Maria Fernanda Torres, PhD

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EMPLOYMENT

SENIOR RESEARCHER
VILNIUS UNIVERSITY
Life Sciences Centre
Feb 2022- | Vilnius, Lithuania

POSTDOCTORAL RESEARCHER
UNIVERSITY OF GOTHENBURG
Department of Biological & Environmental Sciences
Oct 2018-2021 | Gothenburg, Sweden

RESEARCHER AND CURATOR
DNA AND TISSUE COLLECTION
Instituto de investigaciones Alexander von Humboldt
Jan 2013-Jan 2014 | Cali, Colombia

EDUCATION

UNIVERSITY OF EDINBURGH
PhD in Evolutionary Biology
Jan 2014-Nov 2018 | Edinburgh, UK

UNIVERSIDAD DE LOS ANDES
Master in Evolutionary Biology
Jun 2010-Jun 2012 | Bogotá, Colombia

UNIVERSIDAD DE LOS ANDES
Bachelor in Evolutionary Biology
Jun 2006-Jun 2010 | Bogotá, Colombia

SKILLS

Spanish (fluently written and spoken)
English (fluently written and spoken)

Bioinformatics and programming
Whole genome and target sequence data quality check and assembly, from Illumina and Nanopore data.

Variant calling and file manipulation with GATK, picard, samtools, VCFtools, angsd, and similar toolkits.

High Performance Computing systems.

Phylogenomics and phylogenetics using Maximum Likelihood and Bayesian approaches

Programming in Python (particularly proficient in pandas and matplotlib), Bash, R, HTML.

PROFILE

I am an evolutionary biologist in the field of biodiversity and evolution with experience in phylogenetics, phylogenomics, and bioinformatics. I am interested in understanding the mechanisms leading to changes in biodiversity using plants and insects as model systems.

As an independent researcher, I am involved in every aspect of doing science. From planning experiments and carrying out expeditions, to obtaining the sequence data, analysing it, visualising and writing up the results. Besides research, I actively participate in science communication and community engagement activities, raising awareness about environmental and social issues around the world.

PUBLICATIONS

2022 Treiber EL, Zalamea PC, **Torres MF** , Madriñán, Weiblen, GD. Molecular Systematics, Species Concepts, and Myrmecophytism in *Cecropia* (Cecropieae: Urticaceae): Insights from Restriction-Site Associated DNA. *Systematic Botany,* 47(2), 457-466.
We contribute with the most complete *Cecropia* phylogeny to study the origin of myrmecophytism in the genus.

2022 Prata EMB*, **Torres Jimenez MF*** , Bacon CD, de Oliveira AVG, Emilio T. The Description of a Charismatic New Palm Species in the Amazon. *PALMS,* 66(2),57-65.***shared first authorship** .
We tell the story of the species description and the societal threats it faces

2022 Sanín MJ, Cardona A, Valencia-Montoya WA, **Torres Jimenez MF** , Carvalho-Madrigal S, Gómez C, Bacon CD, Roqueme Tangarife T, Jaramillo JS, Zapata A, Valencia V, Arboleda Valencia JW, Vargas V, Paris M. Volcanic events coincide with plant dispersal across the Northern Andes. *Global and Planetary Change,* 210,103757
We uncover the orogenic history of the Andean Western and Central cordilleras from geological samples and with support from calibrated, multi-locus palm phylogenies.

2021 **Torres Jimenez MF** , Stone G, Sanchez A, Richardson JE. Comparative phylogeography of an ant-plant mutualism: An encounter in the Andes. *Global and Planetary Change,* 103598.
We discover criptic ant species using barcodes and uncover areas of gene-flow across the Andes.

2021 Pérez-Escobar OA, Dodsworth S, Bogarin D, Bellot S, Balbuena JA, Schley R, Kikuchi Izai, Morris SK, Epitawalage N, Cowan R, Maurin O, Zuntini A, Arias T, Serna A, Gravendeel B, **Torres Jimenez MF** , Nargar K, Chomicki G, Chase MW, Leitch IJ, Forest F, Baker WJ. Hundreds of nuclear and plastid loci yield insights into orchid relationships. *American Journal of Botany,* 108(7),1166-1180. We resolve the relationship between large orchid groups and provide the most complete phylogeny to date.

