Alison Warman

warman@maths.ox.ac.uk

www.maths.ox.ac.uk/people/alison.warman

inspirehep.net/authors/2724182

ORCID:0009-0001-7199-5426

Mathematical Institute,
University of Oxford,
OX2 6GG

Interests

- Generalized symmetries
- Topological Field Theories
- Conformal Field Theories
- Quantum Phases of Matter
- Quantum Information

Programming

- GAP-system
- Mathematica
- Linux
- Python
- LaTeX

Languages

- **English:** Native proficiency
  IELTS band score 8.5 / 9.0
- **Italian:** Native proficiency
- **French:** DELF A2 level

Doctoral student – University of Oxford

I am a theoretical physicist working on generalized symmetries in quantum systems, ranging from high energy physics to condensed matter and quantum computation

Education

present – 2023 **Doctor of Philosphy in Mathematics** *University of Oxford, United Kingdom*
Research topic: Generalized Symmetries in Quantum Systems
Research group: Mathematical physics
Supervisor: Prof. Sakura Schäfer-Nameki

2023 – 2021 **Master's Degree in Theoretical Physics** *Università di Genova, Italy*
Thesis title: The BRST structure of conformal supergravity and its anomalies
Supervisor: Prof. Camillo Imbimbo
Final mark: 110/110 *cum laude*
Grade Point Average: 30/30 *cum laude*

2021 – 2018 **Bachelor's Degree in Physics** *Università di Genova, Italy*
Final mark: 110/110 *cum laude*
Grade Point Average: 30/30 *cum laude*

2018 – 2013 **Secondary School Diploma** *Scientific High School Nicoloso da Recco, Italy*
Final mark: 100/100 *cum laude*

Teaching Experience

2026 – 2025 **String Theory 1 Tutor** *University of Oxford, United Kingdom*
for mathematical and theoretical physics master's students

2023 **Classical Mechanics Teaching Assistant** *University of Oxford, United Kingdom*
for 3rd year undergraduate maths and physics students

2023 – 2022 **Quantum Mechanics Tutor** *Università di Genova, Italy*
for 3rd year undergraduate physics students

2022 – 2021 **Maths and Physics Tutor** *Università di Genova, Italy*
for 1st year undergraduate engineering and architecture students

Invited talks and seminars

2026 **Phases with Generalized Symmetries from the SymTFT**
Quantum Theories of Fields, Matter, and Strings seminar series

2025 **Phases with Generalized Symmetries**
High Energy Theory Seminar, *Caltech, Pasadena, United States*
Geometry and Mathematical Physics, *University of Birmingham, United Kingdom*

2025 **Phases with non-invertible symmetries in (1+1)d: from Categories to Cold Atoms** Generalized Symmetries: High-Energy, Condensed Matter and Mathematics, *KITP, UC Santa Barbara, United States*

2025 **Phases with non-invertible symmetries in (1+1)d**
Non-Invertible Symmetries in Condensed Matter Theory, *All Souls College, Oxford*

2025 **Aspects of anomalies**
Junior Strings, *Mathematical Institute, Oxford, United Kingdom*

2024 **Superconformal anomalies from superconformal Chern-Simons polynomials** "Milla Baldo Ceolin" award, *Galileo Galilei Institute, Florence, Italy*

2024 **Physical applications of generalized symmeries**
Oxford Weekly Symmetry Meetings, *Department of Physics, Oxford, United Kingdom*

2023 **The index theorem and applications to physics**
Geometric Methods in Mathematical Physics course, *Università di Genova, Italy*

Poster presentations

2025 **Phases with Generalized Symmetries**
XXI Avogadro Meeting, *Catania, Italy*

2025 **Hybrid Lattice Surgery: Non-Clifford Gates via Non-Abelian Surface Codes**
TENSOR25 PhD School, *Göttingen, Germany*

2024 **Gapless SPT and SSB Phases with Non-Invertible Symmetries in (1+1)d**
Symmetries 2024, *Mathematical Institute, Oxford, United Kingdom*

Conferences and Schools attended

2025 **XXI Avogadro Meeting** *Catania, Italy*

2025 **The Many Faces of Boundaries, Impurities, and Defects**
Isaac Newton Institute for Mathematical Sciences, Cambridge, United Kingdom

