# Dheeran E. Wiggins

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in *dheeran-wiggins*

## Education

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

## Research Experience

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| Jun 2024 – Present | **Undergraduate Researcher**, *University of Illinois, Department of Mathematics* <br> in Operator Quantum Error Correction. Advised by Roy Araiza. |
| May 2024 – Present | **Undergraduate Research Fellow**, *Endeavor Health Research Institute* <br> in Mathematical Epidemiology and Dynamics. Advised by Anthony Solomonides. |
| Jan 2024 – Jun 2024 | **Research Scholar**, *Illinois Mathematics Lab* <br> in Winter Spaces and Operator Quantum Error Correction. Advised by Roy Araiza. |
| Jun 2023 – Sep 2023 | **Undergraduate Researcher**, *NorthShore Reserach Institute* <br> in Mathematical Epidemiology and Category Theory in ML. Advised by Anthony Solomonides. |
| Jun 2023 – Aug 2023 | **Research Assistant**, *Northwestern University* <br> in Biomedical Engineering. Advised by Jules Dewald and Hongchul Sohn. |
| Apr 2022 – Jun 2023 | **Research Intern**, *NorthShore Research Institute* <br> in Biomedical Informatics and Mathematical Epidemiology. Advised by Anthony Solomonides. |
| Jun 2022 – Mar 2023 | **Research Collaborator**, *University of Chicago* <br> in COVID-19 Outcomes Data Analysis. Under Julian Solway. |
| May 2021 – Jun 2023 | **Student Researcher**, *Fermilab* <br> in Dark Photon and Doubly Charged Higgs Searches. Advised by Peter Dong. |

## Relevant Coursework

### University of Illinois Urbana-Champaign

$G$ denotes graduate.

- Homotopy Theory$^G$
- Abstract Algebra II$^G$
- Abstract Algebra I$^G$
- Intro to Abstract Algebra II
- Honors Advanced Analysis$^H$
- Algebraic Topology I$^G$
- General Topology$^G$
- Quantum Info Processing Theory

$H$ denotes honors.

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

### Illinois Mathematics and Science Academy

$I$ denotes intersession.

- Category Theory$^I$
- Abstract Algebra
- Number Theory
- Linear Algebra
- Multi-variable Calculus
- Single Variable Calculus
- Quantum Mechanics
- Intro to Quantum Computing$^I$
- 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 & Posters

**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 of $\approx 22$ hours, 27 students. [course page]

**Jan 2025 – Present**   **Course Assistant and Grader**, *University of Illinois Urbana-Champaign*
Math 220 Calculus

## Educational Experiences

**Dec 2024 – Present**   **Independent Study**, *Limits of the n-qubit Pauli Group and Geometric Group Theory*
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

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

## Relevant Skills

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| 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* | | |