GRANTS

2020-2021 • INTERACT-TA grant for an expedition in Utqiagvik - Alaska, US (used by Adrian Hill due to Covid).

2019-2020 • The Royal Society of Arts and Sciences in Gothenburg

2019-2020 • Gustaf Adolfs Bratts forelasningsfond for science outreach and communication

2019-2020 • International Palm Society endowment for research

2015-2016 • Davis Expedition Fund for fieldwork expeditions

2014-2015 • Davis Expedition Fund for fieldwork expeditions

2014-2017 • The Darwin Trust of Edinburgh. Postgraduate research scholarship

2011-2013 • Catalyzing New International Collaborations Program, NSF Grant No. 1132916

2011-2012 • Fondo de Investigaciones de la Facultad de Ciencias, Universidad de los Andes

2006-2010 • Quiero estudiar fellowship, Universidad de los Andes

REFERENCES

• Dr. James Richardson – University College Cork. Ireland. UK. jrichardson@ucc.ie

• Dr. Adriana Sánchez – Universidad del Rosario, Departamento de Biología. Bogotá, Colombia. adriana.sanchez@urosario.edu.co

• Dr. Allison Perrigo – University of Gothenburg, Gothenburg, Sweden. allison.perrigo@bioenv.gu.se

• Dr. Alexandre Antonelli – Royal Botanic Garden Kew, Richmond, Surrey, U.K. a.antonelli@kew.org

PUBLICATIONS (CONTINUATION)

2021 Pérez-Escobar OA, Bellott S, Przelomska NAS, Flowers JM, Nesbitt M, Ryan P, Gutaker RM, Gros-Balthazard M, Wells T, Kuhnhäuser BG, Schley R, Bogarín D, Dodsworth S, Diaz R, Lehmann M, Petoe P, Eiserhardt WL, Preick M, Hofreiter M, Hajdas I, Purugganan M, Antonelli A, Gravendeel B, Leitch IJ, **Torres Jimenez MF** , Papadopulos AST, Chomicki G, Renner SS, Baker WJ. Molecular clocks and archaeogenomics of a Late Period Egyptian date palm leaf reveal introgression from wild relatives and add timestamps on the domestication. *Molecular Biology and Evolution,* msab188.
We date two events of introgression between date palms and sister lineages using ancient and extant DNA

2021 Serna-Sanchez MA, Perez-Escobar OA, Bogarin D, **Torres Jimenez MF** , Alvarez-Yela AC, Arcila JE, Hall CF, de Barros F, Pinheiro F, Dodsworth S, Chase MW, Antonelli A, Arias T. Plastid phylogenomics resolves ambiguous relationships within the orchid family and provides a solid timeframe for biogeography and macroevolution. *Scientific Reports,* 11(1)1-11.
We contribute with the most complete orchid phylogeny to the date of publication.

2021 **Torres Jimenez MF*** , Prata EMB*, Zizka A, Cohn-Haft M, de Oliveira AVG, Emilio T, Chazot N, Couvreur TLP, Mogue Kamga S, Sonke B, Cano A, Collevatti RG, Kuhnhauser BG, Baker WJ, Antonelli A, Bacon CD. Molecular phylogenomics of the palm tribe Lepidocaryeae (Calamoideae: Arecaceae) and description of a new species of *Mauritiella* . *Systematic botany,* 46(3) 863-874
***shared first authorship** . We solve the phylogenetic relationships within the tribe and provide evidence of genetic differentiation in a species new to science.

2021 Ribeiro PG, **Torres Jimenez MF** , Andermann T, Antonelli A, Bacon CD, Matos-Maraví P. An improved bioinformatic platform to integrate short-read, target sequence capture and whole genome sequences of various read depths. *Molecular Ecology,* 30 6021–6035. We extend a pipeline for target sequence data to handle whole genome and test its performance with empirical data.

