

## Lorena Torres-Martínez

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St Mary's college of Maryland

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### PROFESSIONAL APPOINTMENTS

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Present	<b>Assistant Professor</b> , Department of Biology, St Mary's College of Maryland
2018-2021	<b>Postdoctoral Scholar</b> , University of California, Riverside <i>Advisor:</i> Dr. Joel L. Sachs
2016-2018	<b>Koch-Richardson Teaching Postdoctoral Fellow</b> , Tulane University <i>Advisors:</i> Dr. Sunshine Van Bael & Dr. Jordan Karubian
2008-2010	<b>Researcher &amp; Tissue Collection Curator</b> Alexander Von Humboldt Biological Resources Research Institute (CIAT-CGIAR, Cali-Colombia)

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### EDUCATION

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2010 -2016	<b>Ph.D Ecology and Evolutionary</b> , Purdue University <i>Advisors:</i> Dr. Nancy. C. Emery & Dr. Morris Levy <i>Dissertation:</i> "Evolutionary potential of a dispersal-restricted species in response to climate change"
2003-2008	<b>B.S. Biology</b> , Universidad del Valle <i>Graduated High Honors in Biology (Mejor graduando)</i>

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### RESEARCH INTERESTS

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Adaptation to variable and extreme environments, population and quantitative genetics, plant-microbe interactions, mutualism, conservation genomics

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### FELLOWSHIPS, AWARDS & GRANTS

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#### FELLOWSHIPS AND AWARDS

2016-2018	Koch-Richardson Postdoctoral Teaching Fellowship, Tulane University
2008	Honors Graduate in Biology, Universidad del Valle, Cali-Colombia

#### GRANTS

2022-2024	Maryland Native Plant Society (\$3,000)
2023	Faculty Development Grant (\$2400)
2022	Faculty Development Grant (\$2400)
2020-2023	California Conservation Genomics Project (\$50,000)
2017	CELT Faculty development grant, Tulane University (\$500)
2017-2018	CELT Faculty Mentored Undergraduate Research Award (\$2,000)
2014-2016	Dissertation Improvement Grant NSF (\$20,020)
2015	Women in science at Purdue travel grant (\$1,500)
2014 – 2015	Northern California Botanists Scholarship (\$1,000)
2013 – 2015	PRF Grant, Purdue University (\$44,000)
2013	Frederick N. Andrews Environmental Research Travel Grant, Purdue University (\$1,500)

