ERIK AMÉZQUITA

I have interdisciplinary experience working in coding and data analysis reseach projects with plant biologists, archaeologists, and astronomers.

🎓 CAREER AND EDUCATION

PFFIE Postdoctoral Future Faculty Fellow
University of Missouri
📍 Columbia, MO

present | 2023

· Joint appointment between the Division of Plant Sciences & Technology (80%) and the Department of Mathematics (20%)

PhD, Computational Mathematics, Science & Engineering
Michigan State University
📍 East Lansing, MI

2023 | 2018

· Advisors: Elizabeth Munch and Dan Chitwood

B.S., Mathematics
Universidad de Guanajuato
📍 Guanajuato, Gto.

2018 | 2013

· Advisor: Antonio Rieser (CONACYT-CIMAT)

📖 PEER–REVIEWED WORK

Genomics data analysis via spectral shape and topology
E.J. Amézquita, F. Nasrin, K.M. Storey, M. Yoshizawa

2023

· *PLoS ONE* 18(4): 30284820. DOI: 10.1371/journal.pone.0284820

A critical analysis of plant science literature reveals ongoing inequities
R.A. Marks, E.J. Amézquita, S. Percival, A. Rougon-Cardoso, C. Chibici-Revneanu, S.M. Tebele, J.M. Farrant, R. VanBuren, D.H. Chitwood

2023

· *PNAS* 120(10): e2217564120. DOI: 10.1073/pnas.2217564120

The shape of aroma: measuring and modeling citrus oil gland distribution
E.J. Amézquita, M.Y. Quigley, T. Ophelders, D. Seymour, E. Munch, D. H. Chitwood

2023

· *Plants, People, Planet* 5(5): 698-711. DOI: 10.1002/ppp3.10333

Teaching Tools in Plant Biology. Plants and Python, Coding from Scratch in the Plant Sciences
R. VanBuren, A. Rougon-Cardoso, E.J. Amézquita, E. Coss-Navarrete, A. Espinosa-Jaime, O. Gonzalez-Iturbe, A. Luckie-Duque, E. Mendoza-Galindo, J. Pardo, G. Rodríguez-Guerrero, P. Rosiles-Loeza, M. Vásquez-Cruz, S. Fernandez-Valverde, T. Hernandez-Hernandez, S. Palande, and D.H. Chitwood

2022

· *The Plant Cell* 34(7): e1. DOI: 10.1093/plcell/koac187

Measuring hidden phenotype: Quantifying the shape of barley seeds using the Euler Characteristic Transform
E.J. Amézquita, M.Y. Quigley, T. Ophelders, J.B. Landis, D. Koenig, E. Munch, D. H. Chitwood

2021

· *in Silico Plants* 4(1): diab033. DOI: 10.1093/insilicoplants/diab033

CONTACT

🏢 1201 Rollins St
240a LSC
Columbia, MO 65211
✉ eah4d@missouri.edu
⌂ ejamezquita
🔗 ejamezquita.github.io/

View this CV online at
ejamezquita.github.io/cv

SKILLS

Programming: Python, R, C/C++, bash/unix

Technologies: $\LaTeX$, RMarkdown, jupyter, vim, html/css

Languages: Spanish (native), English (fluent), French (elementary)

Made with the R package pagedown.

Last updated on 2023-10-06.

2020 ● **The shape of things to come: Topological data analysis and biology, from molecules to organisms**
E.J. Amézquita, M.Y. Quigley, T. Ophelders, E. Munch, D.H. Chitwood

· *Developmental Dynamics* 249(7): 816-833. DOI: 10.1002/dvdy.175

📖 NON PEER–REVIEWED WORK

2023 ● **The shape and volume of air, kernels, and cracks, in a nutshell**
E.J. Amézquita, M.Y. Quigley, P.J. Brown, E. Munch, D.H. Chitwood

· Submitted. Preprint available. DOI: 10.1101/2023.09.26.559651

2022 ● **Describing Demeter**
E.J. Amézquita

· Athens Science Observer. February 2022. Zine #3: Plant Phenotyping Edition. Link.

