MIRNA VAZQUEZ ROSAS LANDA

I am an Associate Researcher at the Marine Science and Limnology Institute at UNAM doing microbial ecology and evolution.

I am interested in the ocean microbiome, which is mostly unknown. In my new lab, I am exploring biogeography, evolution, ecology, and physiology questions, such as: what are the drivers of microbial species distribution in the ocean? Which are the genomic bases of adaptation that lead to speciation? What is their role in the earth's biogeochemistry? How do they interact with other organisms within the ecosystem?

I approach those questions using computational and experimental approaches like metagenomics, transcriptomics, and stable isotope probing experiments.

As a postdoctoral fellow at the University of Texas at Austin, part of the Baker Lab[1], I studied the ocean's microbial communities to uncover new bacteria metabolisms involved in hydrocarbon degradation.

My interest in bioinformatics and genomics took me to my first postdoc at the Genomics and transcriptomics lab at the INECOL[2] in Xalapa, Ver, where I used the pan-genome paradigm to design a method to identify a phytopathogenic fungus that was killing trees at the Mexican-US border.

I did my Ph.D. at the Ecology Institute at the UNAM[3] in Mexico City. During this time, I studied the landscape genomics of a rare lineage of Vibrionaceae isolated from Cuatro Cienegas[4], looking for the genes that could explain the adaptation to this ultra-oligotrophic environment.

I enjoy teaching and sharing knowledge, and I love the R community. I started using R when I became part of the CDSB[5] and Rladies community[6] and then a co-organizer of RLadies Xalapa[7], a safe place for minorities to learn to code.

View this CV online at: https://mirnavazquez.netlify.app/media/resume.html

CONTACT

mvazquez@cmarl.unam.mx

ORCiD

Google Scholar

MirnaVRL

MirnaVRL

MirnaVRL

LANGUAGE SKILLS

R

Bash

Perl

*Made with the R package **pagedown**.*

The source code is available on github.com/nstrayer/cv.

Last updated on 2023-02-26.

EDUCATION

2017 | 2012

Ph.D. in Sciences

National Autonomous University of Mexico, Ecology Institute.

Mexico City, MX

- **Title**: Patterns of diversification and adaptation of the Vibrionaceae family. The case of Cuatro Cienegas.
- **Advisor**: Dr. Valeria Souza Saldivar.
- **Description**: I examined the evolutionary footprints of local adaptation in the genomes of bacteria isolated from a highly oligotrophic environment in Cuatro Cienegas (CCB), Mexico. I obtained 200 axenic isolates of Vibrionaceae, a group of bacteria with a cosmopolitan distribution, from several ponds around the CCB aquatic system. I identified the patterns of genetic variation among Vibrionaceae isolates, looking for signals of adaptation to structured (Water column) and non-structured (Sediments) environments within the ponds; I analyzed whether the recombination patterns were associated with these environments or constrained to the lineage history. Since several members of Vibrionaceae possess pathogenic relatives, I also evaluate the hypothesis that the members of Vibrionaceae isolated from Cuatro Cienegas (CCB) had no pathogenic genomic elements, under the assumption that bacteria from CCB rarely get into contact with other bacteria, like oceanic Vibrionaceae.

2011 | 2007

B.Sc. in Biology

National Autonomous University of Mexico, FES Iztacala

Mexico City, MX

RESEARCH EXPERIENCE

current | 2022

Associate Researcher

National Autonomous University of Mexico, ICMyL

Mexico City, MX

2022 | 2020

Postdoctoral fellow

The University of Texas at Austin, Marine Microbial Ecology Lab

Austin, USA.

- Currently studying the ecology and evolution of microbes by understanding their metabolism, using metagenomics.
- **Advisor**: Brett Baker

2020 | 2017

Postdoctoral fellow

Ecology Institute, A.C. Genomics and transcriptomics lab — Xalapa, MX.

