



EMMANUEL ALCALÁ

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ABOUT ME

5+ years of experience modeling real-world phenomena to answer research questions and optimize processes. During my PhD and MSc, I built expertise in computationally modeling economic behavior using neural networks and probabilistic models. I thrive in diverse settings, employing both hypothesis-driven and data-driven approaches to unravel complex questions. My passion lies in applying AI to quantitatively study and model phenomena across scientific and applied domains.

Leveraging my expertise in design of experiments and response surface methodology, I optimized nanosensor fabrication as postdoctoral researcher at ITESO (a private higher education institute in Mexico), reducing cost fabrication with faster turnaround for industrial applications. Teaching responsibilities included courses on Decision Making, Game Theory, and Econometrics for Financial Engineering, and currently Advanced Statistical Analysis for the Master of Data Science.

Following a three-month research assistantship at Panamerican University, I transitioned to a post-doctoral research role at the University of Guadalajara in 2022, where I honed my Python and R programming skills to create [YEAB](#), an open-source R package. This experience exemplifies my ability to translate complex concepts into practical applications while continuously expanding my skillset through challenging projects. Throughout my scientific career, I've authored peer-reviewed articles, effectively communicating intricate ideas to diverse audiences and engaging in collaborative, creative environments that demand assertive communication and critical thinking.

EDUCATION

University of Guadalajara Bachelor of Pharmaceutical Chemistry	<i>2008 - 2012</i>
University of Guadalajara, CEIC-CUCBA Master of Behavioral Sciences Examination Date: July 6, 2017 Thesis: Neural network model of impulsive choice	<i>2015 - 2017</i>
University of Guadalajara, CEIC-CUCBA Doctor of Behavioral Sciences Examination Date: May 24, 2021 Thesis: Habit formation and resistance to change; computational models	<i>2017 - 2021</i>

EXPERIENCE

University of Guadalajara (UdG) <i>Posdoctoral Researcher</i>	Dec 2022-
<ul style="list-style-type: none">· Data analysis of spatial data.· Design of experiments.· Data wrangling.· Neural network modeling of multivariate series data with deep variational autoencoders.	
Panamerican University (UP) <i>Research Assistant</i>	Jul 2022 - Nov 2022 <i>CONAHCyT - Project 320943</i>

- Data wrangling.
- Feature engineering.
- Data analysis.
- Writing and testing an R package (see [YEAB](#)).

ITESO

2021

Research Assistant

COECYTJAL - Project FODECYJAL 8248-2019

- Design of Experiments, Regression Analysis, DataViz, Response Surface Methodology.

ITESO

2021-

Associate Professor

- Game Theory and Decision Making in Financial Engineering
- Econometrics.
- Advanced Statistical Analysis.

University of La Ciénega

2019

Lecturer

Guadalajara, Jal

- BioStatistics for Nutritionists

Consultant (Freelancer)

2018 -

Data Analysis and Statistical Consulting

Guadalajara, Jal

- Experimental design, data analysis, and statistical inference for decision-making
- Example project: San Javier Hospital, Fistula Day: <https://bit.ly/2Vz2s17>

UTEG

2017

Academic Advisor

Guadalajara, Jal

- Advisor and mentor for talented students.

SKILLS (0 - 100 %)

R & RStudio (IDE)



Language, statistical software, and various libraries

Python 3



Language, OpenCV, and data science libraries

L^AT_EX 2_ε



Preparation of scientific and technical documents

Linux



OS (different distros) and basic shell scripting

Windows



OS and MS Office suite

macOS



OS and basic shell scripting

ADDITIONAL EDUCATION

2016

Probability Theory and Mathematical Statistics for Physicists

CUCEI, UdG

Data Science Bootcamp (In-person)

IBM-UdG

2017

Model Comparison in Quantitative Analysis of Behavior

UAA - Randolph Grace, PhD

DISTINCTIONS

National System of Researchers - C. 2022 - 2025

SOME PUBLICATIONS

2019

Buriticá, J.J., & **Alcalá, E.** (2019). Increased Generalization in a Peak Procedure after Delayed Reinforcement. *Behavioural Processes*, 169, 103978.

Gómez, E. G., García, V. I., Morales, C. S., López, F. A. L., & **Alcalá, E.** (2020). *Manual de Análisis de Datos de Descuento Temporal en RStudio (MADDTeR)*. Red Universitaria de Aprendizaje (RUA) de la UNAM. <https://www.rua.unam.mx/portal/recursos/ficha/85989>

2021

López-Cárdenas, P.G, **Alcalá, E.**, Sánchez-Torres, J.D., Araujo, E. (2021). Enhancing the Sensitivity of a Class of Sensors: A Data-Based Engineering Approach. *2021 IEEE 21st International Conference on Nanotechnology (NANO)*, 221-224, DOI: [10.1109/NANO51122.2021.9514352](https://doi.org/10.1109/NANO51122.2021.9514352).

López-Cárdenas, P. G., **Alcalá, E.**, Sánchez-Torres, J. D., & Araujo, E. (2021, November). A Resampling Approach for the Data-Based Optimization of Nanosensors. In *2021 18th International Conference on Electrical Engineering, Computing Science and Automatic Control (CCE)* (pp. 1-4). *IEEE*.

2022

Campos-Ordoñez, T., **Alcalá, E.**, Ibarra-Castañeda, N., Buriticá, J., González-Pérez, O. (2021). A repeated cyclohexane inhalation generates stereotypic circling, hyperlocomotion, persistent anxiety-like behavior, and dysregulates the c-Fos expression in striatum and nucleus accumbens. *Behavioural brain research*, 418, 113664

Sosa, R., **Alcalá, E.** (2022). The Nervous System as a Solution for Implementing Closed Negative Feedback Control Loops. *Journal of Experimental Analysis of Behavior*, 1-22

2023

López-Cárdenas, P. G., **Alcalá, E.**, Sánchez-Torres, J. D., & Araujo, E. (2023). Improving self-supported nanowire arrays using response surface methodology for the synthesis of a H₂O₂ nanostructured sensor. *Materials Chemistry and Physics*, 303, 127729