Maria Fernanda Torres, PhD

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EMPLOYMENT

POSTDOCTORAL RESEARCHER
UNIVERSITY OF GOTHENBURG
Department of Biological & Environmental Sciences
Oct 2018- | 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
Assembly and quality checking of whole genome and target sequence data from Illumina and Nanopore reads

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

Strong experience with High Performance Computing systems.

Phylogenomics and phylogenetics using Maximum Likelihood and Bayesian approaches

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

•Molecular Biology
Extraction, amplification and sequencing of animal and plant DNA.

Library preparation protocols for Illumina High Throughput Sequencing •

•Others
Website design and maintenance, data visualization with Python.

PROFILE

I am an evolutionary biologist in the field of macro-genetics with experience in phylogenetics, phylogenomics, and bioinformatics. I am interested in understanding the mechanisms leading to speciation and the impact that environmental changes have on the outcome of this process. My research uses plants, insects, and their interactions as model systems to explore sources of intra- and inter-specific genetic variation and its patterns through time and space.

During my career, I have been part of every aspect of doing modern science. From planning experiments and carrying out expeditions, to obtaining the sequence data, analysing it, visualizing and writing up the results. I particularly enjoy doing fieldwork and analysing data, and I have extensive experience in molecular biology. As a bioinformatician, I have assembled and analysed referenced and *de novo* draft genomes from whole genome and target-capture data generated with short- and long-read technologies.

Besides research, I actively participate in science communication and community engagement activities, raising awareness about environmental and social issues in Colombia and around the world.

PUBLICATIONS

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.
I developed the research idea, generated data, carried out all analyses and wrote the manuscript.

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.
I contributed with multilocus bayesian analyses and reviewed the manuscript.

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.
I contributed with population genomics analyses and reviewed the manuscript.

GRANTS

2020-2021 • INTERACT-TA grant for an expedition in Utqiagvik - Alaska, US.

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

PUBLICATIONS (CONTINUATION)

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. I contributed with analyses and reviewed the manuscript.

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** . I analysed target sequence data, carried out phylogenomic and population genomic analyses, produced the figures and contributed to writing and reviewing manuscript. PEMB collected and described the new species.

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. I contributed with analysis, project design, visualisation and manuscript review.

2021 *Cecropia* (Cecropieae: Urticaceae) phylogeny inferred from restriction-site associated DNA sequences. Treiber E, Zalamea PC, **Torres Jimenez MF** , Madrinan S, Weiblen GD. *American Journal of Botany, accepted* .
I collected the samples and contributed with phylogenomic analyses.

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. I contributed to this project with data analysis and manuscript revision.

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. I contributed to this project with the experimental design, data analyses, scripting, figures, and manuscript writing.

2021 Sanin, MJ, Cardona A, Carvalho-Madrigal S, Valencia W, **Torres Jimenez, MF** , Zapata S, Gomez AC, Leon S, Bacon CD, Arboleda Valencia JW, Paris M. Geogenomic constraints on the late Miocene to Pleistocene discontinuous topographic growth of the Northern Andes. *Global and Planetary Change, accepted.*
I contributed with genomic data processing and time calibration analyses.

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**
I contributed to carrying out the literature review, writing the manuscript, and making figures.

PUBLICATIONS (CONTINUATION)

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.
I developed the research idea, carried out all experiments and wrote the manuscript.

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.
I carried out laboratory work, the species delimitation analyses, and reviewed the manuscript.

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):p.e0140751.
I developed the research idea, carried out the network analyses, and reviewed the draft.

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.
I gathered and synthesised the data and reviewed the manuscript.

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.

OUTREACH PUBLICATIONS

2021 Duncan G, Lefort MC, Mehrian-Shai R, Chakrabarty P, **Torres MF** . Beyond DNA: The rest of the story. *Science,* 371(6529):560-563
I contributed with a short opinion piece.

2019 Wasalathanthri ND, Zaidi SS, Mahrt E, Srivastava S, Yu K, Johansson KSL, Li F, **Torres Jimenez MF** , Lo C, Allareddy V, Romero-Molina C, Mosegaard S, Heaton SM, Park JJ, Bacon CD, Yu S, Polat EO, Wasalathanthri D, Wang W, Agarwal D. Challenging transitions. *Science,* 363(6422):24-26.
I contributed a paragraph about my experiences as a PhD student transitioning from Colombia to the UK.

ONGOING RESEARCH

• Madagascar's rapidly declining biodiversity: Patterns, trends, and opportunities for terrestrial conservation and restoration. Ralimanana H, Perrigo AL, Smith RJ, [...] **Torres Jimenez MF** , [...] Antonelli A. Submitted to *Science* . I contributed to data gathering and visualisation, and manuscript revisions.

• Genomic basis of leaf shape variation in the Amazonian palm *Geonoma macrostachys* . **Torres Jimenez MF** , Sanin MJ, Carvalho S, Ospina A, Antonelli A, Bacon CD. I contributed to this project by collecting the samples and carrying out DNA extractions and sequencing (long and short reads), generating a *de novo* assembly of *G. macrostachys* , carried out population genetics on pool-seq data, and produced the figures and wrote the manuscript.

• A global view of mycorrhizal communities associated with Juglandaceae. Corrales, A, Folk, R, Ge, Z-W, Song, Y-G, Garibay-Orijel, R, Han, X, Alfonso-Corrado, C, **Torres Jimenez MF** , Williams-Linera, G, Chu, C, Manos, P, Vilgalys, R, Gazis, R, Dallin, JW, Turner, B, Clark-Tapia, R, Jusino, M, Troung, C, Soltis, P, Soltis, D, Mujic, AB, Ovrebo, CL, Kozlowski, G, Hadziabdic, D, He, F, Smith, MR. I contributed with the assembly of genomes, gene annotation and prediction, and phylogenomic analyses.

