Ian Gershon Teixeira

CONTACT

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EDUCATION

University of Maryland, College Park MD — 2017–2025

- Ph.D., Applied Mathematics
- Advisors: Jonathan Rosenberg (Mathematics) and Michael Gullans (Physics)

Wesleyan University, Middletown CT — 2013–2017

- B.A., Mathematics *Phi Beta Kappa*

RESEARCH POSITIONS

Stefan E. Warschawski Visiting Assistant Professor — 2025–Present
University of California San Diego, La Jolla CA

MathQuantum Fellow, University of Maryland, College Park MD — 2024–2025

- MathQuantum NSF RTG (DMS-2231533)
- Investigated relationship between unitary t-designs, finite groups, character theory, and used these tools to find novel quantum codes with many fault tolerant gates

RQS Researcher, University of Maryland, College Park MD — 2022–2023

- Joint Center for Quantum Information and Computer Science (QuICS)
- NSF Quantum Leap Challenge Institute for Robust Quantum Simulation: Quantum Simulations Face the Environment: Knowing the Noise: Fault Tolerance Beyond Clifford (OMA-2120757)
- Explored solutions to fault tolerant quantum computation using exotic gates outside the Clifford hierarchy

Summer Researcher, UCSB, Santa Barbara CA — 2016

- NSF funded mathematics research experience for undergraduates (REU) on quantum groups, advised by Ebrahim Ebrahim

TEACHING EXPERIENCE

Sole Contact Instructor, University of Maryland, College Park MD — 2022

- Linear Algebra, Pre-Calculus

Graduate Student Mentor, University of Maryland, College Park MD — 2022

- Directed reading program on quantum error correction

Teaching Assistant, University of Maryland, College Park MD — 2018–2021

- Linear Algebra (4 semesters), Calculus III, Statistics, Linear Algebra for Scientists and Engineers (2 semesters)

Published Articles (all equal coauthored)

E. Kubischta and I. Teixeira. Quantum codes and irreducible products of characters. ***Designs, Codes and Cryptography*** , Published Apr 2025, arXiv:2403.08999

E. Kubischta and I. Teixeira. Permutation-invariant quantum codes with transversal generalized phase gates. ***IEEE Transactions on Information Theory***, 71(1), Published Oct 2024, arXiv:2310.17652

E. Kubischta and I. Teixeira. Quantum codes from twisted unitary t-groups. ***Physical Review Letters***, 133(3), Published July 2024, arXiv:2402.01638

E. Kubischta and I. Teixeira. Family of quantum codes with exotic transversal gates. ***Physical Review Letters***, 131(24), Published Dec 2023, arXiv:2305.07023

Submitted Articles

E. Kubischta and I. Teixeira. Classification of the subgroups of the two-qubit Clifford group, Sept 2024 (**Submitted to *Journal of Physics A: Mathematical and Theoretical***), arXiv:2409.14624

Preprints

E. Kubischta and I. Teixeira. Flexible fault tolerant gate gadgets, Sept 2024, arXiv:2409.11616

E. Kubischta, I. Teixeira, and J. M. Silvester. Quantum weight enumerators for real codes with X and Z exactly transversal, June 2023, arXiv:2306.12526

Articles in Preparation

I. Teixeira, E. Kubischta, and J. Rosenberg. Lie primitive embeddings of finite simple groups in simple Lie groups

E. Kubischta and I. Teixeira. Counting error conditions with character theory and higher distance icosahedral codes

E. Kubischta and I. Teixeira. Qutrit clifford codes from $SU(3)$ representations

E. Kubischta and I. Teixeira. Absolutely maximally entangled qutrit states and exotic holography

Invited Talk

Symmetry and the Reduction of the Error Correcting Conditions with Eric Kubischta, Fermilab Quantum Information Science/High Energy Physics Seminar (Virtual), Fermi National Accelerator Laboratory, July 2023

Talks

Icosahedral Quantum Codes from Twisted Unitary t-groups with Eric Kubischta, Math-Quantum Annual Symposium, University of Maryland, College Park MD, May 2025

Quantum Codes, Transversal Gates, and Representation Theory, Dissertation Defense, University of Maryland, College Park MD, March 2025

Icosahedral Quantum Codes from Twisted Unitary t-groups with Eric Kubischta, Quantum Information Processing Conference 2025, Duke University, Raleigh NC, February 2025

