María A. Valdez Cabrera

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Personal Profile

I am a Postdoctoral Fellow in the Department of Biostatistics at the University of Washington. I focus on the development of statistical tools for phylogenetic analyses. My work has introduced a new continuous metric space for weighted tree-graphs with nonidentical leaves, enabling an intuitive distance measure and reasonable summaries of tree collections. I continue to develop these tools, drawing on my skills in mathematics, statistics, and algorithm design.

My research interests include statistical methods for non-Euclidean data, semiparametric modeling, and topological data analysis.

Education

University of Washington *Seattle, Washington, USA*

PhD in Biostatistics *September 2018 – August 2024*

- Advisor: Amy Willis, Ph. D.
- Dissertation: Statistical methods for phylogenetic trees with non-identical leaf sets

Universidad de Guanajuato *Guanajuato, México*

Bachelor in Mathematics *August 2013 – June 2018*

- Advisor: Eloísa Díaz-Francés, Ph. D.
- Thesis project: Proposal for the efficient estimation of a Binomial success rate and its extension to the comparison of two binomial distributions

Awards and Scholarships

University of Washington *Washington, USA*

School of Public Health Outstanding PhD Award in Biostatistics *April, 2024*

Yearly award granted by faculty in recognition of excellence in four areas: Coursework & Exam Performance, Dissertation & Publications, Written & Oral Skills, and Leadership.

XV Escuela de Probabilidad y Estadística *Guanajuato, México*

Poster Contest *March 2017*

Won the first place in the poster Contest of the XV Summer School of Probability and Statistics of CIMAT.

CIMAT (Center for Research in Mathematics) *Guanajuato, México*

CIMAT scholarship *August 2013 - June 2018*

Scholarship for students who achieve and maintain a high GPA throughout their studies.

Research Experience

University of Washington - Biostatistics Department *Seattle, Washington, USA*

Postdoctoral Fellow *October 2024 – current*

- **Supervisor:** Amy Willis, Ph.D.
- Development of statistical methods and algorithms for Phylogenetic Analysis.

University of Washington - Statistical Diversity Lab *Seattle, Washington, USA*

Research Assistant *June 2022 – August 2024*

- **Supervisor:** Amy Willis, Ph.D.
- Development of statistical methods and software for Phylogenetics.
- Maintenance and improvement of software from the Statistical Diversity Lab such as the R packages: **Breakaway** and **Corncob**.

Fred Hutchinson Cancer Research Center *Seattle, Washington, USA*

Research Assistant *April 2019 – June 2022*

- **Supervisor:** Elizabeth Brown, Ph.D.
- Development of statistical plan for studies on STI incidence rate.
- Analysis on the usage of novel HIV prevention methods in an open label HIV prevention trial under Microbicide Trials Network (MTN).

Fred Hutchinson Cancer Research Center *Seattle, Washington, USA*

Research collaborator *January 2019 – April 2019*

- **Supervisor:** Ruth Etzioni, Ph.D.
- Simulation study on performance of a new biomarker for future screening test.

CIMAT (Center for Research in Mathematics) *Guanajuato, México*

Research Assistant *January 2018 – May 2018*

- **Supervisor:** Víctor Pérez-Abreu, Ph.D.
- Explored the application of Topological Data Analysis into graph theory.

CIMAT (Center for Research in Mathematics) *Guanajuato, México*

Research Assistant *August 2015 – December 2016*

- **Supervisor:** Eloísa Díaz-Francés, Ph.D.
- Improvement of the use of binomial likelihoods in proportions estimation on clinical trials.
- Review on the most common methods of binomial estimation.

Teaching Experience

Teaching Assistant *European Institute for Marine Sciences, Brest University*

EBAME: Emerging Bioinformatics Approaches for Microbial Ecogenomics *October 2025*
- Prepared material for lecture on Differential Abundance and Pangenomics Statistical Analysis.
- Aided participants during lab.

Teaching Assistant *Marine Biological Laboratory, University of Chicago*

STAMPS: Strategies and Techniques for Analyzing Microbial Population Structures *July 2025*
- Prepared material on Statistical Principles for Microbiome Data.
- Conducted a lesson and hands-on lab in Phylogenetics Methods.

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- Prepared material on Statistical Principles for Microbiome Data.

Teaching Assistant *University of Washington*

BIOST 571: Advanced Regression Methods for Dependent Data *January 2023 – March 2023*

BIOST 537: Survival Data Analysis In Epidemiology *January 2022 – March 2022*
- Conducted discussion sections

BIOST 513: Medical Biometry III *March 2021 – June 2021*
- Conducted discussion sections

BIOST 512: Medical Biometry II *January 2021 – March 2021*

BIOST 536: Categorical Data Analysis in Epidemiology *September 2020 – December 2020*