PRESENTATIONS

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

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

2019-2020 Series of presentations at the Antonelli Lab, University of Gothenburg and Gothenburg Global Biodiversity Centre. Gothenburg, Sweden

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

2014 - 2016 Series of presentations at the Science Research Club, Royal Botanic Garden Edinburgh, Edinburgh, UK.

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

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	Staff	Evolution conference. Portland OR, USA
2017	Organizer	March for Science. Me and other three collaborators lead, organized and coordinated the march. From permits to stewarding. Edinburgh, UK
2016	Presenter, brochure 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

EXPERIENCE

SUPERVISION

2021 | University of Gothenburg in Sweden
Co-supervision of Ph.D. student Adrian Hill

TEACHING

2020 | University of Gothenburg in Sweden
One-week, hands-on Workshop for 25 students on the processing and analysis of target sequence data, from sequences to a species tree. I co-organized the workshop, lead two of the practicals and gave two lectures. The workshop

2019 | Universidad CES in Medellín, Colombia
Three-day, hands-on Workshop on Bioinformatics for beginners, teaching basic unix commands, how to process and analyse genomic data, from sequences to a species tree.

2010-2012 | Universidad de los Andes, Colombia
Practicals for the ”Plants and Humans” course. I prepared and taught the laboratory practicals and some of the theoretical lectures, which involved a group of 40 students and three-hour weekly practicals. I also prepared and facilitated the practical’s material, and prepared and marked exams.

EXPERIENCE (CONTINUATION)

DEMONSTRATING

2015-2016 | University of Edinburgh, UK
Demonstrating for the "Population and Community Ecology course". I assisted students once a week during three-hour computer practicals. I helped preparing the practicals and assignments.

2015-2016 | University of Edinburgh, UK
Demonstrating for the "Ecological and Environmental Analyses" course. I assisted students once a week during the three-hour computer practicals. I led three hour Q&A sessions three times every semester in preparations for their exams.

2015 | Royal Botanic Garden Edinburgh, UK
Demonstrating for the "Origin and Diversity of Life" course. I taught and assisted students during two days of lectures about plant evolution and diversification.

COLLECTIONS MANAGEMENT

2013 | the Alexander von Humboldt Institute for Research on Biological Resources in Colombia
I managed the DNA and Tissue Collection and the Molecular Biology Laboratory. I prepared incoming and outgoing material, stored and handled samples, managed the database, and administrated permits and agreements. I managed reagents and consumables for the lab and the collection. I optimized DNA extraction protocols for DNA barcoding and monitoring of illegal traffic of fauna and flora.

2010 | Universidad de los Andes, Bogotá, Colombia.
I managed and curated the DNA and Tissue Collection of the ANDES Museum. I prepared incoming and outgoing material, stored and handled samples, managed the database, and administrated permits and agreements. I managed reagents and consumables for the collection. I contributed to the digitization of herbarium specimens.

MOLECULAR BIOLOGY

2019-2021 | University of Gothenburg in Sweden
High molecular weight DNA extraction from fresh and dried plant material for Nanopore library preparation and sequencing.

2014-2018 | University of Edinburgh in UK
Insect and plant DNA extraction from fresh and degraded material, library preparation for Next Generation Sequencing.

2012 | University of Minnesota in the US
Insect DNA extractions and amplifications for the Weiblen lab.

2011-2012 | Universidad de los Andes, Colombia
Plant and insect DNA extraction and amplification. Research Assistant of the project: "Molecular phylogenetics of Cecropia: A Keystone Neotropical pioneer, US-Colombia collaboration". Contribution acknowledged in Treiber, E.L., Gaglioti, A.L., Romaniuc-Neto, S., Madriñán, S. and Weiblen, G.D., 2016. Phylogeny of the Cecropieae (Urticaceae) and the evolution of an ant-plant mutualism. Systematic Botany, 41(1), pp.56-66.

FIELDWORK EXPEDITIONS

I organised and carried out the following fieldwork expeditions aimed at surveying and/or collecting biological material, in coordination with local authorities and researchers.

2019 | Conservation and diversity in the Amazonian forest: Palms of the Amazon
Two-week expedition to the remote Biological Station "El Zafire". I coordinated a filming crew of four staff, six helpers, two guides, two international and two national researchers, and two students. We recorded the day-to-day of an all-female expedition to collect palm material with the lead of the Bora and Muinane guides.

2013-2016 | Exploring the roles of geographic barriers in determining ant-plant mutualistic associations
Two expeditions lasting three months each to collect ant and plants across 12 locations in the lowland forest of Colombia, including localities in Antioquia, Choco, La Macarena and surroundings, eastern grassland plains, and the Amazon basin.

2012 | Plantas acuáticas de la Orinoquia Colombiana
Series of expeditions to survey and collect aquatic plants in the Colombian savannas.

EXPERIENCE (CONTINUATION)

2010-2012 | *Cecropia* -Ant interactions in Colombia: Identification and specialization network analysis
Series of expeditions around Colombia to collect *Cecropia* plants and their inhabiting ants.

2011 | Restauración ecológica en bosques de sabana en la reserva Tomo Grande, Vichada
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
Several expeditions throughout the year, performing *in situ* experiments with ants and collecting plant material for chemical analyses.

REFERENCES

• Dr. James Richardson – Royal Botanic Garden Edinburgh, Tropical Diversity section. Edinburgh, UK. Universidad del Rosario, Departamento de Biología. Bogotá, Colombia. jamese.richardson@urosario.edu.co

• 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

• Dr. María José Sanín – Universidad CES, Facultad de Ciencias y Biotecnología. Medellín, Colombia. MSANIN@ces.edu.co