

# ANDREA

## BOURQUE

### CONTACT

E-mail                      andrea.bourque72@gmail.com

### EDUCATION

- **Ph.D. in Mathematics (In Progress)** 2024-present  
*University of Chicago* | *Chicago, Illinois, USA*
- **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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| <b>Awards</b>       | <ul style="list-style-type: none"><li>• 2022 Betti and Robert Giles Senior Mathematics Award</li><li>• 2020 Eric Candell Excellence in Physics Award</li><li>• 2019 AMC 12 A Distinguished Honor Roll</li></ul> |
| <b>Scholarships</b> | <ul style="list-style-type: none"><li>• 2021 Peg and Tom Madden Mathematics Research Scholarship</li></ul>  |

### 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 and Related Geometry: Progress and Prospects** 2024  
*University of Georgia, Athens, GA*
  - Talk: "Global Schubert varieties for  $GL_n$ ."
- **Oberwolfach Workshop 2331 - Teichmüller Theory** 2023  
*Mathematisches Forschungsinstitut Oberwolfach, Germany*
  - Talk: "Flips on  $GL(1|1)$  Graph Connections."

- **Bayou Arithmetic Research Days 1** 2022  
*LSU, Baton Rouge, Louisiana*
  - "Lightning" talk: "Geometry from Partitions."
- **UH-LSU-TAMU Undergraduate Math Research Conference** 2022  
*University of Houston, Texas*
  - Talk: " $GL(1|1)$  : A Primer in Supermathematics."
- **Symposium for Undergraduates in the Mathematical Sciences** 2021,2022  
*Online*
  - Talks: " $GL(1|1)$  Graph Connections" in both years.
- **LSU Dean's Circle Science & Spirits** 2021  
*LSU Health Medical Education & Innovation Center, Baton Rouge, Louisiana*
  - Poster: " $GL(1|1)$  Graph Connections", for LSU College of Science donors.
- **LSU Discover Day** 2021  
*Online*
  - Talk: " $GL(1|1)$  Graph Connections."
- **TX-LA Undergraduate Math Conference** 2020  
*Online*
  - Talk: "Teichmüller theory and graph connections for  $G = GL(1|1)$ ."
- **Texas Undergraduate Math Conference** 2019  
*UT Tyler, Texas*
  - Talk: "Hyperbolic Space, Möbius Transformations, and Teichmüller Theory."

## PROGRAMS ATTENDED

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- **Arizona Winter School** 2024  
*Project: Chow Motives of Abelian Varieties | University of Arizona, Tuscon*
- **Bayou Arithmetic Research Days 3** 2023  
*LSU, Baton Rouge, Louisiana*
- **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

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- **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

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- 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.

## SKILLS

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<b>Coding Languages</b>	Mainly Python; past experience with C++, C#, and JS.
<b>CAS</b>	Sagemath, Singular, Mathematica, MATLAB, and MAGMA.
<b>Other Tech</b>	L <sup>A</sup> T <sub>E</sub> X, Git, Linux, SSH, Vi/Vim, Emacs, Dhall, and Arduino.