

Alison Warman

Doctoral student – University of Oxford

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CURRICULUM VITAE

Theoretical physicist combining formal theory, condensed-matter physics, and quantum information.

Keywords: generalized symmetries, anomalies, quantum phases of matter, quantum criticality, topological theories, non-Abelian codes, fault-tolerant quantum computation.

EDUCATION

present – **Doctor of Philosophy in Mathematics**, *University of Oxford, United Kingdom*

2023 Research topic: Generalized Symmetries in Quantum Systems

Research group: Mathematical physics

Supervisor: Prof. Sakura Schäfer-Nameki

2023 – **Master’s Degree in Theoretical Physics**, *Università degli Studi di Genova, Italy*

2021 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 – **Bachelor’s Degree in Physics**, *Università degli Studi di Genova, Italy*

2018 Final mark: 110/110 *cum laude*

Grade Point Average: 30/30 *cum laude*

2018 – **Secondary School Diploma**, *Scientific High School Nicoloso da Recco, Italy*

2013 Final mark: 100/100 *cum laude*

PUBLICATIONS

I have authored **13** research articles: **6** published, a further **2** accepted for publication, and **5** preprints. Authors are often listed alphabetically, as is conventional in hep-th. All my papers can be found on inspirehep.net/authors/2724182.

- [1] A. Warman and S. Schafer-Nameki, “Constant-Depth Clifford-Hierarchy Gates via Non-Abelian Surface Codes,” *PRX Quantum* 7 no. 3, (2026) 033029, [arXiv:2512.13777](https://arxiv.org/abs/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](https://arxiv.org/abs/2510.20890) [quant-ph]. *Accepted for publication in Quantum*.
- [3] 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,” *SciPost Phys.* 21 (2026) 019, [arXiv:2503.12699](https://arxiv.org/abs/2503.12699) [cond-mat.str-el].
- [4] 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](https://arxiv.org/abs/2412.15024) [cond-mat.str-el].
- [5] F. Apruzzi, S. Schafer-Nameki, and A. Warman, “Non-Invertible Symmetries in 6d from Green-Schwarz Automorphisms,” [arXiv:2411.09674](https://arxiv.org/abs/2411.09674) [hep-th]. *Accepted for publication in JHEP*.
- [6] 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](https://arxiv.org/abs/2408.05266) [hep-th].
- [7] 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](https://arxiv.org/abs/2403.00905) [cond-mat.str-el].
- [8] C. Imbimbo, D. Rovere, and A. Warman, “Superconformal anomalies from superconformal Chern-Simons polynomials,” *JHEP* 05 (2024) 277, [arXiv:2311.05684](https://arxiv.org/abs/2311.05684) [hep-th].

PREPRINTS

- [9] A. Warman, N. Tantivasadakarn, and S. Schafer-Nameki, “Exact Recovery for Non-Abelian Surface Codes,” [arXiv:2610.03677](https://arxiv.org/abs/2610.03677) [quant-ph].
- [10] A. Warman, Y. Gai, and S. Schafer-Nameki, “Twin Phases: Intrinsic Deconfined Quantum Criticality,” [arXiv:2605.31601](https://arxiv.org/abs/2605.31601) [cond-mat.str-el].
- [11] Y. Gai, S. Schafer-Nameki, and A. Warman, “Twin Algebras: Condensable Algebras beyond Anyons,” [arXiv:2605.31602](https://arxiv.org/abs/2605.31602) [cond-mat.str-el].
- [12] S. Schafer-Nameki, A. Tiwari, A. Warman, and C. Zhang, “SymTFT Approach for Mixed States with Non-Invertible Symmetries,” [arXiv:2507.05350](https://arxiv.org/abs/2507.05350) [quant-ph].
- [13] 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](https://arxiv.org/abs/2502.20440) [hep-th].

ACADEMIC SCHOLARSHIPS AND AWARDS

- 2027 – Full Oxford DPhil Scholarship, funded by the UKRI Frontier Research Grant, underwriting
2023 the ERC Advanced Grant “Generalized Symmetries in Quantum Field Theory and Quantum Gravity” of Prof. Sakura Schäfer-Nameki
- 2023 “Milla Baldo Ceolin” award from the Italian National Institute of Nuclear Physics (INFN)
- 2023 “Sig.ra Elda Leonarda Signorile” award for top master’s student in physics at the University of Genova
- 2021 – University of Genova partial fee exemption for the top 10% of bachelor’s students in physics in each year
2018 and for top marks in the secondary-school diploma
- 2018 Qualified to participate in the national team competition of the Mathematics Olympiad
- 2018 Second place in the regional round of the Physics Olympiad

LANGUAGES AND TECHNICAL SKILLS

Languages: English (native proficiency, IELTS 8.5/9.0), Italian (native proficiency), and French (DEL F A2).

Systems and Tools: Linux command line, remote computing via SSH and VPN, Oxford’s Advanced Research Computing Cluster, OpenAI Codex, and Claude Code. **Research Computing:** **Python** for numerical studies of lattice models.

GAP (Groups, Algorithms and Programming) and **Mathematica** for analytical calculations involving generalized symmetries. **Developer of the AlgebrasTQD GAP code:** <https://github.com/AlisonWarman/AlgebrasTQD>.