**GRANTS OBTAINED BY STUDENTS UNDER MY SUPERVISION**

2023 - Seahawk Undergraduate Research Fellowship (\$4000) to Sophia Koontz

2023 – Flores Award (\$5000) to Andrew Raley

2022 – Xigma Xi (\$1000) to Jordan Manns

2022 – Seahawk Undergraduate Research Fellowship (\$4000) to Mel Byrne

**PUBLICATIONS**

*undergraduate and high-school students are underlined*

**JOURNAL PUBLICATIONS**

13. Ortiz-Barbosa G.S., **Torres-Martínez, L.**, Rothschild, J., and J.L. Sachs. 2022. Lotus japonicus regulates root nodulation and nitrogen fixation dependent on the molecular form of nitrogen fertilizer. *Plant and Soil*, 483: 533-545
12. Mancini, M., Mercado, O.G., Camantigue, R.X., Nguyen, T., Rothschild, J., Khairi, F., Neal, S., Farsamin, W.F., Lampe, M.T., Perez, I.A., Le, T.H., Ortiz-Barbosa, G.S., **Torres-Martínez, L.**, and J.L. Sachs. 2022. Live soil inocula, not host population or domestication status, is the predominant driver of growth benefits to cowpea. *Plant and Soil*, 482: 585-600
11. Santamaría-Acevedo, L., Levy, M.M., **Torres-Martínez, L.**, Marchant, S., Rondón-González, F., Stashenko, E.E., Levy, M., and J.L. Fuentes. 2022. Genome-derived microsatellite markers in *Lippia origanoides* from Colombia. 2022. *Journal of Herbs, Spices and Medicinal Plants*, 00:1-15.
10. Lumibao, C., **Torres-Martínez, L.**, Magonigal, P., Van Bael, S., and M. Blum. 2022. Microbial mediation of salinity stress response varies by plant genotype and provenance over time. *Molecular Ecology*, 00:1-15.
9. Ortiz-Barbosa G.S., **Torres-Martínez L.**, Neal S., Soubra T., Khairi F., Trinh J., Cardenas P., Porter A. and J.L. Sachs. 2021. No disruption of rhizobial symbiosis during early stages of cowpea domestication. *Evolution*, 76: 496-511.
8. **Torres-Martínez, L.**, Porter, S.S., Wendlandt, C., Purcell, J., Ortiz-Barbosa, G., Rothschild, J., Lampe, M., Warisha, F., Le, T., Weisberg, A.J., Chang, J.H. and Sachs, J.L. 2021. Evolution of specialization in a plant-microbial mutualism is explained by the oscillation theory of speciation. *Evolution*, 75: 1070-1086.
7. **Torres-Martínez, L.**, Sanchez, M., Kimbrought, L., Hendrix, T., Hendrix, M., Day, R.D., Krauss, K.W. and S. Van Bael. 2020. Influence of microbiota on *Taxodium distichum* seedling performance during extreme flooding events. *Part of special thematic issue on applying microbial community research to improve conservation and restoration outcomes. Plant Ecology*, 221: 773-793.
6. **Torres-Martínez, L.**, McCarten, N. and N.C. Emery. 2019. Adaptive potential of plant populations under extreme climate events. *Ecology Letters*, 22 (5), 866-874.
5. Tittes S, Walker J, **Torres-Martínez L** and NC Emery. 2019. Grow where you thrive or where only you can survive? A Bayesian analysis of tolerance curve evolution in a clade with diverse habitat affinities. *The American Naturalist*, 93 (4), 530-544.
4. **Torres-Martínez, L.**, P. Weldy, M. Levy and N.C. Emery. 2017. Spatiotemporal heterogeneity in precipitation patterns explain population-level germination strategies in an edaphic specialist. *Part of special issue on endemism hotspots in Annals of Botany*, 119 (2): 253-265.
3. **Torres-Martínez, L.** and N.C. Emery. 2016. Using RADseq to discover SNP markers in the California vernal pool endemic herb, *Lasthenia fremontii* (Asteraceae). *Conservation Genetic Resources*, 8:145–158.

**BOOK CHAPTERS**

2. Schuster M., **Torres-Martínez L.**, Dukes J.S. 2012. Distribution of terrestrial ecosystems and changes in plant community composition. In: Freedman B. (Ed.) Global Environmental Change. *Handbook of Global Environmental Pollution*. Springer Netherlands, pp. 341-347.

1. Emery, N, **L. Torres-Martínez**, E. Forrestel, B.G. Baldwin and Ackerly, D.D. 2011. The ecology, evolution and diversification of the Vernal Pool Niche in *Lasthenia* (Madiaceae, Asteraceae) p 39- 57. In: Alexander, D.G and R.A. Schlising. 2011. Research & Recovery in Vernal Pool Landscapes. ***Studies from the Herbarium***. Number 16. California State University, Chico.

