

# George Brooks

## Curriculum Vitae

1523 Greene St. #401  
Columbia, SC 29225  
 [www.ghbrooks.me](http://www.ghbrooks.me)

### Research Interests

Extremal combinatorics, spectral graph theory, hypergraph Turán theory, and Ricci curvature of graphs with applications to data science.

### Education

- 2020– **Ph.D. Mathematics**, *University of South Carolina*, Columbia, SC  
Present Advisor: Dr. Linyuan Lu  
2012–2018 **B.S. Mathematics**, *Saginaw Valley State University*, University Center, MI  
Minor in Chemistry

### Academic Employment

- 2020– **Graduate Instructor – Teaching Assistant**  
Present Department of Mathematics, University of South Carolina, Columbia, SC  
2018–2020 **Adjunct Instructor – Tutoring Center**  
Science & Math Division, Northwestern Michigan College, Traverse City, MI

### Teaching Experience

#### University of South Carolina

- 2021– **Instructor of Record**, *Department of Mathematics*  
Present
  - MATH 141: Calculus I (Spring 2025)
  - MATH 374: Discrete Structures (Fall 2024)
  - MATH 115: Precalculus Mathematics (Fall 2024)
  - MATH 115: Precalculus Mathematics (Fall 2023)
  - MATH 174: Discrete Mathematics for Computer Science (Spring 2023)
  - MATH 174: Discrete Mathematics for Computer Science (Fall 2022)
  - MATH 344L/544L: Applied Linear Algebra Laboratory (Spring 2022)
  - MATH 115: Precalculus Mathematics (Fall 2021)
  - MATH 122: Calculus for BA and Social Sciences (Summer 2021)

- 2020– **Teaching Assistant**, *Department of Mathematics*  
Present
  - MATH 142: Calculus II - Honors (Fall 2023)
  - MATH 141: Calculus I - Honors (Fall 2021)
  - MATH 142: Calculus II (Spring 2021)
  - MATH 141: Calculus I (Fall 2020)

#### Northwestern Michigan College

- 2019–2020 **Adjunct Instructor**, *Science & Math Division*
  - MTH 111: Intermediate Algebra (Spring 2020)
  - MTH 08: Pre-Algebra (Spring 2020)
  - MTH 08: Pre-Algebra (Fall 2019)

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## Workshops

- May 2023 **AMS Mathematical Research Communities**  
Beaver Hollow Conference Center, Java Center, NY
- 2022– **RTG: Summer School on Mathematical Foundations of Data Science**  
Present Department of Mathematics, University of South Carolina, Columbia, SC

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## Preprints

4. G. Brooks, W. Linz, and L. Lu. “Maximum spectral gaps of graphs.” *arXiv:2408.15476* (2024).
3. G. Brooks, F. Osaye, A. Schenfisch, Z. Wang, and J. Yu. “Outerplanar graphs with positive Lin-Lu-Yau curvature.” *arXiv:2403.04110* (2024).
2. G. Brooks and W. Linz. “Some exact and asymptotic results for hypergraph Turán problems in  $\ell_2$ -norm.” *arXiv:2310.09379* (2024).

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## Publications

1. G. Brooks, M. Gu, J. Hyatt, W. Linz, and L. Lu. “On the maximum second eigenvalue of outerplanar graphs.” *Discrete Mathematics* 348.5 (2025).

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## Invited Talks

- Mar 2025 **AMS Spring Southeastern Sectional Meeting**  
*Maximum spectral gaps of graphs*  
Clemson University, Clemson, SC
- Nov 2024 **Discrete Math and Combinatorics Seminar**  
*Maximum spectral gaps of graphs*  
University of South Carolina, Columbia, SC
- Oct 2024 **Graduate Colloquium**  
*Maximum spectral gaps of graphs*  
University of South Carolina, Columbia, SC
- Feb 2024 **Discrete Math and Combinatorics Seminar**  
*Outerplanar graphs with positive Lin-Lu-Yau curvature*  
University of South Carolina, Columbia, SC
- Jan 2024 **AMS Special Session on Ricci Curvatures of Graph and Applications to Data Science**  
*Outerplanar graphs with positive Lin-Lu-Yau curvature*  
Joint Mathematics Meeting, San Francisco, CA
- Nov 2023 **Graduate Colloquium**  
*On the maximum second eigenvalue of outerplanar graphs*  
University of South Carolina, Columbia, SC
- Mar 2023 **Graduate Mini-Conference in Discrete Mathematics**  
*Introduction to Flag Algebras*  
University of South Carolina, Columbia, SC
- Oct 2022 **Graduate Colloquium**  
*Introduction to Flag Algebras*  
University of South Carolina, Columbia, SC

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## Awards

- 2023–2024 **Outstanding Graduate Teaching Award**  
University of South Carolina – Department of Mathematics

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## Service

### University of South Carolina

- 2024– **Opportunity Scholars Program – Instructor**  
Present TRIO program supporting students from disadvantaged backgrounds.
- 2024– **Discrete Math and Combinatorics Seminar – Organizer**  
Present Inviting speakers and operating the seminar.
- 2024– **Partners for Minorities in Engineering and Computer Science**  
Present Providing gifted high school students academic enrichment in mathematics.
- 2024– **Math Learning Center Coordinator**  
Present Facilitated LMS integration for MAP and Gateway testing.
- 2023– **Graduate Student Instructor Peer Mentor Program**  
Present Mentoring graduate student instructors of record.
- 2022– **RTG: Summer School on Mathematical Foundations of Data Science**  
Present Teaching and mentoring undergraduate research.
- 2022– **Discrete Reading Seminar – Organizer**  
Present Topics have included: spectral graph theory, hypergraph container method, etc.
- 2021–2022 **Graduate Advisory Council - Student Representative**  
Represented graduate students in departmental matters.

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## Volunteer Work

- 2023–2024 Leaphart Elementary Math Outreach
- 2023–2024 UofSC Annual High School Math Contest - Activity Organizer
- Nov 2021 South Carolina Council of Teachers of Mathematics Conference
- Oct 2021 Oktoberbest 2021: A Symposium on Teaching