

Matthew Yu

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Personal

Born on February 25, 1998.

United States Citizen.

Employment

Institute for Advanced Study, School of Natural Sciences: Member, 2026-present

University of Oxford, Mathematical Institute: Postdoctoral Associate, 4-year offer 2023-2027

Education

Ph.D. in Theoretical Physics, **Perimeter Institute/ University of Waterloo**, 2019-2023.

Thesis: "(Non-)Invertible Topology in Quantum Field Theory"

Supervisors: Jaume Gomis, Davide Gaiotto

Master of Science (MSc), **Perimeter Scholar International (PSI)**, 2018-2019

Thesis: "The Phases of $SU(N)$ QCD₃ with N_f Adjoint Fermion"

Supervisor: Jaume Gomis

University of Maryland, 2016-2018.

Publications

R. Kobayashi, A. Prem, and M. Yu, "Sixteen-Fold Way for Fermionic Topological Orders", [arXiv:2606.28682].

B. Yang, and M. Yu, "The Classification of Pauli Stabilizer Codes: A Lattice and Continuum Treatise", *Submitted: Comm.Math.Phys*, [arXiv:2604.24847].

A. Debray, W. Ye, and M. Yu, "Symmetric Gapped States and Symmetry-Enforced Gaplessness in $(3+1)d$ ", [arXiv:2602.12335].

D. Stockall and M. Yu, "Geometric Categories for Continuous Gauging", *Submitted: Advances in Mathematics*, [arXiv:2511.08254]

A. Debray, W. Ye, and M. Yu, "How to Build Anomalous $(3+1)d$ Topological Quantum Field Theories", *Submitted: Comm.Math.Phys*, [arXiv:2510.24834]

T. Décoppet and M. Yu, "The Classification $(3+1)d$ Symmetry Enriched Topological Order", *Accepted: Comm. Math Phys*, [arXiv:2509.10603]

D. Stockall and M. Yu, "A Generalized Crystalline Equivalence Principle", [arXiv:2508.10978]

- D. Teixeira and M. Yu, "Mutual Influence of Symmetries and Topological Field Theories", [arXiv:2507.06304]
- A. Debray, W. Ye, and M. Yu, "Global Structure in the Presence of a Topological Defect", *Comm.Math.Phys* **407**, 159 (2026), [arXiv:2501.18399]
- C. Delcamp, E. Heng, and M. Yu, "A Non-semisimple Non-invertible Symmetry", *Phys.Rev.B* **112** (2025) 8, 085135 [arXiv:2412.19635]
- A. Debray and M. Yu, "Type IIA String Theory and tmf with Level Structure", [arXiv:2411.07299]
- T. Décoppet, P. Huston, T. Johnson-Freyd, D. Nikshych, D. Penneys, J. Plavnik, D. Reutter, and M. Yu, "The Classification of Fusion 2-Categories", [arXiv:2411.05907]
- L. Bhardwaj, T. Décoppet, S. Schäfer-Nameki, and M. Yu, "Fusion 3-Categories for Duality Defects", *Comm.Math.Phys* **406**, (2025)8, 208, [arXiv:2408.13302]
- A. Debray, W. Ye, and M. Yu, "Bosonization and Anomaly Indicator for (2+1)-D Fermionic Topological Orders", *Comm.Math.Phys* **406** (2025)7, 178, [arXiv:2312.13341]
- T. Décoppet and M. Yu, "Fiber 2-Functors and Tambara-Yamagami Fusion 2-Categories", *Comm.Math.Phys* **406** (2025)3, 64, [arXiv:2306.08117]
- K. Budzik, D. Gaiotto, J. Kulp, B. Williams, J. Wu, and M. Yu, "Semi-Chiral Operators in 4d $\mathcal{N} = 1$ Gauge Theories", *JHEP* **05** (2024) 245, [arXiv:2306.01039]
- A. Debray and M. Yu, "Adams spectral sequences for non-vector-bundle Thom spectra", [arXiv:2305.01678]
- T. Décoppet and M. Yu, "Gauging Noninvertible Defects: A 2-Category Perspective", *Letters in Mathematical Physics* **113** (2023) 36, [arXiv:2211.08436]
- A. Debray and M. Yu, "What Can Bordism Theoretic Anomaly Cancellation do for U", *Comm.Math.Phys* **405** (2024)7, 154, [arXiv:2210.04911]
- K. Budzik, D. Gaiotto, J. Kulp, J. Wu, and M. Yu, "Feynman Diagrams in Four-Dimensional Holomorphic Theories", *JHEP* **07** (2023) 127, [arXiv:2207.14321]
- Z. Yan, and M. Yu, "KLT Factorization of Nonrelativistic String Amplitudes", *JHEP* **04** (2022) 068, [arXiv:2112.00025]
- M. Yu, "Gauging Categorical Symmetries in 3d Topological Orders and Bulk Reconstruction", [arXiv:2111.13697]
- D. Delmastro, J. Gomis, and M. Yu, "Infrared Phases of 2d QCD", *JHEP* **02** (2023) 157, [arXiv:2108.02202]
- M. Yu, "Genus-One Data and Anomaly Detection", *Phys.Rev.D* **105** (2022) 10, 106007, [arXiv:2105.02231]
- T. Johnson-Freyd and M. Yu, "Topological Orders in (4+1)-Dimensions", *SciPost Phys.* **13**, 068 (2022), [arXiv:2104.04534]
- J. Gomis, Z. Yan, and M. Yu, "KLT Factorization of Winding String Amplitudes", *JHEP* **06** (2021) 057, [arXiv:2103.05013]
- T. Johnson-Freyd and M. Yu, "Fusion 2-categories With no Line Operators are Grouplike", *Bull.Austral.Math.Soc.* **104** (2021) 3, 434-442, [arXiv:2010.07950].