## TECHNICAL REPORTS

- Sweet, L.C., La Doux, T., **Torres-Martínez, L** and J.L. Sachs. 2021. 2018-2021 Study Results for the Triple-Ribbed Milkvetch (*Astragalus tricarinatus*). Report On behalf of Joshua Tree National Park to USFWS.
- Sweet, L.C., S. Heacox, M. Davis, P. Ramstead, **L. Torres-Martínez**, C. Barrows. 2020. Monitoring Results for the triple ribbed milkvetch (*Astragalus tricarinatus*) within the Coachella Valley MSHCP Area. Final Report. Prepared for: ***Coachella Valley Conservation Commission***.
- Bocanegra, J.L, C. Villafañe, R. Moreno, **L. Torres M**, A. Velásquez, L. Fory and G. Gallego. 2010. Genetic Characterization of wild cultivars and species of yucca (*Manibot* sp.) on the Colombian Amazon and Orinoco. In: ***Capacity building for implementation of the Protocol of Cartagena in Colombia: Sector Ambiente*** - / Instituto de Investigación de Recursos Biológicos Alexander von Humboldt; Orjuela-R. M.A. y Moreno V. R. (comp.). Bogotá D.C.: Colombia: Ministerio de Ambiente, Vivienda y Desarrollo Territorial; Instituto de Investigación de Recursos Biológicos Alexander von Humboldt.
- Villafañe, C., J.L. Bocanegra, R. Moreno, **L. Torres M**, V.H. García. 2010. Genetic Characterization of wild cultivars of rice (*Oryza* spp.) collected in Vichada Colombia. In: ***Capacity building for implementation of the Protocol of Cartagena in Colombia: Sector Ambiente*** - / Instituto de Investigación de Recursos Biológicos Alexander von Humboldt; Orjuela-R. M.A. y Moreno V. R. (comp.). Bogotá D.C.: Colombia: Ministerio de Ambiente, Vivienda y Desarrollo Territorial; Instituto de Investigación de Recursos Biológicos Alexander von Humboldt.
- Torres L**, Lopez D, Palacio J.D., Duque M.C., Perez Galindo C.A., Gonzalez Vargas I.A and H.C. Cardenas. 2009. Evaluation of the Polymorphism of Microsatellites Markers in *Guadua angustifolia* (Poaceae: Bambusoideae). ***VIII World Bamboo Congress Proceedings***, 5: 64-79.

## IN REVIEW

- Rahman, A., Mancini, M., Cassandra N., Perez, I.A, Farsamin, W.F., Lampe, M.T, Le, T.H., **Torres-Martínez, L.**, Weisberg, A.J., Chang, J.H & J.L. Sachs. Competitive interference among rhizobia reduces legume benefits. *In review by Current Biology*.

## IN PREPARATION (*Manuscripts available upon request*)

- Kehlet-Delgado, H., Montoya, A.P., Jensen, K., Wendlandt, C.E., **Torres-Martínez, L.**, Dexheimer, C., Roberts, R., Friesen, M. L., Griffiths, J.S. & S.S. Porter. The evolutionary genomics of adaptation to stress in wild soil microbiota. *In preparation for submission to PNAS*
- Rahman, A., **Torres-Martínez, L.**, Weisberg, A.J., Chang, J.H & J.L. Sachs. Bradyrhizobium haplotypes adapt to host metapopulations via acquisition of diverse, host-specific symbiosis ICEs. *In preparation for submission to Molecular Ecology*

**Torres-Martínez, L.**, Sweet, L.C, Fraga, L., LaDoux, N.S., Heacox, T., Davis, M. and J.L. Sachs. Genomic diversity of the narrow endemic and endangered legume *Astragalus tricarinatus*. *In preparation for submission to Conservation Genetics*

**Torres-Martínez, L.**, Wendlandt, C., Purcell, J. and J. L. Sachs. Genomic variation and local adaptation in the California native legume *Acmispon strigosus*. *In preparation for submission to Heredity*

**Torres-Martínez, L.**, Brown, L., Díaz-Martín, Z., Oleas, N. and J. Karubian. Fine-scale spatial genetic structure across life stages in a tropical palm species. *In preparation for submission to Heredity*

## PRESENTATIONS

*undergraduate and high-school students are underlined*

### INVITED SEMINARS

- 2022 Texas A&M University, Corpus Christi, USA  
 2021 Clark University, Worcester, USA  
 2019 University of California, Riverside, USA  
 2018 Universidad Nacional de Manizalez, Colombia  
 2018 St. Mary's College of Maryland, USA  
 2016 Tulane University, USA