TEACHING EXPERIENCE

- 2026 – **String Theory 1 Tutor**, *University of Oxford, United Kingdom*
- 2025 for mathematical and theoretical physics Master’s students
- 2023 **Classical Mechanics Teaching Assistant**, *University of Oxford, United Kingdom*
for third-year undergraduate mathematics and physics students
- 2023 – **Quantum Mechanics Tutor**, *University of Genova, Italy*
- 2022 for third-year undergraduate physics students
- 2022 – **Maths and Physics Tutor**, *University of Genova, Italy*
- 2021 for first-year undergraduate engineering and architecture students

EDITORIAL ACTIVITIES AND CONFERENCE ORGANIZATION

- 2026 **Referee** for *PRX Quantum*
- 2025 **Referee** for *Journal of High Energy Physics (JHEP)*
- 2024 **Co-organizer** of the **Symmetries 2024** conference in *Oxford, United Kingdom*

INVITED TALKS AND SEMINARS

Generalized symmetries:

- 2026 **Twin Algebras and Intrinsic Deconfined Quantum Criticality**,
Fundamental Physics UK 2026, *Liverpool, United Kingdom*
- 2026 **Phases from the SymTFT: from intrinsic DQCP transitions to mixed states with non-invertible symmetries**, Topological Families 2026, *St John’s College, Oxford, United Kingdom*
- 2026 **Intrinsic DQCP Transitions from Twin Phases**
Symmetries 26 Conference, *IHP, Paris, France*
- 2026 **Twin Phases: Phase Transitions Without Hidden Symmetry Breaking**, Defects and Extended Excitations in Quantum Field Theory, Quantum Matter and Statistical Models, *GGI, Florence, Italy*
- 2026 **Categorical Symmetries: from Phases to Phase Gates**
Symmetry Seminar series, *online*
London Institute for Mathematical Sciences, *London, United Kingdom*
- 2026 **SymTFT Approach for Mixed States with Non-Invertible Symmetries**
Quantum Information and Quantum Gravity Group of Stockholm University, *online*
- 2026 **Generalized Symmetries and Symmetry Topological Field Theory**
Theoretical Physics Seminar, *University of Genova, Italy*
- 2026 – **Phases with Generalized Symmetries from the SymTFT**
- 2025 Quantum Theories of Fields, Matter, and Strings seminar series
Geometry and Mathematical Physics, *University of Birmingham, United Kingdom*
High Energy Theory Seminar, *Caltech, Pasadena, USA*
- 2025 **Phases with Non-Invertible Symmetries in (1+1)d: from Categories to Cold Atoms**
Generalized Symmetries: High-Energy, Condensed Matter and Mathematics, *KITP, Santa Barbara, USA*
Non-Invertible Symmetries in Condensed Matter Theory, *All Souls College, Oxford, United Kingdom*
- 2024 **Physical applications of generalized symmetries**
Oxford Weekly Symmetry Meetings, *Oxford, United Kingdom*

Quantum computing:

- 2026 **Non-Abelian Codes: from Clifford-Hierarchy Gates to QEC**
Oxford QEC Workshop, *Oxford, United Kingdom*
- 2026 **Logical Gates of Arbitrary Precision in 2D Topological Codes**
QID2026: qLDPC Theory and Application, *KIAS, Seoul, South Korea*
- 2026 **Transversal Gates at Arbitrary Levels of the Clifford Hierarchy in 2D Topological Codes**
Quantum Error Correction conference 2026, *Santa Barbara, USA*
- 2026 **Hybrid Lattice Surgery: Non-Clifford Gates via Non-Abelian Surface Codes**
Quantum Error Correction conference 2026, *Santa Barbara, USA*
- 2026 **Non-Clifford Gates via Non-Abelian Topological Orders**
APS March Meeting, *virtual session*
- 2026 **Transversal Clifford-Hierarchy Gates in 2D via Non-Abelian Surface Codes**
Higher Structures from Symmetries in Quantum Field Theory, *Oberwolfach, Germany*
Quantum Nosh, *Oxford, United Kingdom*
- 2026 **Clifford-Hierarchy Gates from Group Quantum Doubles**
Lattice Methods, TQFTs, and Symmetries, *Uppsala, Sweden*
- 2026 **Quantum Computing from Topological Field Theory**
Oxford Weekly Symmetry Meetings and Mathematical Physics Journal Club, *Oxford, United Kingdom*

Anomalies in Quantum Field Theory:

- 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*
- 2023 **The index theorem and applications to physics**
Geometric Methods in Mathematical Physics course, *University of Genova, Italy*

POSTER PRESENTATIONS

- 2026 **Twin Phases: Phase Transitions Without Hidden Symmetry Breaking**
Symmetries 26 Conference, *IHP, Paris, France*
- 2026 **Transversal Clifford-Hierarchy Gates via Non-Abelian Surface Codes**
Quantum Computing Theory in Practice (QCTiP), *Oxford, United Kingdom*
- 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

- 2026 **Topological Families 2026**, *St John's College, Oxford, United Kingdom*
- 2026 **QID2026: qLDPC Theory and Application**, *KIAS, Seoul, South Korea*
- 2026 **Symmetries 26 Conference**, *IHP, Paris, France*
- 2026 **Defects and Extended Excitations in Quantum Field Theory, Quantum Matter and Statistical Models**, *GGI, Florence, Italy*
- 2026 **Quantum Error Correction conference QEC26**, *Santa Barbara, USA*
- 2026 **Quantum Computing Theory in Practice (QCTiP)**, *Oxford, United Kingdom*
- 2026 **APS March Meeting**, *virtual session*
- 2026 **Higher Structures from Symmetries in Quantum Field Theory**, *Oberwolfach, Germany*
- 2026 **Lattice Methods, TQFTs, and Symmetries**, *Uppsala, Sweden*
- 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, Santa Barbara, USA
- 2025 **Non-Invertible Symmetries in Condensed Matter Theory**, *All Souls College, Oxford*
- 2024 **Symmetries 2024 (co-organizer)**, *Mathematical Institute, Oxford, United Kingdom*
- 2023 **LACES 2023 Winter School**, *Galileo Galilei Institute, Florence, Italy*
- 2022 **Supergravity 2022**, *Genova, Italy*