M. Yu, "Symmetries and Anomalies of $(1+1)$ d Theories: 2-groups and Symmetry Fractionalization", *JHEP* **08** 2021 061, [arXiv:2010.01136].

J. Gomis, Z. Yan, and M. Yu, "T-Duality in Nonrelativistic Open String Theory", *JHEP* **02** (2021) 087, [arXiv:2008.05493].

J. Gomis, Z. Yan, and M. Yu, "Nonrelativistic Open String and Yang-Mills Theory", *JHEP* **03** (2021) 269, [arXiv:2007.01886].

Z. Yan and M. Yu, "Background Field Method for Nonlinear Sigma Models in Nonrelativistic String Theory", *JHEP* **03** (2020) 181, [arXiv:1912.03181].

Talks

2026 July: Ludwig Maximilian University of Munich

2026 July: Technical University Munich

2026 June: Erwin Schrödinger Institute

2026 May: University of Birmingham, Geometry and Mathematical Physics Seminar

2026 May: Oxford Weekly Symmetry Meeting

2026 May: Harvard CMSA, QFT and Physical Mathematics Seminar

2026 May: Perimeter Institute, Mathematical Physics Seminar

2026 April: BIMSA, TQFT and Higher Symmetries Seminar

2026 April: Niels Bohr Institute, High Energy Theory Seminar

2026 April: Odense, Quantum Mathematics Seminar

2026 April: London Institute for Mathematical Sciences

2026 March: Mathematisches Forschungsinstitut Oberwolfach, Higher Structures from Symmetries in QFT

2026 March: Virginia Tech, String Seminar

2025 December: Shing-Tung Yau Center of Southeast University, Forum for Young Scholars in Mathematical Physics

2025 December: University of Tokyo, Theoretical studies of topological phases of matter

2025 November: Simons Collaboration on Global Categorical Symmetries, NYU Pre-meeting

2025 November: Oxford Weekly Symmetry Meeting

2025 October: Cambridge University, BID programme

2025 August: Perimeter Institute, Mathematical Physics Group Meeting

2025 June: Uppsala University

2025 May: New York University Abu Dhabi, Geometry, Topology and Physics (GTP) Seminar

2025 April: University of Chicago, Special Kadanoff Seminar

2025 April: Harvard CMSA, QFT and Physical Mathematics Seminar
2025 March: KITP, GenSym Workshop Discussion Talk
2025 March: London Institute for Mathematical Science
2025 March: Oxford Weekly Symmetry Meeting
2025 February: BIMSA Quantum Symmetry Seminar
2025 January: Institute for Advanced Study, QFT/CMT Seminar
2024 November: Oxford Mathematical Physics Journal Club
2024 September: Scottish Talbot on Algebra and Topology
2024 September: Perimeter Institute Mathematical Physics Seminar
2024 June: Categorical symmetries in Quantum Field Theory Workshop
2024 May: Oxford Mathematical Physics Journal Club
2024 March: University of Göttingen Math Seminar on Higher Structures
2024 January: UCLA CMT seminar
2023 December: IHES physics seminar
2023 November: Oxford Strings Seminar
2023 November: Queen Mary University of London
2023 October: Oxford Weekly Symmetry Meeting: on non-semisimple categories and physics
2023 May: Tsinghua Topological Orders and Category Theory Seminar
2023 May: Nordita Nonrelativistic Strings and Beyond Conference
2023 April: Perimeter Institute QFT and Strings Meeting
2023 February: Dalhousie Atlantic Category Theory Group
2023 January: Global Categorical Symmetry Student and Postdoc Colloquium
2022 December: Oxford Symmetry Seminar
2022 November: Perimeter Institute Mathematical Physics Meeting
2022 October: University of Pennsylvania High Energy Seminar
2022 September: Princeton University Confinement and QCD Strings Collaboration – Student Talk
2022 June: Perimeter Institute Global Categorical Symmetries Conference – Gong Show
2022 March: Kavli IPMU, Physics seminar
2022 March: University of Oxford
2022 January: Virginia Tech Strings Seminar
2021 September: Perimeter Institute QFT and Strings Meeting
2021 September: Perimeter Institute Graduate Student Conference
2021 May: Perimeter Institute: Quantum Matter Meeting
2020 January: Perimeter Institute QFT and Strings Meeting

Professional Activity

Referee for Communications of Mathematical Physics
Referee for Advances in Theoretical and Mathematical Physics
Referee for Journal of High Energy Physics
Referee for Mathematical Reviews
Referee for Quantum
Referee for Sci-Hub
Referee for Symmetry, Integrability and Geometry: Methods and Applications (SIGMA)
Referee for Journal of Physics A: Mathematical and Theoretical

Co-organization of the Symmetries 2024 Conference: <https://sites.google.com/view/symmetries2024/home>

Mentorship

Daniel Texeira, PhD student
Devon Stockall, PhD student

Teaching Experience

Mini-course, Institute for Advanced Study: On fusion 2-categories and applications
TA for QFT I, Perimeter Scholars International
TA for PHYS111 at the University of Waterloo (2023)
TA for Atlantic Topological Quantum Field Theory Spring School (2023)
Oxford summer math research: Rebecca Carter (2025)

Last updated: July 25, 2026