

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

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

\mathcal{G} denotes graduate.

- Homotopy Theory \mathcal{G}
- Abstract Algebra II \mathcal{G}
- Abstract Algebra I \mathcal{G}
- Intro to Abstract Algebra II
- Probability Theory
- Abstract Linear Algebra \mathcal{H}
- Differential Equations
- Symbolic Logic
- Algebraic Topology I \mathcal{G}
- General Topology \mathcal{G}
- Quantum Info Processing Theory
- Honors Real Analysis \mathcal{H}
- Fundamental Mathematics \mathcal{H}
- Calculus III

\mathcal{H} denotes honors.

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

- 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 (≈ 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 Group**, *Von Neumann Algebras and Factor Types*
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	L ^A T _E X, HTML, CSS
LANGUAGES	English <i>fluent</i> , Tamil <i>spoken</i> , Russian <i>intermediate</i> , Spanish <i>elementary</i>		