

CAREER HIGHLIGHTS

Ph.D. in Bioengineering with over 4 years of experience in research, teaching, and tutoring. Experienced in statistical analysis, bioinformatics, and optimization methods for gene expression data analysis. Strong track record in teaching mathematics and statistics courses, along with extensive experience guiding students in coding using RStudio and Python.

- Led and developed research on gene expression analysis through optimization methods, applied to autism, schizophrenia, Alzheimer's disease, hepatitis C, and autoimmune diseases.
- Extensive experience in the use of statistical software such as R, Python, and in implementing machine learning for data analysis.
- Collaborative researcher with experience in interdisciplinary projects, including health-related research.

EDUCATION

Ph.D. in Bioengineering Jan 2019 – Jun 2024

University of Puerto Rico, Mayagüez Campus

Postdoctoral Researcher Feb 2024 – Present

University of Puerto Rico, Mayagüez Campus and Emergent Mechanisms in Biology of Robustness Integration and Organization Institute (EMBRIO)

M.S. in Science in Statistical Mathematics Aug 2015 – May 2018

University of Puerto Rico, Mayagüez Campus

B.S. Mathematics with an emphasis on Statistics Aug 2008 - Jun 2014

Universidad del Tolima, Tolima, Colombia.

EXPERIENCE

Research Assistant Aug 2019 – Jun 2024

Postdoctoral Researcher | University of Puerto Rico, Mayagüez & EMBRIO Institute

Feb 2024 – Present

- Development of interactive applications for calcium trace analysis, including metric extraction and statistical analysis, applied to different organisms such as *Drosophila melanogaster*, *Danio rerio* (zebrafish), and *Arabidopsis thaliana*.
- Development, coding, and implementation of algorithms for calcium signal forecasting.

University of Puerto Rico – Mayagüez Campus (Mayagüez, Puerto Rico)

Elucidación de información genética para diversas condiciones, incluidas el autismo, la esquizofrenia, el Alzheimer, la hepatitis C y el lupus, utilizando métodos de optimización matemática para analizar conjuntos de datos de microarrays y RNA-seq.

- Performed quantitative and qualitative analysis of biological databases to characterize illness at molecular levels
- Developed a bioinformatics suite of tools to identify gene information of interest, routes of maximum correlation, and groups that integrate genes and biological processes through RStudio, R shiny, and phyton.
- Applied mathematical optimization methods at the biological level.
- Biological support in the literature for our results.

Mentor research students in applied optimization groups.

- Train undergraduate and graduate students in optimization methods oriented in the analysis of gene expression data.
- Guide students in coding algorithms in RStudio and in Python.
- Guide undergraduate students to make biological sense of theoretical results by searching the literature

Teacher Assistant

Jan 2015 – Current

University of Puerto Rico – Mayagüez Campus (Mayagüez, Puerto Rico)

- Taught undergraduate courses such as Elementary Statistics, Precalculus, Mathematical Reasoning and Probability, and Statistics for Engineers.
- Created and developed the course material.
- Prepared and taught laboratories.
- Tutored students.

Research Assistant

Aug 2012 – Current

University of Tolima (Tolima- Colombia) and University of Puerto Rico – Mayagüez Campus (Mayagüez, Puerto Rico)

- Trained undergraduate and graduate students in the different optimization methods of our group applied optimization group
- Performed statistical simulations to find approximation features between frequentist and Bayesian interval statistical inference.
- Research in the construction and algebra of the numerical field of hyperreals through an extension of the real line.
- Applied machine learning techniques to identify patterns in data and make decisions.
- Programming interactive applications in R Shiny.

RESEARCH**Manuscripts**

- Narváez-Bandera, I., **Suárez-Gómez, D.**, Isaza, C., Cabrera-Ríos, M. (2021). "Multiple Criteria Optimization (MCO): a gene selection deterministic tool in RStudio". PLoS ONE 17(1): e0262890. <https://doi.org/10.1371/journal.pone.0262890>.
- Luna-Alvear, A. E., **Suárez-Gómez, D.**, Sanchez-Castro, A. A., Rentas-Echeverria, A. C., Cabrera-Ríos, M., & Isaza, C. E. (2024). Assessment of the Degree of Coincidence between Differentially Expressed Genes in Pancreatic Cancer with and without CAR T Cell Treatment. *bioRxiv*. <https://doi.org/10.1101/2024.04.15.589636>