### INVITED CONFERENCE PRESENTATIONS

- Van Bael, S., Kimbrough, E., Lumibao, C., **Torres-Martínez, L.**, Formel, S., Conner, W., Day, R and K. Krauss. 2021. Sea level rise and the microbial communities of baldcypress. Organized Oral Symposium. Plant-microbe interactions in wetland ecosystems: challenges under increasing environmental pressures. *Ecological Society of America Annual Meeting, Virtual meeting 2021.*
- L. Torres-Martínez**, Porter, S., Rothschild, J., Ortiz, G., Lampe, M., Farsamin, W., Le,T., and J. Sachs. 2020. Rapid evolution of specialization in a plant-microbial mutualism. *Northern California Botanists Symposium. California State University, Chico, CA.*
- L. Torres-Martínez** and N.C. Emery. 2019. The adaptive potential of plant populations in response to extreme climate events. *SoCal Evolutionary Genetics meeting (SCalE), University of California, Irvine.*
- Emery, N.C. and **L. Torres-Martínez**. 2015. Evolution of phenotypic plasticity and ecological specialization in temporally varying environments. Organized oral session: "Shifting dimensions: temporal ecology for the next 100 years and beyond." *Ecological Society of America Annual Meeting, Baltimore, MD.*
- Emery, N.C. and **L. Torres-Martínez**. 2015. Rapid Evolution and Phenotypic Plasticity of Vernal Pool Plants in Response to Climate Change. Symposium title: "Best Management Practices for Climate Change Adaptation: A Wetlands Perspective." *Society for Wetland Scientists, Providence, RI.*
- Torres-Martínez, L.** and N.C. Emery. 2014. Germination and Dormancy Variation in Fremont's Goldfields: Implications for Vernal Pool Plant Responses to Climate Change. *Northern California Botanists Symposium. California State University, Chico, CA.*
- Torres-Martínez, L.**, D. Lopez, C. Perez-Galindo, M.C. Duque, I.A.Gonzalez, J.D. Palacio and H. Cardenas. 2009. Molecular Characterization with microsatellites markers of the Juan Maria Cespedes Botanical Garden germ bank accessions of *Guadua angustifolia* (Poaceae:Bambusoideae). *I International Congress of Guadua, other Bamboos and Natural Fibers. Armenia, Colombia.*

### CONTRIBUTED PRESENTATIONS

- Torres-Martínez, L.**, C. Wendlandt, J. Purcell and J. Sachs. 2019. Climate, but not symbiosis, drives local adaptation of an annual legume. *Symbiosis symposium. Yosemite, California, USA*
- Torres-Martínez, L** and N.C. Emery. 2015. The spatial scale of genetic differentiation in wetland plant populations: implications for adaptation to changing climate. *Evolution. Guarujá, Sao Pablo, Brazil.*
- Emery, N.C., **L. Torres-Martínez**, and M. Madden. 2013. Reaction norm evolution and habitat specialization in California goldfields (*Lasthenia*, Asteraceae). *Evolution. Snowbird, UT.*

