

Crystal A Guzmán

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SUMMARY

Computational biologist with expertise in statistical analysis, algorithm modeling, and data visualization. Received a doctorate in biological sciences and endeavors to contribute to data-driven decision-making by incorporating machine learning methods.

TECHNICAL SKILLS

Statistical computing in R

- Univariate and multivariate statistics, generalized linear modeling, nonparametric statistics, random-effect meta-analysis methods, Canonical Analysis of Principal Coordinate (CAP) ordination.

Machine Learning

- Support Vector Machines, Decision Trees, k-nearest neighbors algorithm (KNN), Clustering with k-means, hierarchical agglomerative clustering (HAC), Principal Component Analysis (PCA)

Data Visualization

- ggplot2, Seaborn, Matplotlib, Plotly, Cufflinks

Statistical software

- RStudio, Visual Studio Code, Jupyter, ArcGIS Pro, SPSS, Primer, Statistica, SAS, Fragstats, Sigmaplot, Tableau

Computer languages and packages

- R, Python, NumPy, Pandas

EDUCATION

DePaul University | Chicago, IL | *Graduation June 2024*

M.S. Data Science

- Concentration: Computational Methods
- **Awards:** Geographic Information System (GIS) certificate

University of Illinois at Chicago | Chicago, IL | December 2017

Ph.D. Biological Sciences

- Dissertation: Barriers to tropical rainforest reforestation: tree seedling regeneration in degraded pasture
- **Awards:** Bridge to Doctorate Fellowship (\$30,000), UIC Department award (\$200), Provost Graduate Research award (\$2000), Elmer Hadley research award (\$4322), Latin American Recruitment and Education Services award (\$200), Sigma Xi (\$500), Dr. Martin Luther King Jr. scholarship (\$5000), and Lewis and Clark Fund (\$2100)

University of Illinois at Chicago | Chicago, IL | December 2008

B.A. Biological Sciences

- Research: Used genetic analysis to assess whether threatened island oak (*Quercus tomentella*) hybridized with other oak species.
- **Awards:** Summer Research Opportunity Program (SROP) Fellowship (\$6000), Alliance for Minority Participation (AMPs) award (\$3000)

EXPERIENCE

DePaul University | Chicago, IL | 2018 – Present

Adjunct Professor

- Created and taught environmental science lectures, exams, and assessment assignments.
- Lead laboratory activities, including building population survivorship models, performing statistical analysis on collected data, and simulating future CO₂ concentrations.
- **Awards:** Fulfilled Teaching & Learning Certificate Program (TLCP), advancing complex communication and learning.

National Louis University | Chicago, IL | 2018 – Present

Adjunct Professor

- Co-created two undergraduate courses, ‘Mathematical Thinking for Elementary Teachers’ and ‘Inquiry and Thinking in STEM for Teachers’.
- Contributor to NLU Science department course advancement and lecturer of courses Biology with Laboratory, Mathematical Thinking for Elementary Teachers, Inquiry and Thinking in STEM for Teachers, and Physical Science.
- **Awards:** National Louis University Living Our Values Award

University of Illinois | Chicago, IL | 2008 – 2017

Principal Investigator and Manager

- Applied for funding for Mexico research project, awarded \$51,000.
- Built a fully crossed factorial design field experiment
- Managed 10+ local Mexican employees to do experiment maintenance and data collection.
- Performed statistical analyses to determine barriers to tropical reforestation
- Published and presented experiment results in multiple conference proceedings.
- **Awards:** Recognized twice as a presenter and given 1st Place for Graduate Oral Presentation in Biology (\$1000).

University of Illinois | Chicago, IL | 2008 – 2017

Research Assistant – Genetics laboratory

- Prepared and extracted genetic material from study species
- Analyzed and visualized extracted microsatellite data
- Presented results at multiple conferences.
- **Awards:** \$3000 by the Alliance of Minority Participation organization.

SELECT PUBLICATIONS AND CONFERENCE PRESENTATIONS

- Guzman CA, Howe HF, Wise DH, Coates RI and Zambrano J. 2021. Rodent suppression of establishment in tropical pasture. *Oecologia*: 1-12.
- Guzman CA, Gharehaghaji M and Howe HF. A comprehensive evaluation of early tree regeneration barriers in pastures: A Meta-Analysis. In Preparation. Tentative submission.
- Guzman CA, Abrajam S, Ashley MV. Genetic Differentiation among island and mainland populations and species of California oaks. UIC 2008. University of Illinois, Chicago, IL. April 2008.
- Guzman CA, Howe H. Barriers to Tropical Rainforest Restoration: Tree Seedling Regeneration in a Degraded Tropical Pasture. ESA 2015. Ecological Society of America, Baltimore, Maryland. August 2015.
- Guzman CA, Howe H. Meta-analysis: comprehensive evaluation of regeneration barriers in pastures. ATBC 2017. Association with Tropical Biological Conservation, Merida, Yucatan. July 2017.

AFFILIATIONS AND SOFT SKILLS

- **Collaborators:** H. F. Howe (University of Illinois at Chicago) and Rosamond Coates (Universidad Nacional Autonoma de Mexico)
- **Ph.D. Graduate Advisers:** Doctoral Advisor Henry F. Howe, Joel Brown, Chris Whelan, Miquel Gonzalez-Meler, Corine Vriesendorp, and David Wise
- **Professional Societies:** Society for Advancement of Chicanos and Native Americans in Science (SACNAS), Society of Hispanic Professional Engineers (SHPE), Women in Science and Engineering (WISE)
- **Volunteered:** Science Bowl STEM Jr. and High School Outreach (2008-2015), SHPE STEM Jr. High Outreach, SHPE board member (Historian), Noche de Ciencias, Led Family Biology Workshop (heart dissection)
- **Languages:** English (fluent), Spanish, (fluent), Portuguese (basic)