Ángel Luis Robles Fernández

Graduate student
M.Sc. in Physics
Universidad Veracruzana, Mexico

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Education

2021 - Actual **Evolutionary Biology PhD Candidate**, Arizona State University, School of Life Science
Dissertation:
Predicting host - parasite interactions from different biodiversity dimensions through machine learning
Committee:
Nathan Upham, Nico Franz, Chair
Beckett Sterner
Taichi Suzuki

2020 - 2021 **Master of Science in Physics**, Universidad Veracruzana, Faculty of Physics
Degree in Physics, Universidad Veracruzana, Faculty of Physics 2017
Degree in Music, Universidad Veracruzana, Faculty of Arts 2011

Honors and awards

05/2023 **Grant-Aid-Research** American Society of Mammalogists. $1750.00
10/2022 **2022 Ebbe Nielsen Challenge.** GBIF LACS: GBIF Literature Abstract Classification System. Second Prize (https://gbif.lacs.info/). $5,000.00
03/2022 2022 **Leo S. Rowe Fund Program Beneficiary**. $15,000.00
10/2020 **2020 Young Research award.** Global Biodiversity Information Facility. $5,000.00
05/2016 **5th Young Talent award 2016**. Consejo Veracruzano de Investigación Científica y Desarrollo Tecnológico (COVEICYDET). $1,500.00
11/2016 **Encouragement to Academic and Artistic Recognition**. Universidad Veracruzana. $250
Total: $20,500.00

Peer-reviewed publications

Tinoco-Dominguez E., Amancio G, **Robles-Fernández, Á. L**., & Lira-Noriega, A. (2023). Interaction network of Phoradendron and its hosts and the influence of phylogenetic, geographic, and environmental factors on the probability of interaction. On review
Contribution: Methodology, Formal Analysis, Software, Visualization, Writing – review & editing

Hernandez-Hernández N. A*., **Robles-Fernández, Á. L***., & Upham, N. (2023). Environmental suitability throughout the late Quaternary explains population genetic diversity. Ecography. On review
Contribution: Conceptualization Methodology, Formal Analysis, Validation, Software, Visualization, Writing – original draft

Robles-Fernández, Á. L., Santiago-Alarcon, D., & Lira-Noriega, A. (2022). Wildlife susceptibility to infectious diseases at global scales. Proceedings of the National Academy of Sciences, 119(35), e2122851119.
Contribution: Conceptualization, Data curation, Investigation, Methodology, Formal Analysis, Validation, Software, Visualization, Writing – original draft

Robles-Fernández, Á. L., Santiago-Alarcon, D., & Lira-Noriega, A. (2021). American Mammals Susceptibility to Dengue According to Geographical, Environmental, and Phylogenetic Distances. *Frontiers in Veterinary Science*, *8*
Contribution: Conceptualization, Data curation, Investigation, Methodology, Formal Analysis, Validation, Software, Visualization, Writing – original draft

Robles-Fernández Á. L. and Lira-Noriega A (2017) Combining Phylogenetic and Occurrence Information for Risk Assessment of Pest and Pathogen Interactions with Host Plants. Front. Appl. Math. Stat. 3:17. doi: 10.3389/fams.2017.00017
Contribution: Conceptualization, Data curation, Investigation, Methodology, Formal Analysis, Validation, Software, Visualization, Writing – original draft

Software

Robles-Fernández ÁL. mdd

Avaliable: https://github.com/alrobles/mdd. An R package to download and manipulate spatial range maps for mammals according with Mammal Diversity Database taxonomy. Currently the map version is related to MDD v1.2.

Robles-Fernández ÁL. mammals_virus_text_class

Avaliable: https://github.com/alrobles/mammals_virus_text_class. Mammal parasite paper recommender shiny app. This app search and recommend mammal parasite papers from PubMed database.
The app is running in https://alroble8.shinyapps.io/mammals_virus_text_class/

Robles-Fernández ÁL. abstractsHostParasites

Avaliable: https://github.com/alrobles/abstractsHostParasites. The goal of this R package abstractsHostParasites is to hold tools for generate text classification models applied to classify abstracts

of scientific papers.. This classification is performed through PU learning models.

