

ANDREA

BOURQUE

CONTACT

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EDUCATION

- **Ph.D. in Mathematics (In Progress)** 2024-present
University of Chicago | *Chicago, Illinois, USA*
 - Advisor: Victor Ginzburg
- **M.S. in Mathematics** 2022-2024
Louisiana State University | *Baton Rouge, Louisiana, USA*
 - Advisor: Pramod Achar
- **B.S. in Mathematics** 2020-2022
Louisiana State University | *Baton Rouge, Louisiana, USA*
 - Graduated with *summa cum laude*; college honors; university medal
 - Honors Thesis: "*GL(1|1)* Graph Connections"
 - Minor in Physics

HONORS

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|---------------------|---|
| Awards | <ul style="list-style-type: none">• 2022 Betti and Robert Giles Senior Mathematics Award• 2020 Eric Candell Excellence in Physics Award• 2019 AMC 12 A Distinguished Honor Roll |
| Scholarships | <ul style="list-style-type: none">• 2021 Peg and Tom Madden Mathematics Research Scholarship |

PAPERS

- A. Bourque and P. Achar (2024). "On global Schubert varieties for the general linear group". Preprint. URL: <https://www.arxiv.org/abs/2412.01962>.
- A. Bourque and A. Zeitlin (2023). "Flat $GL(1|1)$ -connections and fatgraphs". In: *Journal of Geometry and Physics* 191. URL: <https://arxiv.org/abs/2208.08033>.

TALKS

- **Representation Theory Student Seminar** 2025
UChicago, Chicago, IL
 - Talk 1: "Basics of affine Springer fibers"
 - Talk 2: "Construction of representations of affine Weyl groups"
- **Women in Math Day** 2025
UChicago, Chicago, IL
 - Talk: "Möbius Inversion as Generalized PIE."

- **Representation Theory and Related Geometry: Progress and Prospects**

University of Georgia, Athens, GA

 - Talk: "Global Schubert varieties for GL_n ."

2024
- **Oberwolfach Workshop 2331 - Teichmüller Theory**

Mathematisches Forschungsinstitut Oberwolfach, Germany

 - Talk: "Flips on $GL(1|1)$ Graph Connections."

2023
- **Bayou Arithmetic Research Days 1**

LSU, Baton Rouge, Louisiana

 - "Lightning" talk: "Geometry from Partitions."

2022
- **UH-LSU-TAMU Undergraduate Math Research Conference**

University of Houston, Texas

 - Talk: " $GL(1|1)$: A Primer in Supermathematics."

2022
- **Symposium for Undergraduates in the Mathematical Sciences**

Online

 - Talks: " $GL(1|1)$ Graph Connections" in both years.

2021,2022
- **LSU Dean's Circle Science & Spirits**

LSU Health Medical Education & Innovation Center, Baton Rouge, Louisiana

 - Poster: " $GL(1|1)$ Graph Connections", for LSU College of Science donors.

2021
- **LSU Discover Day**

Online

 - Talk: " $GL(1|1)$ Graph Connections."

2021
- **TX-LA Undergraduate Math Conference**

Online

 - Talk: "Teichmüller theory and graph connections for $G = GL(1|1)$."

2020
- **Texas Undergraduate Math Conference**

UT Tyler, Texas

 - Talk: "Hyperbolic Space, Möbius Transformations, and Teichmüller Theory."

2019

PROGRAMS ATTENDED

- **Summer School on Enumerative Geometry and Geometric Representation Theory**

University of Pisa, Italy

2025
- **Arizona Winter School**

University of Arizona, Tuscon

2025
- **Arizona Winter School**

Project: Chow Motives of Abelian Varieties | University of Arizona, Tuscon

2024
- **Bayou Arithmetic Research Days 3**

LSU, Baton Rouge, Louisiana

2023

- **Preliminary Arizona Winter School** 2023
Abelian Varieties over Finite Fields | Online
- **Preliminary Arizona Winter School** 2024
Local Fields | Online
- **MSRI/SLMath 992 - Derived Algebraic Geometry** 2023
UC Berkeley, California
- **Southern Regional Number Theory Conference** 2022-2024
LSU, Baton Rouge, Louisiana
- **Western Algebraic Geometry Symposium** 2022
UC Riverside, California

TEACHING

- **College Fellow** 2025-2026
UChicago, Chicago, Illinois
 - TA for Honors Calculus IBL.
- **Research Experience for Undergrads** 2025
UChicago, Chicago, Illinois
 - Advised an undergraduate student in learning cardinals and the continuum hypothesis.
- **Directed Reading Program** 2023
LSU, Baton Rouge, Louisiana
 - Advised an undergraduate student in learning representation theory of finite groups.
- **MATH 7001 and 7002** 2022-2023
Communicating Math I and II | LSU, Baton Rouge, Louisiana
 - 15 minute lecture on trigonometric identities to an LSU trigonometry class.
 - 50 minute lecture on hyperbolic trigonometric functions to an LSU calculus I class.
 - 15-20 minute introductory lecture on manifolds, differential forms, and Stoke's theorem to first year LSU graduate students in mathematics. The lecture was accompanied by a 10 page expository paper on the same topic.
- **Teacher and Personal Tutor** 2021-2022
for SpiderSmart's Katy, Texas branch | Online
 - AMC 8 competition preparation course, twice.
 - Several sections of a course to prepare students to test out of 6th grade math.
 - Course in precalculus.
 - Privately tutored students of various levels, ranging from elementary school to AP Calculus BC.
- **Upper Level Math Teacher** 2020-2021
for Louisiana Math Circle Competition Team | Online
 - Taught skills, concepts, and strategies for the AIME competition.
- **Peer Tutor in Math and Physics** 2019-2020
LSMSA, Natchitoches, Louisiana

- **GED Math Tutor** 2018-2019
LSMSA, Natchitoches, Louisiana
 - Helped under-privileged students prepare to get a GED.

LEADERSHIP

- **Assistant** 2021-2022
for Louisiana Math Circle Competition Team | Online
 - Created homework assignments and mock tests.
 - Proctored competitions.
- **Math Club President** 2018-2020
at Louisiana School for Math, Science, and the Arts | Natchitoches, LA
 - Gave lectures and corresponding problem sets for introductory topics in logic, proofs, and competition math.
 - Organized participation in competitions, such as "Who Wants to Be a Mathematician" and LSU's annual math competition.
 - Started a math tutoring center after our original peer tutoring center went out of use.