- I studied the interaction among plants-insects-microbes. - I designed a diagnosis system to identify Fusarium Kuruoshio using genomics. - I studied the defense mechanisms of Persea americana var. Hass to the attack of the Mexican Fruit Fly, using transcriptomics. - I analyzed the microbiome of the Mexican Fruit Fly.
- **Advisor**: Martin Aluja and Enrique Ibarra-Laclette

2015

Guest Research

The University of Toronto. Guttman Laboratory of Pathogen Genomics and Evolution — Toronto, CA

- Realized the pan-genome analysis of the genomes that I used for my PhD thesis.
- **Advisor**: David Guttman

2014

Guest Research

National Laboratory of Genomics for Biodiversity — Irapuato, MX

- I learned how to assemble and annotate genomes.
- **Advisor**: Enrique Ibarra-Laclette

2011

Guest Research

Center for Research and Advanced Studies of the National Polytechnic Institute — Irapuato, MX

- I designed a bacteria that was capable of sensing the arsenic concentrations in water.
- **Advisor**: Agustino Martinez Antonio

FUNDED PROPOSALS

2022 | 2019

Frontiers in Science research grant by National Council for Science and Technology (CONACyT in Spanish)

Elucidate the potential effects of climate change on the growing problem of altitudinal expansion and host shifts in agricultural pests. — Xalapa, MX.

- **Co-written** with PI Martin Aluja

GRANTS APPLIED

2022 **National Geographic Grants - Level 1**

Elucidating the effect of historical and environmental factors in the structure of the microbial communities

· Individual

2022 **Frontiers in Science research grant by National Council for Science and Technology (CONACyT in Spanish)**

Genome-resolved metagenomics, population genomics and transcriptomics of Mexican mangrove ecosystems.

Mexico City, MX

· Individual

2019 **Postdoctoral Scholar Program**

The interplay between community composition, metabolic interactions, and strain level pan-genome diversity of diatoms and their epibiotic bacteria.

Woods Hole Oceanographic Institution, USA

· **Individual** Postdoc proposal

2018 **Young professor (Catedra) research grant by National Council for Science and Technology (CONACyT in Spanish)**

Bioinformatics for the generation and interpretation of omic data linked to the Mexican fruit production and the optimization of the biorational management of Fruit Flies (Diptera: Tephritidae).

· **Co-written** with PI Martin Aluja.

HONORS AND AWARDS

2023 **Member of the national system of researchers (SNI in Spanish) at level 01.**

2022 | 2019 **Member of the national system of researchers (SNI in Spanish) at the candidate level.**

2016 **Support program for graduate students (PAEP in Spanish). Viatical support to attend an Anvio workshop in Montreal.**

Montreal, CA.

2015 **Support program for graduate students (PAEP in Spanish). Viatical support to make a research stay at the Guttman Lab.**

Toronto, CA

2015 **Support program for graduate students (PAEP in Spanish). Viatical support to attend to Gordon Research Conference on Microbial Population Biology**

New Hampshire, USA

2012 **Scholarship from CONACyT to perform a PhD. at the Ecology Institute, UNAM.**

Mexico City, MX

2010 **Scholarship of Academic Excellence for Student Mobility, UNAM, and Coca-Cola to study for one year at the Complutense University of Madrid at the faculty of science.**

Madrid, ES

PUBLICATIONS

2023 **Assessment of the Molecular Responses of an Ancient Angiosperm against Atypical Insect Oviposition: The Case of Hass Avocados and the Tephritid Fly Anastrepha ludens**

- Martín Aluja, Mirna Vázquez-Rosas-Landa, Daniel Cerqueda-García, Juan L Monribot-Villanueva, Alma Altúzar-Molina, Mónica Ramírez-Vázquez, Olinda Velázquez-López, Greta Rosas-Saito, Alexandro G Alonso-Sánchez, Rafael Ortega-Casas, Adrián José Enríquez-Valencia, José A Guerrero-Analco, Enrique Ibarra-Laclette
- https://www.mdpi.com/1422 0067/24/3/2060

2022 **Integrating proteomics and metabolomics approaches to elucidate the ripening process in white Psidium guajava**

- Monribot-Villanueva, Juan L; Altuzar-Molina, Alma; Aluja, Martin; Zamora-Briseno, Jesus Alejandro; Elizalde-Contreras, Jose M; Bautista-Valle, Mirna V; de Los Santos, Jiovanny Arellano; Sanchez-Martinez, Daniela E; Rivera-Resendiz, Francisco J; Vazquez-Rosas-Landa, Mirna;
- https://www.sciencedirect.com/science/article/pii/S0308814621016629

2021

Design of a diagnostic system based on molecular markers derived from the Ascomycetes pan-genome analysis: the case of Fusarium Dieback disease