BIOST 523: Statistical Inference For Biometry II *January 2020 – March 2020*

BIOST 512: Medical Biometry II *January 2019 – March 2019*

BIOST 511: Medical Biometry I *September 2018 - December 2018*

Teaching Assistant *Universidad de Guanajuato*

M24101: Statistical Methods *January 2016 – June 2016*

– Conducted lectures and review sessions

Publications

Refereed research articles

1. **Valdez Cabrera, M. A.**, & Willis, A. D. (2025). *Distances Between Extension Spaces of Phylogenetic Trees*. IEEE Transactions on Computational Biology and Bioinformatics, 22(2), 614–627.
2. Mirembe, B. G., **Valdez Cabrera, M.**, van der Straten, A., Nakalega, R., Cobbing, M., Mgodi, N. M., Palanee-Phillips, T., Mayo, A. J., Dadabhai, S., Mansoor, L. E., Siva, S., Nair, G., Chinula, L., Akello, C. A., Nakabiito, C., Soto-Torres, L. E., Baeten, J. M., & Brown, E. R. (2022). *Correlates of Dapivirine Vaginal Ring Acceptance among Women Participating in an Open Label Extension Trial*. AIDS and Behavior. https://doi.org/10.1007/s10461-022-03841-z
3. Urquídez, O., & **Valdez, M.** (2019). *Diseño de grafos pesados con n-cíclos persistentes*. Morfismos, Vol. 23 No.1

Other refereed scholarly publications

1. **Valdez Cabrera, M. A**. (2024). Statistical Methods for Phylogenetic Trees With Non-Identical Leaf Sets. ProQuest Dissertations & Theses.
2. **Maria Alejandra Valdez Cabrera.** Propuesta de Estimación Eficiente de una Proporción de Éxito Binomial y su extensión a la comparación de dos Distribuciones Binomiales. June 2018 (Undergrad Thesis, University of Guanajuato)

Non-refereed scholarly publications

1. **Valdez Cabrera, M. A.**, & Willis, A. D. (2025). *Geometry of the space of phylogenetic trees with non-identical leaves.* https://doi.org/10.48550/arxiv.2508.0674

Conferences and Workshops

Invited presentations

1. **Valdez Cabrera, M.** Towering BHV spaces to analyse trees with non-identical leaves. Presented at: JSM 2025; August 2025; Nashville, TN, USA.
2. **Valdez Cabrera, M.** & Willis, A. Developing statistical methods to compare Phylogenetic Trees with non-identical leaf sets. Presented at: WNAR 2023 Annual Meeting; June 2023; Anchorage, AK, USA.
3. **Valdez Cabrera, M.** & Willis, A. Statistical methods to analyze phylogenetic trees with non-identical leaf sets. Presented at: 6th International Conference on Econometrics and Statistics; July 2023; Tokyo, Japan.
4. **Valdez Cabrera, M.** Esqueleto de Homología Persistente como descriptor del borde de objetos en una imagen (Homologically Persisten Skeleton for describing the border of objects in an Image). Presented at: Noveno Verano de Probabilidad y Estadística en el CIMAT; June 2016; Guanjuato, México.

Poster Presentations

1. **Valdez Cabrera, M.** Towering Tree Space: a metric between trees with differing leaf sets. Poster presented at: Contemporary Challenges in Large-Scale Sequence Alignments and Phylogenies, Bridging Theory and Practice; August 2025; Chicago, IL, USA.
2. Gati Mirembe, B., **Valdez Cabrera, M.**, Cobbing, M., ..., Brown, E. Correlates of Dapivirine vaginal ring uptake among women participating in an open label extension trial-MTN-025/HOPE. Poster presented at: HIV R4P; January 2021; Virtual.
3. **Valdez Cabrera, M.** & Díaz-Francés, E. Propuesta de estimación de una proporción Binomial con intervalos de verosímilitud de nivel adecuado (Proposal for the estimation of a Binomial proportion with appropriate level likelihood intervals). Poster presented at: XV Escuela de Probabilidad y Estadística en el CIMAT; March 2017; Guanajuato, México.

Workshops and Conference Participation

1. Object Oriented Data Analysis in Health Sciences Workshop; July 2023; Chicago, IL, USA.
2. 2019 Women in Statistics and Data Science (WSDS) Conference; October 2019; Bellevue, WA, USA.
3. III School of Topological Data Analysis and Stochastic Topology; January 2017; Toluca, Mexico.

Extracurricular Activities

Biostatistics Student Seminar Organizer *September 2019 – December 2022*

Activities included the planning of useful sessions for students and the recruitment of presenters each quarter, keeping assistance for enrolled students for proper accreditation and making public announcements for each session.

Organizational Committee of National Elementary and Middle School Mathematical Olympiads program (ONMAPS) *January 2015 – June 2018*

Member of the Organizational Committee of National Elementary and Middle School Mathematical Olympiads program (ONMAPS) for the state of Guanajuato. Activities included designing, applying and grading selection tests, training the selected students and giving workshops to teachers of different schools.

Mathematics Educational Extension department *January 2014 – December 2014*

Volunteer at the Mathematics Educational Extension department of CIMAT (Matemorfosis). As part of this team I gave workshops of interactive mathematics to kids along the state of Guanajuato.

Technical skills

Programming	R, C/C++, Python, JavaScript
R packages	devtools, dplyr, ggplot2, lme4, msm, shiny, tidyverse
Miscellaneous	Shell (Bash), LaTeX(Overleaf/R Markdown), Git, SQL

References available upon request.