2021 Hill A, **Torres Jimenez MF** , Chazot N, de Cassia CS, Faurby S, Bacon CD. Fruit colour and range size interact to influence diversification. *bioRxiv,* 2021.10.26.465838. We show how fruit color interacts with dispersal and results in high diversification in midium-range species

2021 **Torres Jimenez MF** , Chazot N, Emilio T, Uddling JF, Antonelli A, Faurby S*, Bacon CD*. Plant habit and temperature seasonality determine leaf shape in palms (Arecaceae). *Shared last co-authorship. bioRxiv 2021.10.26.465896. We untangle the effects of climate and plant allometry in determining leaf shape in palms. Update to be published in Sept 20th, 2022.

2019 Andermann T*, **Torres MF*** , Matos-Maraví P, Liberal IM, Batista R, de Sousa F, Blanco-Pastor J, Gustafsson ALS, Bacon CD, Antonelli A. A technical guide for target sequence capture in ecology and evolution. *Frontiers in Genetics,* 10:1407. ***shared first authorship** . We provide detailed guidance for beginners in target sequence data analyses based in the workshop material Andermann T and I developed.

2017 **Torres MF** and Sanchez A. Neotropical ant-plant *Triplaris americana* attracts *Pseudomyrmex mordax* ant queens during seedling stages. *Insect Sociaux.* 64(2):255-261. We show how ant founders find their hosts through olphactory cues using *in situ* experiments.

2016 Mendoza ÁM, **Torres MF** , Paz A, Trujillo-Arias N, López-Alvarez D, Sierra S, Forero F. and Gonzalez MA. Cryptic diversity revealed by DNA barcoding in Colombian illegally traded bird species. *Molecular Ecology Resources,* 16:862-873. We provide barcoding protocols and delimit the bird species in the Colombian tissue collection.

2015 Stevenson PR, Link A, González-Caro S, and **Torres MF.** Frugivory in Canopy Plants in a Western Amazonian Forest: Dispersal Systems, Phylogenetic Ensembles and Keystone Plants. *PloS one,* 10(10) 0140751. We use network analyses and empirical data on animal data to reveal the strength of plant-animal associations.

2015 Arbeláez-Cortés E, **Torres MF** , López-Álvarez D, Palacio-Mejía JD, Mendoza ÁM and Medina CA. Colombian frozen biodiversity: 16 years of the tissue collection of the Humboldt Institute. *Acta Biológica Colombiana,* 20(2):163-173. We provide a synthesis of the DNA and tissue samples in Colombia within the context of the country's biodiversity.

2012 **Torres MF** , Madriñán S, Weiblen GD. *Cecropia*- Ant interactions in Colombia: Identification and specialization network analysis. Master's thesis. Department of Biological Sciences, Universidad de los Andes. Bogotá, Colombia.

2010 **Torres MF** , Sánchez A, Quijano C, Madriñán S. Neotropical ant-plant *Triplaris americana* leaf volatiles as attractants of *Pseudomyrmex mordax* ant queens. Undergraduate thesis. Department of Biological Sciences, Universidad de los Andes. Bogotá, Colombia.

ONGOING RESEARCH (SELECTED)

• Genomic basis of leaf shape variation in the Amazonian palm *Geonoma macrostachys.* **Torres Jimenez MF** , Sanín MJ, Carvalho S, Ospina A, Antonelli A, Bacon CD. My involvement includes study design, sample collection, DNA extractions, quality check and *de novo* assembly of *G. macrostachys* Illumina and Nanopore reads, population genetics using pool-seq data, and manuscript production.

PRESENTATIONS (SELECTED)

2022 Deadwood-associated fungi and insect communities under plant invasions. Kew research Seminar, Royal Botanic Garden Kew, UK.

2022 Mutualismos entre plantas y hormigas, evolución entre montañas. Research Seminar, Universidad del Rosario, Colombia.

