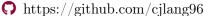
# Christopher Lang, Ph.D.

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# **Education**

2020 – 2024	Ph.D., University of Waterloo
	Pure Mathematics - Thesis title: Solitons with continuous symmetries
2019 – 2020	Master of Advanced Study, University of Cambridge (Queens' College) Mathematics
2014 – 2019	BMath, Co-op, University of Waterloo Mathematical Physics and Pure Mathematics

# Research

### **Journal Articles**

- C. J. Lang, "Hyperbolic monopoles with continuous symmetries," *Journal of Geometry and Physics*, vol. 203, p. 105 258, 2024, ISSN: 0393-0440. ODOI: 10.1016/j.geomphys.2024.105258. arXiv: 2310.10626.
- B. Charbonneau, A. Dayaprema, C. J. Lang, Á. Nagy, and H. Yu, "Construction of Nahm data and BPS monopoles with continuous symmetries," *Journal of Mathematical Physics*, vol. 63, no. 1, p. 013 507, 2022, Editor's Pick, ISSN: 0022-2488. ODI: 10.1063/5.0055913. arXiv: 2102.01657.
- C. J. Lang and M. L. Waite, "Scale-dependent anisotropy in forced stratified turbulence," *Physical Review Fluids*, vol. 4, p. 044 801, 4 2019. ODI: 10.1103/PhysRevFluids.4.044801.

#### **Invited Talks**

- An introduction to monopoles, instantons, and more, Colloquium talk, Memorial University of Newfoundland, Oct. 2024.
- Instantons with continuous symmetries, Geometric Models of Matter, University of Leeds, Aug. 2024. 

  Ourl: https://www.youtube.com/watch?v=a5dZKpBPkxQ&.
- 3 Spherically symmetric hyperbolic monopoles, CMS Winter Meeting, Dec. 2023.
- 4 Spherically symmetric hyperbolic monopoles, Colloquium talk, Memorial University of Newfoundland, Oct. 2023.
- 5 Revisiting symmetric hyperbolic monopoles, Differential Geometry Working Seminar, University of Waterloo, Jul. 2023.
- 6 Hyperbolic monopoles with continuous symmetries (Part 2), Differential Geometry Working Seminar, University of Waterloo, Mar. 2023.
- 7 Hyperbolic monopoles with continuous symmetries, Differential Geometry Working Seminar, University of Waterloo, Nov. 2022.
- 8 Understanding and mitigating student resistance to active learning, Graduate Students in Teaching Conference, University of British Columbia, May 2022.
- 9 The spectral curve of a SU(2) monopole (Part 2): Identifying subbundles, Differential Geometry Working Seminar, University of Waterloo, Apr. 2022.

- Understanding and mitigating student resistance to active learning, Teaching and Learning Conference, University of Waterloo, Apr. 2022.
- The spectral curve of a SU(2) monopole (Part 1): A holomorphic vector bundle, Differential Geometry Working Seminar, University of Waterloo, Mar. 2022.
- Constructing BPS monopoles with spherical symmetry, Oxford-London Gauge Assembly, University College London, Jun. 2021.
- Constructing Nahm data and BPS monopoles with continuous symmetries, Ottawa Mathematics Conference, University of Ottawa, May 2021.
- Constructing BPS monopoles with spherical symmetry, GSTGC, Indiana University, Apr. 2021.
- On the charge density and asymptotic tail of a monopole, Differential Geometry Working Seminar, University of Waterloo, Mar. 2021.
- The many faces of monopoles, Differential Geometry Working Seminar, University of Waterloo, Feb. 2021.
- Using group actions to simplify differential equations, Part III Seminar Series, University of Cambridge, Dec. 2019.
- 18 Simplifying Nahm data with group actions, CUMC, Queen's University, Jul. 2019.
- The ADHM–Nahm procedure, Geometry Seminar, University of Waterloo, Jun. 2019.
- Simplifying Nahm data with group actions, Geometry Seminar, University of Waterloo, May 2019.
- Local isotropy in stratified turbulence, USRA Mini-Conference, University of Waterloo, Aug. 2018.

#### **Thesis**

C. J. Lang, "Solitons with continuous symmetries," Ph.D. Thesis, University of Waterloo, Waterloo, Canada, 2024. OURL: https://hdl.handle.net/10012/20906.

# **Teaching**

### **Certifications**

Mar. 2022 Certificate in University Teaching

Dec. 2020 Fundamentals of University Teaching

Nov. 2020 Certificate in Online Course Facilitation

### Lecturing

Fall, 2022 MATH 137 - Calculus I for Honours Mathematics, University of Waterloo

# Programming Skills

Fortran, Maple, Git, L'EX

### **Awards**

2023–2024 Rai Mathematics Graduate Scholarship

Ontario Graduate Scholarship

# **Awards (continued)**

Outstanding Teaching Assistant Award Alexander Graham Bell CGS - Doctoral 2020-2023 President's Graduate Scholarship 2020-2024

Jessie Zou Excellence in Research (Finalist)

NSERC CGS - Masters (Declined)

NSERC Undergraduate Student Research Award 2016, 2018 & 2019

# **Areas of Interest**

Lie theory, moduli spaces, and gauge theory—specifically instantons and monopoles

# References

#### Research

#### Dr. Benoit Charbonneau

University of Waterloo Department of Pure Mathematics

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#### Dr. Derek Harland

University of Leeds School of Mathematics

☑ D.G.Harland@leeds.ac.uk

### Dr. Ruxandra Moraru

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## **Teaching**

### Dr. Blake Madill

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### **■** Dr. Henry Shum

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