- Vazquez-Rosas-Landa, Mirna; Sanchez-Rangel, Diana; Hernandez-Dominguez, Eric E; Perez-Torres, Claudia-Anahi; Lopez-Buenfil, Abel; de Jesus Garcia-avila, Clemente; Carrillo-Hernandez, Edgar-David; Castaneda-Casasola, Cynthia-Coccet; Rodriguez-Haas, Benjamin; Perez-Lira, Josue;
- https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0246079

2021

Metagenomic Survey of the Highly Polyphagous Anastrepha ludens Developing in Ancestral and Exotic Hosts Reveals the Lack of a Stable Microbiota in Larvae and the Strong Influence of Metamorphosis on Adult Gut Microbiota

- Aluja, Martin; Zamora-Briseno, Jesus Alejandro; Perez-Brocal, Vicente; Altuzar-Molina, Alma; Guillen, Larissa; Desgarennes, Damaris; Vazquez-Rosas-Landa, Mirna; Ibarra-Laclette, Enrique; Alonso-Sanchez, Alexandro G; Moya, Andres;
- https://www.frontiersin.org/articles/10.3389/fmicb.2021.685937/full

2020

Population genomics of Vibrionaceae isolated from an endangered oasis reveals local adaptation after an environmental perturbation

- Vazquez-Rosas-Landa, Mirna; Ponce-Soto, Gabriel Yaxal; Aguirre-Liguori, Jonas A; Thakur, Shalabh; Scheinvar, Enrique; Barrera-Redondo, Josue; Ibarra-Laclette, Enrique; Guttman, David S; Eguiarte, Luis E; Souza, Valeria;
- https://bmcgenomics.biomedcentral.com/articles/10.1186/s12864 020 06829 y

2020

Evidence for succession and putative metabolic roles of fungi and bacteria in the farming mutualism of the ambrosia beetle Xyleborus affinis

- Ibarra-Juarez, Luis Arturo; Burton, MAJ; Biedermann, PHW; Cruz, L; Desgarennes, Damaris; Ibarra-Laclette, Enrique; Latorre, Amparo; Alonso-Sanchez, Alexandro; Villafan, Emanuel; Hanako-Rosas, Greta;
- https://journals.asm.org/doi/full/10.1128/mSystems.00541 20

2020

A first glimpse of the mexican fruit fly anastrepha ludens (Diptera: Tephritidae) antenna morphology and proteome in response to a proteinaceous attractant

- Ruiz-May, Eliel; Altuzar-Molina, Alma; Elizalde-Contreras, Jose M; Arellano-de Los Santos, Jiovanny; Monribot-Villanueva, Juan; Guillen, Larissa; Vazquez-Rosas-Landa, Mirna; Ibarra-Laclette, Enrique; Ramirez-Vazquez, Monica; Ortega, Rafael;
- https://www.mdpi.com/1422 0067/21/21/8086

2019

Genomic signals of adaptation towards mutualism and sociality in two ambrosia beetle complexes

- Blaz, Jazmin; Barrera-Redondo, Josue; Vazquez-Rosas-Landa, Mirna; Canedo-Texon, Anahi; Aguirre von Wobeser, Eneas; Carrillo, Daniel; Stouthamer, Richard; Eskalen, Akif; Villafan, Emanuel; Alonso-Sanchez, Alexandro;
- https://www.mdpi.com/2075 1729/9/1/2

2018

How divergent is the Cuatro Cienegas oasis? Genomic studies of microbial populations and niche differentiation

- Gomez-Lunar, Zulema; Vazquez-Rosas-Landa, Mirna; Ponce-Soto, Gabriel Yaxal; Moreno-Letelier, Alejandra; Olmedo-alvarez, Gabriela; Eguiarte, Luis E; Souza, Valeria;
- https://link.springer.com/chapter/10.1007/978 3 319 93423 5_5

2018

Impact of rearing conditions on the ambrosia beetles microbiome

- Ibarra-Juarez, Luis Arturo; Desgarennes, Damaris; Vazquez-Rosas-Landa, Mirna; Villafan, Emanuel; Alonso-Sanchez, Alexandro; Ferrera-Rodriguez, Ofelia; Moya, Andres; Carrillo, Daniel; Cruz, Luisa; Carrion, Gloria;
- https://www.mdpi.com/380452

2017

Comparative genomics of free-living Gammaproteobacteria: pathogenesis-related genes or interaction-related genes?