2021 Temperature as important driver of leaf dissection in palms (Arecaceae). Palms 2021.

2020 Phylogenomics and phylogeography to understand ant mutualisms. Invited speaker for the Genome Sciences seminar, University of Washington, USA

2019 Introduction to Bash and how to manage large amounts of data. Presentations at the Antonelli Lab Software Club, University of Gothenburg. Gothenburg, Sweden

2017 Effects of Andean geographic history on the population history of the plant-ant *Azteca.* Naomi Pierce lab seminar. Harvard University. Cambridge MA, USA

2013 Interacciones *Cecropia*- hormiga en Colombia: Identificación y análisis de la red de asociaciones. **Torres MF** , Weiblen GD, Madriñán S. VII Congreso Colombiano de Botánica, Ibagué, Colombia.

2011 Interacción planta-hormiga: Atracción química de *Triplaris americana* a reinas de *Pseudomyrmex mordax* . **Torres MF** , Sánchez A, Quijano C, Madriñán S. VI Congreso Colombiano de Botánica, Cali-Colombia.

2010 Interacción planta-hormiga: Atracción química de *Triplaris americana* a reinas de *Pseudomyrmex mordax* . **Torres MF** , Sánchez A, Quijano C, Madriñán S. Seminar at Universidad Nacional de Colombia. Bogotá, Colombia.

POSTERS

2017 **Torres MF** . Effects of Andean geographic history on the population history of the plant-ant *Azteca.* Evolution 2017, Portland OR, USA.

2017 **Torres MF** . Effects of Andean geographic history on the population history of the plant-ant *Azteca.* "Ecological genomics of coevolutionary interactions" workshop at ETHzurich, 2017, Weggis, Switzerland.

2016 **Torres MF** . Effects of Andean geographic history on the population history of the plant-ant *Azteca.* Poster presentation for third year students, School of Biological Sciences, University of Edinburgh. Edinburgh, UK.

2013 Torres MF, Weiblen GD, **Madriñán S** . "*Cecropia*- ant interactions in Colombia: Identification and network analysis" Poster presentation, Botany, New Orleans, USA.

2013 **Torres MF** , Weiblen GD, Madriñán S. "*Cecropia*- ant interactions in Colombia: Identification and network analysis" Poster for the Sciences Faculty research forum at Universidad de los Andes, Bogotá, Colombia.

TRAINING

2021 "Oh-Know" k-mer-based approaches for non-model organisms. ForBio. virtual.

2019 Workshop on Model-based inference in Phylogeography - from single species to communities. ForBio. Drøbak, Norway.

2019 Workshop on Genomics. evomics.org. Český Krumlov, Czechia.

2017 Ecological genomics of coevolutionary interactions. ETHzurich. Weggis, Switzerland.

2017 Population genomics workshop. University of Sheffield. Sheffield, UK.

2015 Computational Molecular Evolution. Wellcome Trust Advanced Courses. Cambridge, UK.

2014 One week course: Introduction to Python, University of Edinburgh. Edinburgh, UK.

2012 Workshop in Evolutionary approaches to biodiversity science. ATBC 2012, Bonito-MS, Brazil.

OUTREACH (SELECTED)

2021	Blog video	Mutualismo y co-evolución plantas-hormiga. Research interview for Colombia's science communication channel "Ciencia café pa' sumercé". Shared via Facebook (21k views) and Twitter.
2021	Conversatory	Building sciences for peace in Latin America: Interdisciplinary experiences from Colombia. Organised and hosted an event to discuss the historical effect of the conflict and reflect on solutions and experiences that help building peace.
2019-2020	Documentary	Zafire: lessons from the Amazon documentary at the International Science Festival in Gothenburg. The documentary follows my expedition to collect palms in the Amazon. I coordinated the expedition, the filming and helped during the pre-production. Gothenburg, Sweden
2019	Blog post	Looking for palms in the Amazon forest, Antonelli-lab website. http://antonelli-lab.net/wp-admin/post.php?post=802&action=edit
2019	Public presentation	International Biodiversity Day: Tales from the field Goteborgs Naturhistoriska Museum
2019	Mentorship	1000 girls 1000 futures mentorship program program The New York Academy of Sciences
2017	Blog post	The smell of a brand new house, Insectes Sociaux https://insectessociaux.com/2017/06/09/the-smell-of-a-brand-new-house/
2017	Organizer	March for Science. Me and other three collaborators lead, organized and coordinated the march. From permits to stewarding. Edinburgh, UK
2016	Presenter, editor	"rbgeColombia, eight years of ongoing collaborative research". Stand for the state visit of the President of Colombia's. Natural History Museum. London, UK