Posters

Transversal Gates and the Clifford Hierarchy poster with Eric Kubischta, IEEE International Symposium on Information Theory (ISIT) Quantum Information Knowledge (QuIK) workshop, Athens, Greece, July 2024

Family of Quantum Codes with Exotic Transversal Gates poster with Eric Kubischta, NSF Quantum Leap Challenge Institute for Robust Quantum Simulation Workshop, University of Maryland, College Park MD, June 2023

Presentations

Introduction to Quantum Computing, talk with Eric Kubischta, Geometry & Physics Seminar (RIT), University of Maryland, College Park MD, Feb 2023

Encoding a Qubit in a Molecule, Grant Proposal (Virtual) with Eric Kubischta and Victor Albert, University of Maryland, College Park MD, May 2022

Molecular Symmetry and Three-Manifolds, Ph.D. Oral Candidacy Exam, University of Maryland, College Park MD, Apr 2022

Finding Your Inner Qubit, talk with Eric Kubischta, Quantum Error Correction and Fault-Tolerance graduate course (PHYS 858G), University of Maryland, College Park MD, Dec 2021

Gravity in 1+1 Dimensions, talk, Geometry & Physics Seminar (RIT), University of Maryland, College Park MD, Oct 2021

The Sachdev-Ye-Kitaev Model, talk, Geometry & Physics Seminar (RIT), University of Maryland, College Park MD, Oct 2021

An Eccentric History of Conformal Field Theory, talk, Elementary Particles Physics II graduate course (PHYS 752), University of Maryland, College Park MD, May 2021

Homotopy Theoretic Computation of Symmetry Protected Topological Phases of Matter, talk, Geometry & Physics Seminar (RIT), University of Maryland, College Park MD, Apr 2020

Invertible Topological Quantum Field Theories, talk, Geometry & Physics Seminar (RIT), University of Maryland, College Park MD, Sep 2019

Stability and BPS Branes, talk, Geometry & Physics Seminar (RIT), University of Maryland, College Park MD, Mar 2019

The SYK Model and Holography, talk with John Martyn , Geometry & Physics Seminar (RIT), University of Maryland, College Park MD, Dec 2018

Condensed Matter and AdS/CFT, talk with John Martyn, Geometry & Physics Seminar (RIT), University of Maryland, College Park MD, Nov 2018

Quantum Error Correction and the Toric Code Made Easy, talk with Eric Kubischta, Introduction to Quantum Information Processing graduate course (CMSC 657), University of Maryland, College Park MD, Nov 2018

The Mathematical Structure of Super-Yang-Mills (Part II), talk, Geometry & Physics Seminar (RIT), University of Maryland, College Park MD, Oct 2018

The Mathematical Structure of Super-Yang-Mills (Part I), talk, Geometry & Physics

Seminar (RIT), University of Maryland, College Park MD, Oct 2018

N=2 Supersymmetry from Complex Structures, talk with Matthew Yu, Geometry & Physics Seminar (RIT), University of Maryland, College Park MD, Apr 2018

Generalized Kähler Manifolds, talk with Matthew Yu, Geometry & Physics Seminar (RIT), University of Maryland, College Park MD, Mar 2018

Gerbes and Twists, talk, Geometry & Physics Seminar (RIT), University of Maryland, College Park MD, Feb 2018

Generalized Geometry, talk, Geometry & Physics Seminar (RIT), University of Maryland, College Park MD, Feb 2018

The Quantum Hall Effect (Part II), talk, Geometry & Physics Seminar (RIT), University of Maryland, College Park MD, Oct 2017

The Quantum Hall Effect (Part I), talk, Geometry & Physics Seminar (RIT), University of Maryland, College Park MD, Sep 2017

Awards

MathQuantum Fellow 2024
- Annual stipend $37,000, plus $1,000 travel

Hauptman Summer Fellowship 2024
- Summer stipend $2,500

Jacob K. Goldhaber Travel Grant 2024

International Conference Student Support Award 2024

RQS Researcher 2022

University of Maryland Dean's Fellowship 2018-2020
- Annual stipend $2,500

Rice Prize 2017
- Awarded to top senior in mathematics at Wesleyan University

Peer Review

Referee for IEEE Transactions on Information Theory, Physical Review X 2024

Contributions

Error Correction Zoo entries 2021
- Quantum-double code
- Modular-qudit surface code
- Group-algebra code

Quantum Computing Stack Exchange 2022–Present

MathOverflow 2019–Present

Mathematics Stack Exchange 2019–Present