

# Astrid Arena Olave Herrera

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📍 Bogotá, COL

## EDUCATION

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**Ph.D in Mathematics** 2021 - Present  
*Michigan State University*

**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

## RESEARCH EXPERIENCE

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**Research group Computational Modeling of Biological Systems (Combios)** August 2018-2021  
*Universidad Nacional de Colombia*  
Research leader: Francisco Gómez  
Topological Data Analysis for functional neuroimaging.

**Research group RNómica teórica y computacional** June 2017-2018  
*Universidad Nacional de Colombia*  
Research leader: Clara Isabel Bermudez  
Mathematic models in RNA structure

**Fields Undergraduate Summer Research Program** July-August 2017  
*The Fields Institute for Research in Mathematical Sciences*

Research Supervisor: Professor Konstantinos Georgiou  
 Project: Lower Bounds for Semidefinite Programming  
 Relaxations to Combinatorial Optimization Problems

## PRESENTATIONS AND PAPERS

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2. 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
1. Olave, A. A., *Persistent homology analysis of rna secondary structures*, Poster session presented at XXII Colombian Congress of Mathematics, 2019, Popayán, 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)

## TEACHING EXPERIENCE

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**Survey of Calculus I (MTH 124)** Fall 2021  
*Michigan State University*

**Tutor of Círculos Matemáticos** 2019 - II  
*Universidad Nacional de Colombia*  
 Guided enthusiastic high school students about mathematics into the experience of being a mathematician

**Integral calculus** 2018 - I  
*Universidad Nacional de Colombia*

## HONORS AND AWARDS

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**Scholarship for complete tuition for M.Sc programs** 2019  
*Universidad Nacional de Colombia*

**Exemption from payment for best average** 2013-2018  
*Universidad Nacional de Colombia*

2018-2021

2014-2021