

Sarah Allred

Curriculum Vitae

Department of Mathematics
Louisiana State University
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Education

- 2017–Present **Ph.D., Mathematics** (expected graduation date: 2022), Louisiana State University.
Advisor: Bogdan Oporowski
- 2016–2017 **M.S., Mathematics**, Louisiana State University.
- 2012–2016 **B.S., Mathematics**, Auburn University.

Research Interests

- General Combinatorics, Graph Theory
- Specific Structural and Extremal Graph Theory

Papers

Published papers

1. S. Allred, P. Johnson, M. Murphy, *Forbidding Rainbow Cycles with Edge-Colorings of $K_{m,n}$* . Alabama Journal of Mathematics **Vol. 38 2014**.
2. S. Allred, P. Johnson, *Theta Graphs are Hall t -chromatic for all $t = 0, 1, 2, \dots$* . Bulletin of the ICA, **Vol. 81 2017**, .

Preprints

3. S. Allred, G. Ding, B. Oporowski, *Unavoidable Induced Subgraphs of Large 2-Connected Graphs*
arXiv: 2009.12503

Papers in preparation

4. S. Allred, G. Ding, B. Oporowski, *Unavoidable Induced Subgraphs of Infinite 2-Connected Graphs*.
5. S. Allred, C. Erickson, K. Grace, H.T. Hall, A. Jensen, *A Combinatorial Bound on the Number of Distinct Eigenvalues of a Graph*.

Extended Research Travel

- Summer 2021 **Participant AMS Mathematics Research Community**
Topic: Approaches to Inverse Problems using Combinatorics and Linear Algebra

Internships

- Summer 2020 **Software Engineering Institute, Carnegie Mellon University**
- Participated in ongoing research into investigating alterations to compressed archives:
 - Developed a prototype framework for format specifications
 - Represented data at multiple layers of abstraction, from binary encoding to human-readable description
 - Work product consisted of:
 - A series of technical presentations to a group with interests that include digital forensics, network security, and machine vision
 - A binary file parsing code in Python to read data and construct a higher-order representation of the file data

Awards, Honors, and Distinctions

Louisiana State University

- 2021-22 **Department Nominee for the Alumni Association Teaching Assistant Award**
2020 **Certificate of Teaching Excellence**
2020 **David Oxley Graduate Student Teaching Award**
2016–2018 **Board of Regents Fellow**

Presentations

Invited talks

- 2022 **Unavoidable Induced Subgraphs of Large and Infinite 2-Connected Graphs**, *Women in Combinatorics Virtual Colloquium*.
2020 **Unavoidable Induced Subgraphs of Large 2-Connected Graphs** Matroid Union Seminar, *University of Waterloo*.
2018 **Theta Graphs are Hall t -Chromatic**, Auburn REU, *Auburn University*.

Other talks

- 2020 **Unavoidable Induced Subgraphs of Large 2-Connected Graphs** LSU Combinatorics Seminar, *Louisiana State University*.
2019 **Unavoidable Induced Subgraphs of Large 2-Connected Graphs** 7th Mississippi Discrete Math Workshop, *University of Mississippi*
20].19 **Unavoidable Induced Subgraphs of Large 2-Connected Graphs** 31st Cumberland Conference on Combinatorics, Graph Theory and Computing, *University of Central Florida*.
2018 **Combinatorics Introduction Talk**, GEAX Program, *Louisiana State University*.
2018 **Theta Graphs are Hall t -Chromatic**, Southeastern International Conference on Combinatorics, Graph Theory, and Computing, *Florida Atlantic University*.

Conferences Attended

- 2020 **Virtual Grace Hopper Celebration**, *virtual*
2019 **7th Mississippi Discrete Math Workshop**, *University of Mississippi*.
2019 **31st Cumberland Conference on Combinatorics, Graph Theory and Computing**, *University of Central Florida*.

- 2019 **AMS Spring Southeastern Sectional Meeting**, *Auburn University*.
- 2018 **6th Mississippi Discrete Math Workshop**, *University of Mississippi*.
- 2018 **AMS Spring Southeastern Sectional Meeting**, *Vanderbilt University*.
- 2018 **49th Southeastern International Conference on Combinatorics, Graph Theory, and Computing**, *Florida Atlantic University*.
- 2017 **5th Mississippi Discrete Math Workshop**, *University of Mississippi*.
- 2014 **REU in Algebra and Discrete Mathematics at Auburn University**.

Teaching

I was the instructor of record, where I had the sole responsibility of preparing and presenting lectures, assigning and grading tests, and assigning the overall course grade for the following courses.

Louisiana State University

- Fall 2021 **Honors Calculus I**
- Summer 2021 **Differential Calculus**
- Spring 2021 **Honors Calculus II**
- Fall 2020 **Honors Calculus I**
- Spring 2020 **College Algebra**
 Taught students with ACT score less than 19 using the R2R format. Classes met twice a week for 50 minutes. The students were required to spend 4.5 hours in a tutoring computer lab in addition to class. All assignments were given using the MyMathLab software.
- Fall 2019 **Calculus I**
- Summer 2019 **Calculus II**
 Homework assignments were given using the WebAssign software.
- Spring 2019 **Calculus I**
 Homework assignments were given using the WebAssign software.

Service and Outreach

Louisiana State University

- 2021–Present **Member** Student Colloquium Committee, *Louisiana State University*.
- Fall 2021 **Mentor for the Communicating Math Graduate Course** *Louisiana State University*.
- 2021 **Chair**, G.E.A.U.X Orientation Program for New Math Graduate Students, *Louisiana State University*.
- 2020–Present **Organizer**, LSU Combinatorics Seminar, *Louisiana State University*
 Organized and ran the LSU Combinatorics Seminar as a virtual seminar with participants from multiple different countries.
- Fall 2020 **Mathematics Graduate Student Mentor Program** Started a tiered mentoring program for mathematics graduate students, pairing first-year graduate students with more advanced students for support.
- Spring 2020 **Mentor for the Communicating Math Graduate Course** *Louisiana State University*.

- Fall 2019 **Mentor for the Communicating Math Graduate Course** I mentored a first-year graduate student. I met with the student several times throughout the semester as they observed my class, and guided them through writing and presenting a lecture in my Calculus I course. *Louisiana State University.*
- Fall **Department Representative to the Graduate Student Association**
- 2019-present Represented the mathematics graduate students in the Graduate Student Association and presented any concerns graduate students had to the GSA. *Louisiana State University*
- 2019 **Math with Middle and High School Students** Gave a talk on assorted topics in Graph Theory to both a middle school and a high school math class. *Lafayette Christian School*
- 2017–2020 **Committee Member**, G.E.A.U.X Orientation Program for New Math Graduate Students, *Louisiana State University.*
- 2017–Present **Mentor**, KIDS HOPE
Mentored an elementary student in reading, mathematics, and life skills.
- 2017 **Proctor and Grader**, High School Math Contest, *Louisiana State University*

Professional Memberships

American Mathematical Society
Association for Women in Mathematics

Mathematical Association of America
Women in CyberSecurity

References

Bogdan Oporowski, LSU (Advisor)
Guoli Ding, LSU
James Oxley, LSU (Teaching)

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