2021 ● **Midiendo el fenotipo oculto con técnicas matemáticas novedosas**
E.J. Amézquita. Edited by R. Shekar

· Botany One. Blog entry. Link

👤 TEACHING AND MENTORING EXPERIENCE

2022
|
2019
● **Experience at Michigan State University**
· Mentor for the ACRES REU. Conducted weekly professional development workshops and weekly social events for an undergraduate audience. Summer 2022.
· TA for CMSE 201: Intro to Computational Modelling and Data Analysis. Fall 2019

Audience was mainly undergraduate students with no prior coding experience

2022
|
2021
● **Teaching Assistant at other institutions in the US**
· SGI 2022. Summer Geometry Initiative REU. Massachusetts Institute of Technology.
· SGI 2021. Summer Geometry Institute REU. Massachusetts Institute of Technology.
· Code In Place. Stanford University.

Conducted virtually

2018
|
2016
● **Teaching Assistant at CIMAT/Universidad de Guanajuato**
· Precalculus and analytic geometry. Spring 2018
· Topology I (Intro to point-set topology). Fall 2017
· 14th Calculus Problem-solving Workshop. Summer 2017
· Introduction to C++ and data structures (Online). Summer 2017
· Introduction to probability. Fall 2016

Some courses involved leading tutorials on C++ or R

🎤 INVITED TALKS

2023 ● **Mapper and the topological shape of genomic analysis**
MU-GNU International Symposium in Plant Biotechnology. Bond LSC. Columbia, MO.

2023 ● **A primer on Topological Data Analysis**
Geometry and Topology Seminar. Department of Mathematics. University of Missouri. Columbia, MO

2023 ● **Exploring the mathematical shape of plants**
CS Colloquium. Department of Computer Science. Saint Louis University. St. Louis, MO

2023 • **When topology meets plant morphology**
USTARS 2023. Underrepresented Students in Topology and Algebra Research Symposium, Seattle

2023 • **The mathematical shape of plants**
Plant Sciences Seminar. Department of Botany and Plant Sciences. University of California, Riverside

2023 • **Measuring the shape of plants and nuts using topological data analysis**
JMM 2023. Joint Mathematics Meeting. American Mathematical Society. Boston, MA.

2022 • **Using the Euler characteristic to quantify the shape of barley seeds**
OU Topology and Data Science Seminar. Department of Math. University of Oklahoma. Virtual

2022 • **Bridging applied topology and plant biology**
JMM 2022. Joint Mathematics Meeting. American Mathematical Society

2022 • **Measuring the shape of plants with the Euler Characteristic Transform**
UFTDA 2022. University of Florida Topological Data Analysis Conference. Gainesville, FL

2021 • **Analyzing maize leaf angles and modeling leaf curvature**
2021 NAPPN. North American Plant Phenotyping Network. Virtual

2018 • **Efficient object classification using the Euler characteristic**
II Coloquio de Desarrollo Tecnológico al Servicio del Patrimonio Cultural. Guanajuato. Gto.

🔧 SELECTED WORKSHOPS LEAD

2022 • **The shape of things: Measuring the shape of plants with Topological Data Analysis**
2022 NAPPN. North American Plant Phenotyping Network. Athens, GA. Check material.

2021 • **Using the Euler characteristic to quantify the shape in biology**
2021 AATRN Tutorial-a-thon. Applied Algebraic Topology Research Network. Watch video.

2021 • **Measuring the shape of plants with Topological Data Analysis**
2021 NAPPN. North American Plant Phenotyping Network. Check material.

🪪 SELECTED POSTERS PRESENTED

2023 • **The shape and size of shells, kernels, and cracks, in a nutshell**
CAFNR Research Symposium. University of Missouri. Columbia, MO

2022 • **Using topology to analyze the shape of plants**
IPPS2022. International Plant Phenotyping Symposium. Wageningen, The Netherlands

2022 • **Modeling the shape of citrus and their oil gland distribution**
OSU PSS. The Ohio State University Plant Sciences Symposium. Virtual

2017 • **Object classification using the Euler characteristic**
Barrett Memorial Lectures. Math Department. University of Tennessee. Knoxville, TN

2017 • **Bridging mathematics and archaeology**
3a Escuela de Análisis Topológico de Datos y Topología Estocástica. ABACUS. CINVESTAV. Edo Mex

⬤ SELECTED WORKSHOPS AND HACKATHONS ATTENDED

2022
Beyond Abstract Measures: geometry and computation
Organized by the Lorentz Center, Leiden, The Netherlands

2021
Datathon4Justice
D4J. Organized by QSIDE. Institute for Quantitative Study of Inclusion, Diversity, and Equity. Virtual

