Josué Barrera Redondo

Humboldt Research Fellow | Max Planck Institute for Biology Tübingen

PERSONAL INFORMATION

WORK ADDRESS: Max-Planck-Ring 5, 72076 Tübingen, Germany
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EDUCATION

08/2015-09/2020 **Ph.D.** "Genomic evolution and domestication of pumpkins (*Cucurbita* ssp.)". Supervised by Prof. Luis E. Eguiarte, Instituto de Ecología, Universidad Nacional Autónoma de México. Graduated with Latin honors (*cum laude*).

10/2009-09/2014 **Bachelor's degree in Biology**. Facultad de Ciencias, Universidad Nacional Autónoma de México.

RESEARCH EXPERIENCE

11/2022-present **Humboldt Research Fellow**, "Tracking down the evolution and functional integration of *de novo* emerged genes in brown algae". Host researcher: Susana M. Coelho, Max Planck Institute for Biology Tübingen.

04/2021-10/2022 **Postdoctoral Research Fellow**, "Evolution of sex chromosomes in brown algae (Phaeophyceae)". Supervised by Prof. Susana M. Coelho, Max Planck Institute for Developmental Biology.

09/2012-07/2015 **Undergraduate research assistant**, "Molecular evolution of tree ferns (Cyatheaceae)". Supervised by Prof. Luis E. Eguiarte and Prof. Santiago Ramírez Barahona, Instituto de Ecología, Universidad Nacional Autónoma de México.

PUBLICATIONS

(* = Corresponding author) (# = Equal contribution)

1. Manley, B.F., Lotharukpong, S.J., **Barrera-Redondo, J.**, Yildirir, G., Sperschneider, J., Corradi, N., Paszkowski, U., Minska, E.A., Dallaire, A.* (2023): A highly contiguous genome assembly reveals sources of genomic novelty in the symbiotic fungus *Rhizophagus irregularis*. *G3*, **13(6),** jkad077.
2. **Barrera-Redondo, J.***, Lotharukpong, S.J., Drost, H-G.*, Coelho, S.M.* (2023): Uncovering gene-family founder events during major evolutionary transitions in animals, plants and fungi using GenEra. *Genome Biology*, **24,** 54.
3. Heesch, S., Serrano-Serrano, M., **Barrera-Redondo, J.***, Luthringer, R., Peters, A.F., Destombe, C., Cock, J.M., Valero, M., Roze, D., Salamin, N., Coelho, S.M.* (2021): Evolution of life cycles and reproductive traits: insights from the brown algae. *Journal of Evolutionary Biology,* **34(7),** 992-1009.
4. Martínez-González, C., Castellanos-Morales, G.*, **Barrera-Redondo, J.**, Sánchez-de la Vega, G., Hernández-Rosales, H.S., Gasca-Pineda, J., Aguirre-Planter, E., Moreno-Letelier, A., Escalante, A.E., Montes-Hernández, S., Lira-Saade, R.*, Eguiarte, L.E.* (2021): Recent and historical gene flow in

cultivars, landraces, and a wild taxon of *Cucurbita pepo* in Mexico. *Frontiers in Ecology and Evolution,* **9,** 307.