**POSTER PRESENTATIONS**

- Sweet, L.C., **Torres-Martínez, L.**, Naomi S. Fraga, N.S., La Doux, T., Heacox, S., Davis, M., and Joel L. Sachs. 2021. Genomic diversity of the narrow endemic and endangered legume *Astragalus tricarinatus*. *Ecological Society of America Annual Conference, Virtual meeting 2021*.
- Torres-Martínez, L.**, C. Wendlandt, J. Purcell and J. Sachs. 2019. Climate, but not symbiosis, drives local adaptation of an annual legume. *Gordon Research Seminar (GRS) on Genomic Changes Behind Adaptation and Ecosystem Functions. Southern New Hampshire University, Hooksett, NH*.
- Torres-Martínez, L.**, Hendrix, T., Kimborough, L., Hendrix, M., Sánchez, M., and S. Van Bael. 2018. The role of root fungi swamp cypress seedling tolerance to extreme climate events. *Ecological Society of America Annual Conference, New Orleans*.
- Sánchez, M., **Torres-Martínez, L.** and S. Van Bael. 2018. Impact of differential flooding regimes on the Arbuscular Mycorrhizal Fungi and Root Fungal Endophytes of Baldcypress seedlings (*Taxodium distichum*). *International Mycological Congress, San Juan, Puerto Rico*.
- Hendrix, T., **Torres-Martínez, L.**, Kimborough, L., Hendrix, M., Sanchez, M., and S. Van Bael. 2018. Influence of root fungi on the resilience of swamp cypress seedlings to extreme climate events. *CELT Student Poster Presentation, Tulane University, New Orleans*.
- Torres-Martínez, L.**, D. Lopez, C. Perez-Galindo, M.C. Duque, I.A. Gonzalez, J.D. Palacio and H. Cardenas. 2009. Evaluation of the polymorphism of microsatellites markers in *Guadua angustifolia* (Poaceae: Bambusoideae). *VIII World Bamboo Congress. Thailand, Bangkok*.
- Torres-Martínez, L.**, D. Lopez, C. Perez-Galindo, M.C. Duque, I.A. Gonzalez, J.D. Palacio and H. Cardenas. 2009. Molecular Characterization with microsatellites markers of the Juan Maria Cespedes Botanical Garden germ bank accessions of *Guadua angustifolia*. *V Colombian Congress of Botany. Nariño University, Pasto, Colombia*.

**TEACHING & MENTORING**

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**INSTRUCTOR AND LECTURER**

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|-------------------------------|---|
| <b>Spring 2023</b>            | <b>Conservation Biology (BIO 380)</b><br><i>Advanced &amp; Specialty undergraduate level course</i>   |
| <b>Fall 2022</b>              | <b>Genetics (BIO270) &amp; Lab (BIO270L)</b><br><i>Undergraduate level course covering main concepts in Genetics -Biology Major requirement</i><br>St Mary's College of Maryland, St Mary's City, MD                  |
| <b>Spring 2022 &amp; 2023</b> | <b>Principles of Biology II (BIOL106) &amp; Lab (BIOL106L)</b><br><i>Undergraduate level course covering main concepts in biology -Biology Major requirement</i><br>St Mary's College of Maryland, St Mary's City, MD |
| <b>Fall 2021</b>              | <b>Plant Physiology (BIOL435 – 435L)</b><br><i>Undergraduate level course covering main principles in plant physiology and evolution</i><br>St Mary's College of Maryland, St Mary's City, MD                         |
| <b>2017 -2018</b>             | <b>Principles of Biology I Lab (BIOL105L)</b><br><i>Undergraduate level course covering main concepts in biology -Biology Major requirement</i>   |
| <b>2017 -2018</b>             | <b>Genomics and Bioinformatics (EBIO 6660)</b><br><i>Graduate level course covering main principles in programming and analyses of next generation sequencing technique.</i><br>Tulane University, New Orleans, LA    |
| <b>2016-2018</b>              | <b>Plant Biology and Adaptations (EBIO 3591/6591)</b><br><i>Graduate and undergraduate level course covering main principles in plant anatomy and physiology</i><br>Tulane University, New Orleans, LA.               |
| <b>Fall 2016</b>              | <b>Tropical Plant Biology (Independent Study Course)</b>  |

*Reviewed taxonomy of tropical plants with PhD Student John White.*  
Tulane University, New Orleans, LA

## WORKSHOPS LED

- 2018**                    **Brown Bag Seminar Series: “How to teach science”**  
*Center for Engaged Learning at Tulane (CELT), New Orleans, USA April 4<sup>th</sup>*
- 2017**                    **Genomics of adaptation: understanding the genetic basis of evolutionary change**  
*Bioinformatics Center of Colombia (BIOS), Manizales, Colombia, September 28-29<sup>th</sup>*

