

# Astrid Arena Olave Herrera

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## EDUCATION

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- Ph.D. in Mathematics** 2021 - Present  
*Michigan State University*  
 Advisor: Elizabeth Munch
- M.Sc. in Applied Mathematics** 2021  
*Universidad Nacional de Colombia*  
 Thesis: Revealing brain network dynamics during the emotional state of suspense using topological data analysis  
 Advisor: José Perea. Coadvisor: Francisco Gomez
- B.Sc. with Honors in Mathematics** 2018  
*Universidad Nacional de Colombia*  
 Thesis: Persistent homology analysis of RNA secondary structures  
 Advisor: Gustavo N. Rubiano

## RESEARCH INTERESTS

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- Topological data analysis:  
Foundations and applications
- Algebraic topology
- Mathematical biology

## PRESENTATIONS

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3. Olave, A. A., *Revealing brain network dynamics during the emotional state of suspense using topological data analysis*, Oral contribution presented at GEOTOP-A International Conference: Applications of Geometry and Topology, 2024
2. Olave, A. A., *Revealing brain network dynamics during the emotional state of suspense using topological data analysis*, Short talk presented at II Workshop virtual SIPAIM, 2021
1. Olave, A. A., *Persistent homology analysis of rna secondary structures*, Poster session presented at XXII Colombian Congress of Mathematics, 2019, Popayán, Colombia

## PAPERS

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2. Olave, A. A., Perea, J. A., and Gómez, F., *Revealing brain network dynamics during the emotional state of suspense using topological data analysis*, bioRxiv (2024)
1. Georgiou, K., Jiang, A. J., Lee, E., Olave, A. A., Seong, I., and Upadhyaya, T., *Lift & project systems performing on the partial-vertex-cover polytope*, Theoretical Computer Science **820** (2020), 1–16

## HONORS AND AWARDS

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|---|-----------|
| Scholarship for complete tuition for M.Sc programs<br><i>Universidad Nacional de Colombia</i> | 2019      |
| Exemption from payment for best average<br><i>Universidad Nacional de Colombia</i>            | 2013-2018 |

## TEACHING EXPERIENCE

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| Calculus III (MTH 234)<br><i>Michigan State University</i><br>Teaching assistant for sections 001,015 and 018                 | Spring 2024 |
| Matrix Algebra with<br>Computational Applications (MTH 314)<br><i>Michigan State University</i><br>Instructor for section 101 | Summer 2023 |
| Calculus II (MTH 133)<br><i>Michigan State University</i><br>Teaching assistant for sections 013,018 and 024                  | Spring 2023 |
| Calculus I<br><i>Michigan State University</i><br>Teaching assistant for sections 019,021 and 024                             | Fall 2022   |
| Mathematics Learning Center<br><i>Michigan State University</i><br>Tutor  | Spring 2022 |
| Survey of Calculus I (MTH 124)<br><i>Michigan State University</i><br>Teaching assistant for Lecture 1                        | Fall 2021   |
| Tutor of Círculos Matemáticos<br><i>Universidad Nacional de Colombia</i>  | 2019 - II   |

Guided enthusiastic high school students about mathematics  
into the experience of being a mathematician

### **Integral calculus**

2018 - I

*Universidad Nacional de Colombia*

## **WORK EXPERIENCE**

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### **Fresh eye reviewer**

July 2019

*Instituto Colombiano para la Evaluación de la Educación - Icfes*

Revised questions for Saber 11 exam (Colombia's high school exit examination)

## **EXTRACURRICULAR ACTIVITIES**

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### **Council of Graduate Students**

2023-2024

*Representative of the mathematics department*

### **Sin Medida inter-university catholic community**

2018-2021

*Leadership team member*

### **Universidad Nacional women's soccer team**

2014-2021

*Goalkeeper*