Christopher Elliott

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Research mathematician transitioning to machine learning with a particular interest in AI safety and alignment, bringing expertise in algebraic geometry, differential geometry, and topology. Experienced in developing mathematical frameworks for complex systems and translating between theoretical structures and physical applications. Seeking to apply rigorous mathematical approaches to fundamental challenges in machine learning.

Research Expertise & Skills

- Research experience: published 14 papers in leading mathematics journals on algebraic and geometric aspects of quantum field theory

- Technical skills: Python (NumPy, PyTorch), C, LaTeX, Git, Linux/Unix

- Communication skills: teaching, technical writing, collaborative research

- Mathematical skills: linear algebra and multivariate calculus, algebraic and differential geometry, topology, representation theory, mathematical physics

Education

Ph.D. in Mathematics — 2016
Northwestern University — Evanston, IL

MMath, Mathematics — 2010
University of Cambridge — Cambridge, UK

Professional Development

Deep Learning Specialization — 2024
DeepLearning.AI — Coursera

Professional Experience

Visiting Assistant Professor — 2022–Present
Amherst College — Amherst, MA

- Led research investigating geometric and algebraic aspects of supersymmetric field theories

- Taught 10 courses in calculus, linear algebra, number theory, topology, abstract algebra, and Lie theory: ~ 200 students

- Organized 9 collaborative research workshops in mathematical physics

- Mentored undergraduate research in algebra and mathematical physics

Visiting Assistant Professor — 2019–2022
University of Massachusetts — Amherst, MA

- Led research on geometric aspects of quantum field theory

- Created and co-taught a graduate course on moduli spaces in representation theory

- Taught 11 large undergraduate courses in calculus, abstract algebra and differential equations: ~ 400 students

- Organized an online graduate workshop hosted by ICTS, Bengaluru, India, with over 600 participants from over 35 countries

Postdoctoral Fellow — 2016–2019
IHÉS — Bures sur Yvette, France

- Conducted research in geometric representation theory and mathematical physics

- Built international collaborations with 8 collaborators in 5 countries