- Vazquez-Rosas-Landa, Mirna; Ponce-Soto, Gabriel Yaxal; Eguiarte, Luis E; Souza, V;
- https://academic.oup.com/femspd/article/75/5/ftx059/3861975?login=true

2014

Two role model of an interaction network of free living proteobacteria from an oligotrophic environment

- Aguirre_von_Wobeser, Eneas; Soberon_Chavez, Gloria; Eguiarte, Luis E; Ponce_Soto, Gabriel Yaxal; Vazquez_Rosas_Landa, Mirna; Souza, Valeria;
- https://sfamjournals.onlinelibrary.wiley.com/doi/full/10.1111/1462 2920 .12305

SOFTWARE

2022

rbims

- An R package to analyze microbial metabolism from metagenome-assembled genomes (MAGs).
- https://github.com/mirnavazquez/RbiMs

LEADERSHIP AND SERVICE

2023 — **Full member of the Red Mexicana de Bioinformatica**[8]

Mexico City, MX

- We promote bioinformatics culture in Mexico and Latin America.

2022 — **Member of the board of the CDSB**[9]

Cuernavaca, MX.

- We are a group interested in helping members of Latin American countries acquire the necessary skills to contribute to open source software development.

2021 | 2018 — **Co-organizer of Rladies Xalapa**[10]

Xalapa, MX.

- We promote gender diversity in the R community.

2021 — **Abstract reviewer for the conference of women in bioinformatics and data science.**

- https://wbds.la/conferences/2WBDSLAC/index.html

I enjoy sharing my knowledge and helping people to grow

MENTORING EXPERIENCE

2019 | 2018 — **Manuel Alejandro Ochoa Sanchez**

INECOL

Xalapa, MX.

- MSc student

TEACHING EXPERIENCE – INSTRUCTOR

2023 — **Bioinformatics workshop for the Marine Science Institute, UNAM**

Virtual event.

2022 — **Bioinformatics tools for the analysis of genomes and transcriptomes**

Xalapa, MX.

2022 — **Encuentro de Bioinformatica en Mexico 2022. Analisis avanzado de metagenomas.**

Virtual event.

- https://comunidadbioinfo.github.io/es/post/cdsb 2022 workshops/

2021 — **Encuentro de Bioinformatica en Mexico 2021. Flujos de trabajo con RStudio y creacion de Shiny apps**

Virtual event.

- https://comunidadbioinfo.github.io/cdsb2021_workflows/

2019

Bioinformatics seminar

Xalapa, MX.

• INECOL. Graduate program

2019 | 2018

Bioinformatics tools for the analysis of genomes and transcriptomes

Xalapa, MX.

• INECOL. Graduate program

2018

Bash, Perl and C programming languages for the analysis of biological data.

Xalapa, MX.

• INECOL. Graduate program

2017

III Introductory Workshop to Bioinformatics

Mexico City, MX.

• Ecology Institute, National Autonomous University of Mexico.

2017 | 2014

Prokaryotic Biology.

Mexico City, MX.

• Faculty of Science, National Autonomous University of Mexico. Bachelors program. Semesters 2015-1, 2016-1, 2017-1 and 2018-1

2016

II. Introductory Workshop to Bioinformatics: From Alignments to Metagenomics.

Mexico City, MX.

• Ecology Institute, National Autonomous University of Mexico.

TEACHING EXPERIENCE – ASSISTANT

2019 | 2018

Ethics and Scientific Writing, Arming Proposals Research and Creativity, Innovation and Patent Generation.

Xalapa, MX.

• INECOL. Graduate program

2017

Study of microbial evolution.

Mexico City, MX.

• Ecology Institute, National Autonomous University of Mexico. Graduate program. Semester 2017-2.

WORKSHOPS

2019

Workshop in Advanced Bioinformatics: Comparative Genomics and Evolution Using Data Science.

Institute of Mathematics and Institute of Neurobiology.

Juriquilla, MX.

2019 **How to Build and Create Tidy Tools**
Center for Genomic Sciences — Cuernavaca, MX.
- https://comunidadbioinfo.github.io/post/building tidy tools cdsb-runconf2019/#.XTdh1UNOm94

2018 **Latin American R/Bioconductor Developers Workshop**
Center for Genomic Sciences — Cuernavaca, MX.
- https://comunidadbioinfo.github.io/post/r bioconductor developers workshop 2018/#.XTdiA0NOm94

2018 **Statistical analysis with R**
IPICYT — San Luis Potosi, MX.