- Narváez-Bandera, I., Suárez-Gómez, D., Castro-Rivera, C.D.M. *et al.* Hepatitis C virus infection and Parkinson's disease: insights from a joint sex-stratified BioOptimatics meta-analysis. *Sci Rep* **14**, 22838 (2024). <https://doi.org/10.1038/s41598-024-73535-0>.
- Suárez-Gómez, D., Narváez-Bandera, I., Castro, C., Camasta, A., Méndez Cruz, S. R., Figueroa-Stuart, V., Luna Alvear, A. E., Bravo-Cordero, A., Ferrer-Saenz, F., Cabrera-Ríos, M., & Isaza, C. E. Gene Expression Changes and Pathways Commonalities Between Autism and Schizophrenia Through BioOptimatics (submitted).
- Aguilar-García X., Nieves-Carril, I., Narváez-Bandera, I., **Suárez-Gómez, D.**, Isaza, C.E., Cabrera-Ríos, M. "Study of Breast and Colorectal Cancers in Women through BioOptimatics (submitted).
- González-Borja, **D. Suárez-Gómez**, O. Lugo-Capera, "Análisis semanal de la tasa de propagación del COVID-19 en Colombia", Entre Ciencia e Ingeniería-UCP (submitted).
- Rocha-Clavijo, D., **Suarez-Gomez, D.**, Miranda, G., Pérez Rosas, N., Luna Alvear, A. E., Colom Brana, S., Isaza, C. E., & Cabrera-Rios, M. *Quantifying Calcium Dynamics in T Cell Populations: An Automated Analysis Framework for Antigen Fluorescence Applying Functional Anova* (in progress).
- Suarez-Gomez, D.**, Perez-Rosas, N. C., Miranda-Contreras, G. I., Colom-Brañas, S. R., Zhang, W., Mim, M. S., Tang, S., Gazzo, D., Deng, Q., Staiger, C. J., Reeves, G., Isaza-Brando, C. E., Umulis, D., Zartman, J., & Cabrera, M. "CalciumInsights: An Open-Source, Tissue-Agnostic Graphical Interface for High-Quality Analysis of Calcium Signals (in progress).

Thesis

Suárez-Gómez, D., (2023). "Gene Expression Commonalities Between Autism and Schizophrenia Via Biooptimatics." (Dissertation).

Suárez-Gómez, D., (2019). "Sample Size of a Bayesian and Frequentists Approximation in the Interval Estimation." (Master thesis).

Suárez-Gómez, D., (2015). "Mathematical Principles of the Hyper Reals." (Bachelor's thesis).

Memberships

- The Applied Optimization Group Aug 2018 – Present
- Emergent Mechanisms in Biology of Robustness Integration and Organization Institute (EMBRIO) Jan 2023 – Present

ACHIEVEMENTS & WARDS

- Beca Fondo Dotal General – UPRM 2022
- Scholarship Summer Institute in Statistical Genetics - Washington University 2021

POSTERS

- Third place - Puerto Rico Neuroscience Conference, Ponce Health Sciences University 2019
- One of the three best abstracts selected after peer review-2021 ALLIANCE Scientific Day. 2021

Honorable mentions – Universidad del Tolima (Tolima, Colombia)

- Award-winning thesis 2014

SKILLS

- Basic SAS, Basic SQL, R, Python, Minitab, MATLAB, Microsoft Office products, Moodle platform.
- Ability to identify, critically analyze, and solve problems; Quick Learner; Service-Oriented; Teamwork-Oriented

SERVICE

Mentorship

Graduate students mentored

- 2021-2024 Alibeth Luna Alvear, Ph.D. Bioengineering
- 2020-2022 Daniel Rocha Clavijo, Ph.D. Bioengineering
- 2020-2021 Lesbia Lopez Lima, Ph.D. Bioengineering
- 2019-2022 Isis Narváez Bandera, Ph.D. Bioengineering

Undergraduate students mentored

- 2023-2024 Coral Castro, B.S. Biology
- 2021-2022 Karlianie Rivera, B.S. Biotechnology
- 2021-2022 Sebastian Mendez, B.S. Biology
- 2021-2022 Richardson Calderon Rivera, B.S. Industrial Engineering
- 2021-2022 Wilfredo Ramos Vazquez
- 2020-2021 Frederick Gonzalez, B.S. Industrial Engineering
- 2020-2021 Alezandra Hernandez, B.S. Industrial Engineering

REFERENCES

- Mauricio Cabrera Rios, Industrial Engineering and Bioengineering Professor, University of Puerto Rico at Mayaguez, mauricio.cabrera1@upr.edu
- Clara E. Isaza, Biology and Bioengineering Professor, University of Puerto Rico at Mayaguez, clara.isaza@upr.edu
- Wolfgang Rolke, Statistics Professor, University of Puerto Rico at Mayaguez, wolfgang.rolke@upr.edu
- Edgardo Lorenzo Gonzalez, Statistics Professor, University of Puerto Rico at Mayaguez, edgardo.lorenzo1@upr.edu