

ESTEBAN VARGAS BERNAL

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Websites: [LinkedIn](#), [Professional Website](#)

EDUCATION

[The Ohio State University](#), Columbus, OH
PhD in Mathematics, Graduate minor in Statistics. August 2022
GPA: 4.0

[The Ohio State University](#), Columbus, OH
MS in Mathematics. May 2020

[Universidad de los Andes](#), Bogotá, Colombia
Magister en Matemáticas. August 2013

[Universidad Nacional de Colombia](#), Bogotá, Colombia
Matemáticas. June 2011

TEACHING EXPERIENCE

[Arizona State University](#), Tempe, AZ
Postdoc. August 2023 - present
Taught lectures of Differential Equations (MAT 275), Linear Algebra (MAT 342).

[The Ohio State University](#), Columbus, OH
Lecturer. August 2022 - June 2023
Taught lectures of Differential Calculus (MATH 1151), Integral Calculus (MATH 1172), and Linear Algebra (MATH 2568). Taught recitations of College Algebra (MATH 1148) and Integral Calculus (MATH 1152).

[The Ohio State University](#), Columbus, OH
Graduate Teaching Associate. August 2017 - August 2022
Taught recitations of Differential Calculus (MATH 1151), Integral Calculus (MATH 1152, MATH 1172), and Vector Calculus (MATH 2153, MATH 2173).

[Universidad Sergio Arboleda](#), Bogotá, Colombia
Adjunct professor. January 2017 - May 2017
Taught Linear Algebra II and Abstract Algebra.

[Universidad Central](#), Bogotá, Colombia
Adjunct professor. February 2014 - November 2016
Taught Descriptive Statistics, Differential Calculus, Integral Calculus, Ordinary Differential Equations, and Linear Algebra.

[Universidad de los Andes](#), Bogotá, Colombia
Graduate Teaching Associate. August 2011 - May 2013
Taught recitations of Differential Calculus, Integral Calculus, and Ordinary Differential Equations.

RESEARCH EXPERIENCE

[Arizona State University](#), Tempe, AZ
Presidential Post Doctoral Fellow. August 2023 - present
Research on core groups for syphilis using data from the Network Epidemiology of

Syphilis Transmission (NEST) study and a community detection algorithm that accounts for the relatively high treatment rate of pre-exposure prophylaxis (PrEP) users.

[The Ohio State University](#), Columbus, OH

PhD student. August 2017 - August 2022

Research on applied mathematics. Related Lagrangian and Eulerian approaches for modeling disease dynamics on a network through fundamental matrices. Extended the community detection algorithm InfoMap to networks with absorption and applied it to epidemiological data. Defined a Kemeny's constant for absorbing Markov chains.

[Universidad de los Andes](#), Bogotá, Colombia

MS student. August 2011 - May 2013

Research on Mathematical Biology. Applied game theory to model sexual selection on *Engystomops pustulosus* species of frog. Analysed an epidemiological model.

PUBLICATIONS

Vargas Bernal E., Porter M. A., Tien J. H. An Extension of InfoMap to Absorbing Random Walks, [arXiv:2112.10953 \[cs.SI\]](#), 2022.

Vargas Bernal E., Tien J. H. Mean First Passage and Kemeny's constant for absorbing Markov chains, In preparation.

Vargas Bernal E., Tien J. H. Turner A. N, Miller W. C. Case study: Effective community structure and syphilis dynamics among MSM in Columbus, Ohio, In preparation.

Vargas Bernal E., Saucedo O., Tien J. H. Relating Eulerian and Lagrangian spatial models for vector-host disease dynamics through a fundamental matrix, *Journal of Mathematical Biology* 84.7 (2022): 1-36.

Sanabria Malagón C., Vargas Bernal E. Competent Host and Endemicity of Multi-Host Vector-Borne Diseases, *Bulletin of Mathematical Biology* 81.11 (2019): 4470-4483.

Vargas Bernal E., Sanabria Malagón C. Modeling Sexual Selection in Túngara frog and Rationality of Mate Choice, *Bulletin of Mathematical Biology* 79.12 (2017): 2847-2864.

PARTICIPATION AT CONFERENCES

International Conference on Mathematical Multiscale Modeling in Biology. Guanacaste, Costa Rica. October 21-24, 2019. Talk "Relating Eulerian and Lagrangian Spatial Models for Vector-host Disease Dynamics Through a Fundamental Matrix".

Mathematical Models in Ecology and Evolution 2017. City, University of London, London, UK. July 10-12, 2017. Talk "Modeling Sexual Selection in Túngara Frog and Rationality of Mate Choice".

Ecology and Evolution of Infectious Disease (EEID). Cornell University, Ithaca, NY. June 3-5, 2016. Poster "The role of disease cycles in the endemicity of infectious diseases".

PROGRAMMING SKILLS

Python, R, MATLAB.

MENTORING EXPERIENCE

[The Ohio State University](#), Columbus, OH

REU Mentoring. Summer 2022

Worked with Ethan Baxter, from University of California, Santa Barbara, on extensions of modularity maximization to graphs with absorption.

[Universidad de los Andes](#), Bogotá, Colombia

IREs program. Summer 2015

Collaborated with graduate students from the [Simon A. Levin Mathematical Center](#) to mentor undergraduate students from Universidad de los Andes.

SERVICE ACTIVITIES

[The Ohio State University](#), Columbus, OH

YSP bridge instructor. Autumn 2022

Taught a recitations with YSP students. Offered extended office hours, provided personalized feedback, and reported academic progress for YSP students.

HONORS

First-Year Graduate Teaching Associate Award 2018-2019

Department of Mathematics of The Ohio State University.

Fulbright Minciencias Scholarship

PhD studies 2017.

Mazda Foundation for Science and Art Scholarship

Bogota, Colombia 2012.