2021
Immersive Visualization Institute
IVI2021. Abrams Planetarium, MSU Libraries, and MSU Museum. East Lansing. MI

⬤ OUTREACH

2023
If life gives you lemons, analyze the shape of their aroma
Science on Tap. International Tap House. Columbia, MO

2023
Mental Health in Mathematics and Computer Science
Panel organizer and moderator. SGI23. Massachussets Institute of Technology. Virtual

2022
Webinar de Solicitudes al Doctorado en Estados Unidos
Panelist. Organized by the Coloquio de Exestudiantes CIMAT/DEMAT. Virtual

2022
Mental Health in Mathematics and Computer Science
Panel organizer and moderator. SGI22. Massachussets Institute of Technology. Virtual

2021
A topologist and a plant biologist go for a newly shaped beer
Hispanics in STEM celebration. WaMPS. Michigan State University. East Lansing, MI

2020
Using topology to quantify the shape of barley
Summer Math Academy. Math Department. University of Toronto. Virtual

2020
Wrangling and Presenting Data with Pandas and Seaborn in Python
Social Science Data Analytics Initiative. Michigan State University. Virtual

2020
Narrating our data with RMarkdown
Social Science Data Analytics Initiative. Michigan State University. Virtual

2018
La maldición de la dimensión y aprendizaje de máquina
Ciencia es Cultura. Dirección de Extensión Cultural. UGto. San Luis, Gto.

2017
Un matemático y un psicólogo se hallan en Hanoi
Ciencia es Cultura. Dirección de Extensión Cultural. UGto. Guanajuato, Gto.

2016
Infinitos grandes e infinitos pequeños
Ciencia es Cultura. Dirección de Extensión Cultural. UGto. San Miguel Allende, Gto.

⬤ SELECT SERVICE

2022 | 2021
President of the CMSE Graduate Student Organization
CMSE and the Council of Graduate Students

· Lead department-wide events, committees, and inquiries to attend graduate students' needs

2017 | 2016

Student Representative
College of Natural and Exact Sciences Council. Universidad de Guanajuato.
· Logged each session minutes, such as budget or policy, and shared them with the math students.

2016 | 2015

High School Mathematics Seminar Co-Organizer
Escuela de Nivel Medio Superior, Guanajuato. Guanajuato.
· Delivered lectures on math topics usually not covered at high school levels, such as combinatorics or group theory.

2013 | 2012

Tutor of the Guatemalan Math Olympiad Team
Math Olympiad National Team. Guatemala.
· Successfully lobbied the Guatemalan Department of Education to obtain funding for 3 students to participate in the 15th Central American and Caribbean Math Olympiad.

🎗 AWARDS

2023

Distinguished Graduate Student. Travel Grant (US$700)
USTARS 2023. Underrepresented Students in Topology and Algebra Research Symposium.

2022

Best Poster Award. 3rd Place out of 173 posters.
IPPS2022. International Plant Phenotyping Symposium. Wageningen, The Netherlands

2022

Travel Grant (EUR 2000)
IPPS2022. International Plant Phenotyping Symposium. Wageningen, The Netherlands

2022

Fitch H. Beach Award
College of Engineering. Michigan State University
· 2nd place. Most outstanding graduate research within the College of Engineering.

2022

Travel Grant (US$800)
2022 NAPPN. North American Plant Phenotyping Network. Athens, GA

2019

Travel Grant (US$800)
Applied Mathematical Modeling with Topological Techniques. ICERM. Providence, RI

2019

IMPACTS Fellowship
Awarded jointly by Michigan State University and the NRT-NSF program (NSF DGE-1828149).

2018

Sotero Prieto Medal
Sociedad Mexicana de Matemáticas
· Best undergrad math thesis produced in Mexico during the 2017-18 academic year.

2018

Francisco Aranda Ordaz Award
Asociación Mexicana de Estadística
· 3rd place. Best undergrad statistics theses produced in Mexico during the 2016-18 academic years.

2018

Raymond P. and Marie M. Ginther Graduate Fellowship
Awarded by CMSE to outstanding incoming graduate students.

2018 | 2013

CIMAT Academic Excellence Scholarship
Merit-based scholarship for math undergraduates.

2017 **Best Undergraduate Mathematics, Physics and Earth Sciences Innovation Research Project.**
4to Congreso Interinstitucional de Jóvenes Investigadores. 3rd Place. Nationwide event.

2017 **Best Undergraduate Engineering Research Project**
5to Encuentro de Jóvenes Investigadores. 1st Place. Statewide event