# Dheeran E. Wiggins

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## 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

**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.

**Jun 2023 – Sep 2023** — **Undergraduate Researcher**, *NorthShore Reserach 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.

**Apr 2022 – Jun 2023** — **Research Intern**, *NorthShore Research Institute*
in Biomedical Informatics and Mathematical Epidemiology. Advised by Anthony Solomonides.

**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

$^G$ denotes graduate.

- Homotopy Theory$^G$
- Abstract Algebra II$^G$
- Abstract Algebra I$^G$
- Intro to Abstract Algebra II
- Symbolic Logic
- 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

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| In Preparation | **Poulin's stabilizer formalism for operator quantum error correction and noncommutative graphs**<br>with Anderson et al. |
| In Preparation | **A mathematical characterization of viral epidemics in a naive population**<br>with Anthony Solomonides. |

## Talks

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| May 2024 | **Winter Spaces and the Stabilizer Formalism**, *Illinois Mathematics Lab Open House*<br>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*<br>Poster advised by Anthony Solomonides. |
| Apr 2024 | **Modeling a Viral Epidemic With a Concurrent "Misinfodemic"**, *Illinois Undergraduate Research Symposium*<br>Talk advised by Anthony Solomonides. |
| Apr 2024 | **Winter Spaces and the Stabilizer Formalism**, *Illinois Quantum Information Science & Technology (IQUIST) World Quantum Day*<br>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*<br>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*<br>with Anne et al. Poster advised by Peter Dong. |
| Apr 2023 | **Unidirectional build architecture: Refactoring a HEP data collection codebase**, *Annual IMSAloquium*<br>Talk advised by Peter Dong. |
| Apr 2022 | **An investigation of triboson decays into four-lepton final states**, *Annual IMSAloquium*<br>with George Bayliss and Jesus Fileto. Talk advised by Peter Dong. |

## Teaching

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

## Learning

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| Mar 2025 – Present | **Reading Group**, *Von Neumann Algebras and Factor Types*<br>with Jihong Cai. |
| Dec 2024 – Present | **Independent Study**, *Infinite Tensor Products of Groups and Hilbert Spaces*<br>with Igor Mineyev. |
| Jul 2024 – Present | **Directed Reading**, *Homotopy Type Theory (HoTT)*<br>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

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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* | | |