Dheeran E. Wiggins

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Education

In Progress	**BS Mathematics**, *University of Illinois Urbana-Champaign*
June 2023	**HS Diploma**, *Illinois Mathematics and Science Academy*

Research Experience

Incoming Jun 2025 — **Fellow**, *MathQuantum Research Training Group, University of Maryland*
Advised by Maicol Ochoa.

Jun 2024 – Present — **Undergraduate Researcher**, *University of Illinois, Department of Mathematics*
in Operator Quantum Error Correction. Advised by Roy Araiza.

May 2024 – Present — **Undergraduate Research Fellow**, *Endeavor Health Research Institute*
in Mathematical Epidemiology and Dynamics. Advised by Anthony Solomonides.

Jan 2024 – Jun 2024 — **Research Scholar**, *Illinois Mathematics Lab*
in Winter Spaces and Operator Quantum Error Correction. Advised by Roy Araiza.

Apr 2022 – Sep 2023 — **Research Intern**, *NorthShore Research Institute*
in Mathematical Epidemiology and Category Theory in ML. Advised by Anthony Solomonides.

Jun 2023 – Aug 2023 — **Research Assistant**, *Northwestern University*
in Biomedical Engineering. Advised by Jules Dewald and Hongchul Sohn.

Jun 2022 – Mar 2023 — **Research Collaborator**, *University of Chicago*
in COVID-19 Outcomes Data Analysis. Under Julian Solway.

May 2021 – Jun 2023 — **Student Researcher**, *Fermilab*
in Dark Photon and Doubly Charged Higgs Searches. Advised by Peter Dong.

Relevant Coursework

University of Illinois Urbana-Champaign

$\mathcal{G}$ denotes graduate.

- Homotopy Theory$^{\mathcal{G}}$
- Abstract Algebra II$^{\mathcal{G}}$
- Abstract Algebra I$^{\mathcal{G}}$
- Intro to Abstract Algebra II
- Symbolic Logic
- Algebraic Topology I$^{\mathcal{G}}$
- General Topology$^{\mathcal{G}}$
- Quantum Info Processing Theory

$\mathcal{H}$ denotes honors.

- Probability Theory
- Abstract Linear Algebra$^{\mathcal{H}}$
- Differential Equations
- Honors Real Analysis$^{\mathcal{H}}$
- Fundamental Mathematics$^{\mathcal{H}}$
- Calculus III

Illinois Mathematics and Science Academy

$\mathcal{I}$ denotes intersession.

- Category Theory$^{\mathcal{I}}$
- Abstract Algebra
- Number Theory
- Linear Algebra
- Multi-variable Calculus
- Single Variable Calculus
- Quantum Mechanics
- Intro to Quantum Computing$^{\mathcal{I}}$
- Modern Physics
- Optics
- Electricity & Magnitism
- Classical Mechanics

Papers

IN PREPARATION	**Poulin's stabilizer formalism for operator quantum error correction and noncommutative graphs** with Anderson et al.
IN PREPARATION	**A mathematical characterization of viral epidemics in a naive population** with Anthony Solomonides.

Talks

APR 2025	**A model for the infinite tensor product of groups: Insights from quantum information**, *Illinois Undergraduate Research Symposium* Talk advised by Igor Mineyev.
MAR 2025	**On noncommutative graphs and Poulin's stabilizer formalism**, *Rose-Hulman Undergraduate Mathematics Conference* Talk advised by Roy Araiza.
MAY 2024	**Winter Spaces and the Stabilizer Formalism**, *Illinois Mathematics Lab Open House* with Anderson et al. Poster advised by Roy Araiza.
APR 2024	**Modeling a Viral Epidemic With a Concurrent "Misinfodemic"**, *Research Institute Spring Scientific Research Poster Reception* Poster advised by Anthony Solomonides.
APR 2024	**Modeling a Viral Epidemic With a Concurrent "Misinfodemic"**, *Illinois Undergraduate Research Symposium* Talk advised by Anthony Solomonides.
APR 2024	**Winter Spaces and the Stabilizer Formalism**, *Illinois Quantum Information Science & Technology* (*IQUIST*) *World Quantum Day* with Anderson et al. Poster advised by Roy Araiza.
APR 2023	**Identification and estimated yield of background events in a search for a doubly charged Higgs boson at CMS**, *American Physical Society April Meeting* with Anne et al. Poster advised by Peter Dong.
APR 2023	**Identification of optimal production channels for dark photon searches**, *American Physical Society April Meeting* with Anne et al. Poster advised by Peter Dong.
APR 2023	**Unidirectional build architecture: Refactoring a HEP data collection codebase**, *Annual IMSAloquium* Talk advised by Peter Dong.
APR 2022	**An investigation of triboson decays into four-lepton final states**, *Annual IMSAloquium* with George Bayliss and Jesus Fileto. Talk advised by Peter Dong.

Teaching

JAN 2025	**Introduction to Mathematical Quantum Error Correction**, *Illinois Mathematics and Science Academy* minicourse for Intersession 2025 ($\approx$ 22 hours, 27 students) [course page]
JAN 2025 – PRESENT	**Course Assistant and Grader**, *University of Illinois Urbana-Champaign* Math 220: Calculus

Learning

MAR 2025 – PRESENT	**Reading Seminar**, *Von Neumann Algebras and Type III factors* with Jihong Cai.

Dec 2024 – Present	**Independent Study**, *Infinite Tensor Products of Groups and Hilbert Spaces* with Igor Mineyev.
Jul 2024 – Present	**Directed Reading**, *Homotopy Type Theory* (*HoTT*) with Anthony Solomonides.
Jul 2023	**Student**, *Princeton Summer School on Condensed Matter Physics*, Princeton, NJ

Professional Affiliations

Mar 2024 – Present	**Member**, *American Mathematical Society*
Feb 2023 – Present	**Member**, *American Physical Society*

Relevant Skills

Symbolic	SageMath, Maple, Mathematica	Numerical	matlab, Scilab, gnu Octave
Programming	Python, C++, Java	Markup	LaTeX, html, css
Languages	English *fluent*, Tamil *spoken*, Russian *intermediate*, Spanish *elementary*		