical transistors*, Preprint, 2024. arXiv:2408.09223

○ Laurent Hébert-Dufresne, Matthew M. Kling, Samuel F. Rosenblatt, Stephanie N. Miller, P. Alexander Burnham, **Nicholas W. Landry**, Nicholas J. Gotelli, and Brian J. McGill, *Stochastic diffusion with approximate master equations with mean-field limits*, Preprint, 2024. arXiv:2408.07755

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](#)

Software

○ [Comple**X** **G**roup **I**nteractions](#) (XGI): Creator and Core Developer   *NumFOCUS affiliated*
○ [HyperContagion](#): Creator and Core Developer
○ [HyperNetX](#): Contributor

Presented work

Invited talks...

○ *Opinion disparity in hypergraphs with community structure: theory and practice*   *May 2025*
SIAM Dynamical Systems   Denver, CO

○ *Realistically modeling diseases: From data to models and back again*   *April 2024*
Bryn Mawr College Bi-Co Mathematics Colloquium   Bryn Mawr, PA

○ *Realistically modeling diseases: From data to models and back again*   *February 2025*
University of Virginia Statistics Colloquium   Charlottesville, VA

○ *Realistically modeling diseases: From data to models and back again*   *April 2024*
Grinnell College   Grinnell, IA

○ *Opinion disparity in hypergraphs with community structure: theory and practice*   *October 2024*
DIMACS Workshop at Rutgers University   New Brunswick, NJ

○ *Modeling contagion processes with noisy and uncertain networks*   *October 2024*
Graph and Network Data Seminar at the University of Virginia   Charlotteville, VA

○ *Modeling contagion processes with noisy and uncertain networks*   *October 2024*
EEBio Seminar at the University of Virginia   Charlotteville, VA

○ *Reconstructing networks from complex social processes*   *September 2024*
Quantitative Collaborative Seminar at the University of Virginia   Charlotteville, VA

○ *CompleX Group Interactions (XGI)*   *June 2024*
Software Tools for Network Science Satellite at NetSci   Quebec City, Quebec, Canada

○ *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

- *Efficient sampling from the hypergraph configuration model* — June 2025
  NetSci — Maastricht, the Netherlands
- *Governance as a complex, networked, democratic, satisfiability problem* — March 2025
  APS Global Physics Summit — Anaheim, CA
- *Nonparametric approach to network reconstruction from time-series data* — June 2024
  NetSci — Quebec City, Quebec, Canada
- *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

- *Reconstructing networks from simple and complex contagions* January 2025
  Dynamics Days
- *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

- *Minitutorial: A Practical Guide to Modeling with Higher-order Networks* May 2025
  Conference on Applications of Dynamical Systems Denver, CO
- *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

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: "Reconstructing networks from simple and complex contagions"

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 reservoir 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

Contagion on Complex Social Systems Workshop (CCSS)

Co-chair

- Burlington, VT, August 14-16, 2023
- Boulder, CO, August 10-12, 2022

Software and Data for Supporting Network Science satellite workshop

Co-chair

- Maastricht, Netherlands, June 2, 2025 (Co-located with NetSci)

TopoNets satellite workshop

Co-organizer

- Maastricht, Netherlands, June 2, 2025 (Co-located with NetSci)
- Quebec City, Canada, June 17, 2024 (Co-located with NetSci)
- Vienna, Austria, July 10, 2023 (Co-located with NetSci)
- Palma, Spain, October 20, 2022 (Co-located with CCS)

Talkboctopus seminar series **Burlington, VT**

Co-organizer *Fall 2022 - Spring 2023*

Models and Methods for Sparse (Hyper) Network Science

Co-organizer

- Boston, MA, January 6, 2023 (Co-located with JMM)

CU Boulder Applied Math Department   **Boulder, CO**
Joint coordinator of the Dynamical Systems seminar   *Spring 2021, 2022*

Program committees

- The International School and Conference on Network Science (NetSci): 2024, 2025
- Workshop on Modelling and Mining Networks (WAW): 2024, 2025

Peer review

Journals

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

Conferences

Algorithm Engineering and Experiments (2022)

Other professional activities

Workshops attended

- *Workshop on Spreading on Social Networks at DIMACS at Rutgers*   *October 2024*
  Participant   New Brunswick, NJ
- *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 SISMID 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 American Physical Society (APS)

- The Network Science Society
- The Complex Systems Society

Media

- *Reconstructing networks from simple and complex contagions*
  October 28th, 2024
  Quantum Photonics Club podcast
- *Are Ideas Contagious?*
  October 9th, 2024
  University of Virginia College of Arts & Sciences Press Release
- *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