

# 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
- Computational biology

## TEACHING EXPERIENCE

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- Matrix Algebra with  
Computational Applications (MTH 314)** Summer 2023  
*Michigan State University*  
 Instructor for section 101
- Calculus II (MTH 133)** Spring 2023  
*Michigan State University*  
 Teaching assistant for sections 013,018 and 024
- Calculus I** Fall 2022  
*Michigan State University*  
 Teaching assistant for sections 019,021 and 024

<b>Mathematics Learning Center</b> <i>Michigan State University</i> Tutor	Spring 2022
<b>Survey of Calculus I (MTH 124)</b> <i>Michigan State University</i> Teaching assistant for Lecture 1	Fall 2021
<b>Tutor of Círculos Matemáticos</b> <i>Universidad Nacional de Colombia</i> Guided enthusiastic high school students about mathematics into the experience of being a mathematician	2019 - II
<b>Integral calculus</b> <i>Universidad Nacional de Colombia</i>	2018 - I

## **PRESENTATIONS**

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2. Olave, A. A., *Revealing brain network dynamics during the emotional state of susoense 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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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

## **WORK EXPERIENCE**

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<b>Fresh eye reviewer</b> <i>Instituto Colombiano para la Evaluación de la Educación - Icfes</i> Revised questions for Saber 11 exam (Colombia's high school exit examination)	July 2019
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## **HONORS AND AWARDS**

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

## **EXTRACURRICULAR ACTIVITIES**

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**Sin Medida inter-university catholic community** 2018-2021  
*Leadership team member*

**Universidad Nacional women's soccer team** 2014-2021  
*Goalkeeper*