

# Gage Hoefler

---

Department of Mathematical Sciences  
University of Delaware  
111 Ewing Hall,  
Newark, DE 19716, USA  
ghoefler@udel.edu  
[sites.udel.edu/ghoefler/](https://sites.udel.edu/ghoefler/)

## EDUCATION

*Ph.D.*, Mathematics  
University of Delaware, Newark, DE,  
Sept. 2020-present.  
*Advisor: Dr. Ivan G. Todorov*

*M.Sc.*, Mathematics  
University of Delaware, Newark, DE,  
Sept. 2020-May 2022.  
*Advisor: Dr. Ivan G. Todorov*

*B.Sc., B.A.*, Computer Science and Mathematics  
University of Nebraska at Omaha, Omaha, NE,  
Aug. 2016-May 2020.  
*Summa cum laude*

## RESEARCH INTERESTS

Operator algebras, quantum information theory, and non-local games.

## SUBMITTED PUBLICATIONS

1. G. Hoefler and I.G. Todorov, *Homomorphisms of quantum hypergraphs*, (2023), 22 pp. [arXiv:2311.06355](https://arxiv.org/abs/2311.06355)

## REFEREED PUBLICATIONS

1. G. Hoefler and I.G. Todorov, *Quantum hypergraph homomorphisms and non-local games*, (2022), 55 pp. (to be published in *Dissertationes Mathematicae*)  
[arXiv:2211.04851](https://arxiv.org/abs/2211.04851)

2. K. Camenga, B. Collins, G. Hoefler, P.X. Rault, J. Quezada, J. Wilson, and R. Johnson Yates, *On the geometry of numerical ranges over finite fields*, (2021), *Linear Algebra and its Applications*, Volume 628. pp. 182-201.  
[arXiv:2107.09191](https://arxiv.org/abs/2107.09191)

## INVITED TALKS

**UNO X-Math Conference**,  
*Quantum resources and information transmission*,  
Omaha, NE, Dec. 2023.

**Workshop on Operator Algebras and Quantum Information**,  
*Classical and quantum hypergraphs and their homomorphisms*,  
Newark, DE, May 2023.

**Functional Analysis and Operator Algebras in Greece**,  
*Quantum hypergraph homomorphisms and applications to non-local games*,  
Athens, Greece (online), Feb. 2023.

---

**UNO X-Math Conference,**  
*Non-local games and operator algebras,*  
Omaha, NE, Dec. 2022.

**Inverse Problems and Analysis Seminar,**  
*Quantum hypergraph homomorphisms and operator systems,*  
Newark, DE, Oct. 2022.

**CONTRIBUTED TALKS Analytical and Combinatorial Methods in Quantum Information Theory II**

*Classical and quantized hypergraphs and their homomorphisms,*  
Edinburgh, Scotland, July 2023.

**Banach Algebras and Applications,**  
*Quantum hypergraph homomorphisms and operator systems,*  
Granada, Spain, July 2022.

**JMM MAA Student Session,**  
*What is the boundary of a finite field numerical range?,*  
Online, Jan. 2021.

**EXPOSITORY TALKS**

**Hallenbeck Graduate Student Seminar,**  
*Operator algebras and connections to non-local games,*  
Newark, DE, Oct. 2023.

**Hallenbeck Graduate Student Seminar,**  
*Quantum chromatic numbers of graphs: connections to  $C^*$ -algebras,*  
Newark, DE, May 2022.

**University of Nebraska Omaha Mathematics Colloquium,**  
*All about pursuing a Ph.D. in mathematics,*  
Omaha, NE (online), Sept. 2021.

**University of Delaware GEMS Colloquium,**  
*Partial order games,*  
Newark, DE (online), July 2021.

**TEACHING EXPERIENCE**

**University of Delaware,**  
MATH115 Precalculus: *Spring 2024,*  
MATH010 Intermediate Algebra: *Fall 2023,*  
MATH221 Calculus I: *Fall 2021, Summer 2023,*  
MATH241 Analytic Geometry and Calculus A: *Fall 2020, Summer 2022,*  
MATH242 Analytic Geometry and Calculus B: *Spring 2021, Spring 2022.*  
Vector Spaces Preliminary Exam Review: *Jan. 2022.*

**University of Nebraska at Omaha,**  
MATH1220 College Algebra: *Fall 2019, Spring 2020 (undergraduate),*  
MATH1320 Pre-Calculus Algebra: *Fall 2019, Spring 2020 (undergraduate),*  
MATH1330 Trigonometry: *Fall 2019, Spring 2020 (undergraduate),*  
MATH1930 Calculus for the Managerial, Life and Social Sciences: *Fall 2019, Spring 2020 (undergraduate).*

---

\*Terms which are italicized denote instructor of record experience.

**STUDENT  
RESEARCH  
SUPERVISION**

**University of Delaware,**  
Zhang Wenzhen, *UD Summer Scholars*, May-Aug. 2023,  
Evan Liszewski, *GEMS program*, May-Aug. 2021.

**AWARDS**

**University of Delaware Graduate College Student Travel Award,**  
July 2023.

**University of Delaware UNIDEL funds,**  
Feb. 2023-May 2023.

**University of Delaware GEMS recipient,**  
May 2021-Aug. 2021.

**NASA Nebraska Space Mini Grant,**  
Aug. 2017-Dec. 2019.

**EXPERIENCE**

*Software development intern,*  
Union Pacific, Department of Information Technology, Omaha, NE,  
May 2018-Aug. 2019.

- Rewrote and updated outdated in-house programs.
- Full-stack development, which involved creating software which handled interaction between the user and backend, along with database communication.

*Student grader,*  
University of Nebraska Omaha, Department of Mathematics, Omaha, NE,  
Jan. 2019-May 2020.

- Grader for MATH1960 (Calculus II), MATH2050 (Applied Linear Algebra), MATH2230 (Introduction to Abstract Mathematics), MATH4560 (Number Theory and Cryptography).

**TRAINING,  
CONFERENCES,  
AND  
WORKSHOPS**

**YMC\*A,**  
Leuven, Belgium, Aug. 2023

**ICMS: Analytical and Combinatorial Methods in Quantum Information Theory II,**  
Edinburgh, Scotland, July 2023

**University of Delaware: Workshop on Operator Algebras and Quantum Information,**  
Newark, Delaware, May 2023

**East Coast Operator Algebras Symposium,**  
East Lansing, Michigan, Oct. 2022

**Banach Algebras and Applications,**  
Granada, Spain, July 2022

**Virginia Operator Theory and Complex Analysis Meeting,**  
Richmond, Virginia, Nov. 2021

**SERVICE**

**Graduate student representative,**  
University of Delaware Department of Mathematical Sciences, September 2023- present.

**Co-founder,**  
University of Delaware's Math Circle chapter, Aug. 2023- present.

**Vice-president,**  
University of Delaware's SIAM chapter, Aug. 2022-July 2023.

**Secretary,**  
University of Delaware's SIAM chapter, Aug. 2021-July 2022.

**New student mentor,**  
University of Delaware's AWM chapter, Aug. 2021-present.

**Student outreach volunteer,**  
University of Delaware, Department of Mathematical Sciences Winter Research Symposium, Feb. 2021.

**SKILLS**

*Programming Languages & Software:* Proficient in C, Java, Python, AngularJS, HTML/CSS, Mathematica, and markup language LaTeX.  
Familiarity with Sage, Ruby, and MySQL.