2015	Presenter	Cabaret of Dangerous Ideas -The Cocaine Conspiracy. Public outreach and education event about positive and negative impacts of drug legalization. Fringe Festival, Edinburgh, UK
2015	Presenter	Seminar: the environmental impact of the illegal production, trade and consumption of cocaine. Uppsala University, Sweden
2014 - **2015**	Guide and presenter	Expedition Botanics at the Edinburgh International Science Festival. Edinburgh, UK
2014	Presenter	Cabaret of Dangerous Ideas -Between white lines. Public outreach and education event about social and environmental impacts of cocaine production. Fringe Festival, Edinburgh, UK

TEACHING

2022 Workshop in Target Sequence data for 25 students, University of Gothenburg, Sweden (at Tjärnö).
2020 Workshop in Target Sequence data for 25 students, University of Gothenburg, Sweden (online).
2019 Workshop in Bioinformatics for beginners (4 students), teaching basic Unix commands, how to process and analyse genomic data, from sequences to a species tree. Universidad CES, Colombia.
2015-2016 Demonstrating for the "Population and Community Ecology" course. University of Edinburgh, UK
2015-2016 Demonstrating for the "Ecological and Environmental Analyses" course. University of Edinburgh, UK
2015 Demonstrating for the "Origin and Diversity of Life" course. Royal Botanic Garden Edinburgh, UK
2010-2012 Laboratory practicals and lectures for the "Plants and Humans" course at the Bachelor's degree level, targeted to students outside the biology curriculum.

SUPERVISION

2022-2026 Supervision of Milda Riepšaitė (Ph.D. student) at Vilnius University.
2021-2025 Co-supervision of Gabriel Damasco (Post-Doc) and Adrian Hill (Ph.D. student) at the University of Gothenburg regarding bioinformatic methods, phylogenomics, and population genomics.

MOLECULAR BIOLOGY

2019-2021 High weight DNA extraction for Illumina and Nanopore sequencing.
2013-2017 DNA extraction for Sanger and Illumina sequencing, barcoding and PCR amplification, library preparation for Illumina sequencing. DNA purification methods.
2012-2013 Barcoding of samples in the DNA and tissue collection at the Instituto de investigaciones Alexander von Humboldt, Colombia.
2010-2012 DNA extractions and barcoding of ant and plant material for the Weiblen Lab (Minnesota, USA) and the Madriñán Lab (Bogotá, Colombia).

FIELDWORK EXPEDITIONS (ORGANISED AND RAN)

2019 Conservation and diversity in the Amazonian forest: Palms of the Amazon. Two weeks of sampling material and documentary recording.
2013-2016 Exploring the roles of geographic barriers in determining ant-plant mutualistic associations. Twelve one-week expeditions throughout Colombia's rain forest.
2012 Plantas acuáticas de la Orinoquia Colombiana. Two one-week long expeditions to survey and collect aquatic plants in the Colombian savannas.
2010-2012 *Cecropia* -Ant interactions in Colombia: Identification and specialization network analysis. Around six expeditions following Colombia's roads to collect *Cecropia* plants and their inhabiting ants.
2011 Restauración ecológica en bosques de sabana en la reserva Tomo Grande, Vichada. Month-long expedition to the Colombian savannas to collect seedlings and set up experiments of reforestation.
2010 Neotropical ant-plant "varasanta" leaf volatiles as attractants of associated ant queens. Monthly expeditions throughout one year, performing *in situ* experiments with ants and collecting plant material for chemical analyses.

PEER-REVIEW

- Invited editor for the special issue "Bioinformatics for plant biology" for the Application in Plant Sciences Journal.
- Peer-review for Methods in Ecology and Evolution, Frontiers in Plant Sciences, and Molecular Ecology Resources.