2016 **An Anvio workshop in Montreal**
The University of Montreal — Montreal, CA.
- Taught by Dr. Eren Murat of the University of Chicago

2012 **Strategies and Techniques for Analyzing Microbial Population Structure**
Marine Biological Laboratory — Woods Hole Oceanographic Institution

I am constantly learning

CONFERENCES, TALKS, POSTERS AND SCIENTIFIC OUTREACH

2022 **ISCB-LA SOIBIO BioNetMX 2022**
UNAM — Juriquilla, MX.
- I presented how we can use metagenomics to explore new metabolisms and diversity.

2022 **Simposio Resiliencia del sur del Golfo de México y laguna de Términos**
UNAM — Campeche, MX.
- I presented the results of the first metagenomics study I made, where I showed the diversity of bacteria that degrade hydrocarbons and how we can use such an approach to study the Gulf of Mexico.

2021 **Bioconductor2021**
Virtual event
- Presented the rbims[11] package in which I am working on.

2021 **useR**
Virtual event
- Presented the rbims[12] package in which I am working on.

2021 **World Microbial Forum**

Virtual event

- Presented the results of the first metagenomics study that I made, where I show the diversity of bacteria that degrade hydrocarbons. Poster here[13].

2021 **MicrobiomeMX**

Virtual event

- I talked about a diagnosis system to identify the pathogen responsible of the Fusarium Dieback disease

2020 **RladiesMX**

Virtual event

- I showed how to use R in microbiology. Conference here[14]. Participation on minute 2.42.

2019 **Plant and Animal Genome conference**

San Diego, USA.

- Poster presentation of the effects of oviposition in Avocado Hass. Abstract here[15].

2019 **Not everything that shines is green or bacteria with jellyfish genes**

Xalapa, MX.

- Instructor at the program of Promotion of science and technology of young scientists (Fomento a la ciencia y tecnologia de jovenes cientificos in Spanish) with the project: Not everything that shines is green or bacteria with jellyfish genes (No todo lo que brilla es verde o bacterias con genes de medusa) at the Ecology Institute, A.C.

2017 **VI National Ecological Meeting**

Leon, MX.

- Oral presentation

2017 **XL National Meeting of Microbiology**

Guadalajara, MX.

- Poster presentation

2016 **VI Students Symposium**

Ecology Institute, UNAM

Mexico City, MX.

- Oral presentation

2015 **IV Biochemistry and Molecular Microbial Biology Congress**

Coahuila, MX.

- Poster presentation

2015 **I st Joint Symposium Evolution and Genomics. Bath University and the Center for Genomic Sciences at UNAM.**

Cuernavaca, MX.

• Poster presentation

2015 **Gordon Research Conference on Microbial Population Biology.**

Proctor Academy

New Hampshire, USA.

• Poster presentation

2013 **III Biochemistry and Molecular Microbial Biology Congress**

• Poster presentation

2012 **I st Meeting for the conservation of Cuatro Cienegas, Coahuila**

Center for Ecosystem Research

• Poster presentation

LANGUAGES

• Native: Spanish (Mexico)
• Bilingual: English

LINKS

1: https://sites.utexas.edu/baker lab/
2: https://www.inecol.mx/personal/index.php/moleculares/139 enrique ibarra laclette
3: http://www.ecologia.unam.mx/web/
4: https://www.sciencemag.org/news/2020/07/watch threatened pools mexican desert hold clues early life
5: https://comunidadbioinfo.github.io
6: https://rladies.org
7: https://www.meetup.com/rladies xalapa/
8: https://www.redmexicanadebioinformatica.org/
9: https://comunidadbioinfo.github.io/
10: https://www.meetup.com/rladies xalapa/
11: https://github.com/mirnavazquez/RbiMs
12: https://github.com/mirnavazquez/RbiMs
13: https://twitter.com/MirnaVRL/status/1406971373948440578?s=20
14: https://www.youtube.com/watch?v=hKut39SpQoY
15: https://pag.confex.com/pag/xxvii/meetingapp.cgi/Paper/37298