Robles-Fernández ÁL. gbifliterature

Avaliable: https://github.com/alrobles/gbifliterature. The goal of gbifliterature is to connect with GBIF Literature API and retrieve the full information by year.

Robles-Fernández ÁL. ecointeraction

Avaliable: https://github.com/alrobles/ecointeraction. A toolbox R package to model and predict unknown interactions based, but not limited, on phylogenetic, environmental and geographic distance among the host.

Robles-Fernández ÁL. fastJaccard

Avaliable: https://github.com/alrobles/fastJaccard. An R package designed to run the Jaccard similarity for binary matrices in parallel using Rcpp and RcppParallel.

Robles-Fernández ÁL. geotax

Avaliable: https://github.com/alrobles/geotax. An R package to calculate the probability of interaction given phylogenetic information and transfer results to geographical space.

Robles-Fernández ÁL. maxnetmap

Avaliable: https://github.com/alrobles/maxnetmap. An R package to fit species distributions models from occurrence records and environmental variables, using 'maxnet' packages and manipulate as a raster output.

International conference - Oral

2024 Robles-Fernández ÁL 11th Biennial Conference of the International Biogeography Society. Prague, Czech Republic.

2022 Robles-Fernández ÁL 101st Annual Meeting of the American Society of Mammalogist.

2022 Robles-Fernández ÁL 10th Biennial Conference of the International Biogeography Society. Vancouver, BC, Canada.

2020 Robles-Fernández ÁL 10th Tenth International Conference on Complex Systems. New England Complex Systems Institute.

2017 Robles-Fernández ÁL 8th Biennial Conference of the International Biogeography Society. Tucson, AZ, USA.

Specialized Skills

Computer Skills

General Proficient with PC (Linux and Windows operating systems) computers with knowledge of LATEX and standard office suite.
Virtualization Technologies VirtualBox
Systems Linux (CentOS, Debian / Ubuntu)
Programming Languages R, SQL, Python, C++

Big Data Technologies Apache Spark, Apache Hadoop, Apache Impala

Domain of the statistical environment R. I have experience in manipulating and structuring a wide variety of data types. Through this statistical environment it is possible to link the connection to relational and non-relational databases in different file systems (for example, hdfs, using R as a link for the manipulation of Apache Spark or Apache Hadoop). In addition, within the same statistical environment, I can analyze data using artificial intelligence algorithms, as well as generate predictive statistical models of machine learning. I also develop web services (REST API) to expose the machine learning models made to be consumed by any application (either in a Java framework, C #, Python, etc.). To a lesser extent I have had experience with the following programming languages: Python, Mathematica, C ++, JavaScript

Professional experience

August 2021 - Actual
Arizona State University
Research Assistant

Feb 2020 – December 2021
Universidad Veracruzana
Research Assistant
Conacyt fellowship
CVU 875979

Feb 2020 – December 2021
In my research I model the ecological interaction among mammals and viruses using environmental, geographical and phylogenetic information using machine learning. Mammal species predicted as highly susceptible coincide with sets of species that have been reported infected in field studies, but it also suggests other species that have not been previously considered or that have been captured in low numbers. Also, the environment (i.e., the distance between the species' optima in bioclimatic dimensions) in combination with geographic and phylogenetic distance is highly relevant in predicting susceptibility to DENV in wild mammals. My results agree with previous modeling efforts indicating that

temperature is an important factor determining DENV transmission, and provide novel insights regarding other relevant factors and the importance of considering wild reservoirs. This modeling framework will aid in the identification of potential DENV reservoirs for future surveillance efforts.

Tenaris Tamsa
Feb 2018 – Feb 2020
Senior Automation Analyst

In charge of optimizing processes from mathematical regression and classification models with artificial intelligence algorithms taking large volumes of data from different sources. Responsible for statistical modeling and natural language processing. Maintaining relational and non-relational databases. Conducting data manipulation, cleaning and auditing. Additionally, in charge of data mining via different regression algorithms and classification methods. Implementing machine learning predictive models. Developing web applications with graphic information derived from the machine learning models, such as dashboards with KPIs for process monitoring. Responsible for preparing BI reports from case studies to obtain added value from the data.