## TEACHING ASSISTANT

- 2012-2016**            **Evolution (BIOL 580)**  
Department of Biological Sciences, Cluster of Ecology and Evolution. Purdue University, West Lafayette, IN. *Instructor: Dr. Morris Levy.*
- 2013-2015**            **Biology (BIOL 110)**  
Department of Biological Sciences, Cluster of Ecology and Evolution. Purdue University, West Lafayette, IN. *Instructor: Dr. Athena Anderson*
- 2013**                    **Conservation Biology (BIOL 483)**  
Department of Biological Sciences, Cluster of Ecology and Evolution. Purdue University, West Lafayette, IN. *Instructor: Dr. Kerry Rabenold*

## RESEARCH STUDENTS MENTORED (35 TOTAL)

- Trained **ten** undergraduate students in microbiology techniques, greenhouse-based experiments, and scientific writing as part of a **directed research** course in Plant Microbial Ecology at St Mary’s College of Maryland
- Trained **three** graduate students, **six** undergraduate students, and **two** high school students in microbiological techniques, data analyses in R and scientific writing at the University of California, Riverside
- Trained **six** undergraduate students and **two** graduate students in molecular techniques, experimental evolution techniques, and scientific writing at Tulane University
- Trained **six** undergraduate students in experimental evolution techniques and DNA extraction protocols at Purdue University

## PROFESSIONAL SERVICE

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### REVIEWER

- Scientific Journals: Evolution (2X), Ecosphere(1X), American Journal of Botany (1X), Madroño (1X), Conservation Genetics (3X), Agriculture (1X), Forest, Tree genetics & Genomes (2X), Plants (1X), PeerJ (1X), Plant Biology (1X),
- Research Grants: National Science Foundation (2020 & 2022), Ruth Mathes Scholarship Program (Fall 2021 & 2022)

### ADMINISTRATIVE ROLES

- **Mentored undergraduates as part of Women in Science at Tulane (WISE)**  
Advice several undergraduates in their career development and advancement in science
- **Plant Journal Coordinator**  
Scheduled meetings for the weekly discussions on plant biology research in the EEB department at *Tulane University*
- **Secretary of CSAP (Colombian Student Association at Purdue)**  
Supported the advancement of higher education of Colombian students at *Purdue University*

#### OUTREACH ACTIVITIES

- **Served as a Wonder Woman**  
As part of the STEMing initiative that aims to inspire the next generation of girls in science in Southern Maryland I was invited to share my path as a scientist to girls in elementary school in spring 2021
- **Volunteer of GIST (Girls in Stem at Tulane) & BATS (Boys at Tulane in Stem)**  
Helped in guiding and teaching girls and boys from elementary school different research techniques in plant-microbe interactions during spring 2018. This activity is developed by the Department of Ecology and Evolutionary Biology at Tulane University each year.

#### UNIVERSITY SERVICE

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- External Evaluator of Master research thesis for Jeysnner Arley Pinzón Bayona (Universidad Industrial de Santander) in spring 2023
- Served as committee member for the search of two faculty candidates in ENS in fall 2022
- External Evaluator of Undergraduate research thesis for Alejandra Gil (Universidad del Valle - 2022)
- Served as SURF mentor over the summer of 2022 & 2023 at St Mary's College of Maryland
- Served on the committee that oversees the coordination of the Natural Sciences and Math colloquium in 2022-2023 for the Biology Department
- Collaborative teaching of ART390 with Dr. Sue Johnson by guiding students in their final project in fall 2021
- Served as manager of the greenhouse facilities in the Biology Department during 2021-2023 at St Mary's College of Maryland

#### PROFESSIONAL MEMBERSHIPS

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Society for Advancement of Chicanos/Hispanics & Native Americans in Science (SACNAS)  
 American Phytopathological Society (APS)  
 Society for the Study of Evolution (SSE)  
 Ecological Society of America (ESA)  
 Northern California Botanist  
 California Botanical Society  
 American Association for the Advancement of Science (AAAS)  
 Maryland Native Plant Society