2025 **TENSOR25 PhD School** *Göttingen, Germany*

2025 **The Physics and Mathematics of Boundaries, Impurities, and Defects**
Isaac Newton Institute for Mathematical Sciences, Cambridge, United Kingdom

2025 **Generalized Symmetries: High-Energy, Condensed Matter and Mathematics** *KITP, UC Santa Barbara, United States*

2025 **Non-Invertible Symmetries in Condensed Matter Theory** *All Souls College, Oxford*

2024 **Symmetries 2024 (co-organizer)** *Mathematical Institute, Oxford, United Kingdom*

2025 **XIX Avogadro Meeting** *Padova, Italy*

2023 **LACES 2023 Winter School** *Galileo Galilei Institute, Florence, Italy*

2022 **Supergravity 2022** *Genova, Italy*

Honours and Awards

2027 – 2023 **Full Oxford DPhil Scholarship** UKRI Frontier Research Grant, underwriting the ERC Advanced Grant "Generalized Symmetries in Quantum Field Theory and Quantum Gravity" of Prof. Sakura Schäfer-Nameki

2023 **"Milla Baldo Ceolin" award** Top 10 INFN Master's theses by female students

2023 **"Sig.ra Elda Leonarda Signorile" award** Top Master's Physics student at the University of Genova

2021 **University of Genova partial fee exemption** Top 10% third year Physics Bachelor students

2020 **University of Genova partial fee exemption** Top 10% second year Physics Bachelor students

2019 **University of Genova partial fee exemption** Top 10% first year Physics Bachelor students

2018 **University of Genova partial fee exemption** Top marks in secondary school diploma

2018 **Qualified to participate** Team competition of the Mathematics Olympiad - Nationals

2018 **Second Place** Physics Olympiad - Regionals

Preprints and Publications

[1] A. Warman and S. Schafer-Nameki, "Transversal Clifford-Hierarchy Gates via Non-Abelian Surface Codes," arXiv:2512.13777 [quant-ph].

[2] S.-J. Huang, A. Warman, S. Schafer-Nameki, and Y. Chen, "Hybrid Lattice Surgery: Non-Clifford Gates via Non-Abelian Surface Codes," arXiv:2510.20890 [quant-ph].

[3] S. Schafer-Nameki, A. Tiwari, A. Warman, and C. Zhang, "SymTFT Approach for Mixed States with Non-Invertible Symmetries," arXiv:2507.05350 [quant-ph].

[4] L. Bhardwaj, Y. Gai, S.-J. Huang, K. Inamura, S. Schafer-Nameki, A. Tiwari, and A. Warman, "Gapless Phases in (2+1)d with Non-Invertible Symmetries," arXiv:2503.12699 [cond-mat.str-el].

[5] L. Bhardwaj, S. Schafer-Nameki, A. Tiwari, and A. Warman, "Gapped Phases in (2+1)d with Non-Invertible Symmetries: Part II," arXiv:2502.20440 [hep-th].

[6] A. Warman, F. Yang, A. Tiwari, H. Pichler, and S. Schafer-Nameki, "Categorical Symmetries in Spin Models with Atom Arrays," *Phys. Rev. Lett.* 135 no. 20, (2025) 206503, arXiv:2412.15024 [cond-mat.str-el].

[7] F. Apruzzi, S. Schafer-Nameki, and A. Warman, "Non-Invertible Symmetries in 6d from Green-Schwarz Automorphisms," arXiv:2411.09674 [hep-th].

[8] L. Bhardwaj, D. Pajer, S. Schafer-Nameki, A. Tiwari, A. Warman, and J. Wu, "Gapped phases in (2+1)d with non-invertible symmetries: Part I," *SciPost Phys.* 19 no. 2, (2025) 056, arXiv:2408.05266 [hep-th].

[9] L. Bhardwaj, D. Pajer, S. Schafer-Nameki, and A. Warman, "Hasse diagrams for gapless SPT and SSB phases with non-invertible symmetries," *SciPost Phys.* 19 no. 4, (2025) 113, arXiv:2403.00905 [cond-mat.str-el].

[10] C. Imbimbo, D. Rovere, and A. Warman, "Superconformal anomalies from superconformal Chern-Simons polynomials," *JHEP* 05 (2024) 277, arXiv:2311.05684 [hep-th].