5. **Barrera-Redondo, J.[#,*]**, Sanchez-de La Vega[#], G., Aguirre-Liguori, J.A., Castellanos-Morales, G., Gutiérrez-Guerrero, Y.T., Aguirre-Dugua, X., Aguirre-Planter, E., Tenaillon, M.I., Lira-Saade, R.*, Eguiarte, L.E.* (2021): The domestication of *Cucurbita argyrosperma* as revealed by the genome of its wild relative. *Horticulture Research,* **8,** 109.
6. **Barrera-Redondo, J.**, Lira-Saade, R., Eguiarte, L.E.* (2020): Gourds and tendrils of Cucurbitaceae: how their shape diversity, molecular and morphological novelties evolved via whole-genome duplications. *Molecular Plant,* **13(8),** 1108-1110.
7. **Barrera-Redondo, J.**, Piñero, D., Eguiarte, L.E.* (2020): Genomic, transcriptomic and epigenomic tools to study the domestication of plants and animals: a field guide for beginners. *Frontiers in Genetics,* **11,** 742.
8. Vazquez-Rosas-Landa, M., Ponce-Soto, G.Y., Aguirre-Liguori, J.A., Thakur, S., Scheinvar, E., **Barrera-Redondo, J.**, Ibarra-Laclette, E., Guttman, D.S., Eguiarte, L.E., Souza, V.* (2020): Population genomics of Vibrionaceae isolated from an endangered oasis reveals local adaptation after an environmental perturbation. *BMC Genomics,* **21(1),** 418.
9. Gutiérrez-Guerrero, Y.T., Ibarra-Laclette, E., **Barrera-Redondo, J.**, Ortega, J., Rebollar, E.A., Martínez del Río, C., León-Paniagua, L., Urrutia, A.O., Eguiarte, L.E.* (2020): Genomic consequences of dietary diversification and parallel evolution due to nectarivory in leaf-nosed bats. *GigaScience,* **9(6),** giaa059.
10. **Barrera-Redondo, J.**, Hernández-Rosales, H.S., Cañedo Torres, D.V., Aréstegui Alegria, K., Torres-Guevara, J., Parra, F., Torres-García, I., Casas, A.* (2020): Variedades locales y criterios de selección de especies domesticadas del género *Cucurbita* (Cucurbitaceae) en los Andes Centrales del Perú: Tomayquichua, Huánuco [*Landrace diversity and local selection criteria of domesticated squashes and gourds (Cucurbita) in the central Andean mountain range of Peru: Tomayquichua, Huánuco*]. *Botanical Sciences,* **98(1),** 101-116.
11. Aguirre-Dugua, X.*, Castellanos-Morales, G., Paredes-Torres, L.M., Hernández-Rosales, H.S., **Barrera-Redondo, J.**, Sanchez-de la Vega, G., Tapia-Aguirre, F., Ruiz-Mondragón, K.Y., Scheinvar, E., Hernández, P., Aguirre-Planter, E., Montes-Hernández, S., Lira-Saade, R.*, Eguiarte, L.E.* (2019): Evolutionary Dynamics of Transferred Sequences Between Organellar Genomes in *Cucurbita*. *Journal of Molecular Evolution,* **87(9-10),** 327-342.
12. **Barrera-Redondo, J.**, Ibarra-Laclette, E., Vázquez-Lobo, A., Gutiérrez-Guerrero, Y.T., Sánchez de la Vega, G., Piñero, D., Montes-Hernández, S., Lira-Saade, R.*, Eguiarte, L.E.* (2019): The genome of *Cucurbita argyrosperma* (silver-seed gourd) reveals faster rates of protein-coding gene and long noncoding RNA turnover and neofunctionalization within *Cucurbita*. *Molecular Plant,* **12(4),** 506-520.
13. Blaz, J., **Barrera-Redondo, J.**, Vázquez-Rosas-Landa, M., Canedo-Téxon, A., Aguirre von Wobeser, E., Carrillo, D., Stouthamer, R., Eskalen, A., Villafán, E., Alonso-Sánchez, A., Lamelas, A., Ibarra-Juarez, L., Pérez-Torres, C., Ibarra-Laclette, E.* (2019): Genomic signals of adaptation towards mutualism and sociality in two ambrosia beetle complexes. *Life,* **9(1),** 2.
14. Eguiarte, L.E.*, Hernández-Rosales, H.S., **Barrera-Redondo, J.**, Castellanos-Morales, G., Paredes-Torres, L.M., Sánchez-de la Vega, G., Ruiz-Mondragón, K.Y., Vázquez-Lobo, A., Montes-Hernández, S., Aguirre-Planter, E., Souza, V., Lira, R.* (2018): Domesticación, diversidad y recursos genéticos y genómicos de México: El caso de las calabazas [*Domestication, diversity, genetic and genomic resources of Mexico: The case of pumpkins*]. *TIP Revista Especializada en Ciencias Químico-Biológicas,* **21(S2),** 85-101.
15. Castellanos-Morales, G., Paredes-Torres, L.M., Gámez, N., Hernández-Rosales, H.S., Sánchez-de la Vega, G., **Barrera-Redondo, J.**, Aguirre-Planter, E., Vázquez-Lobo, A., Montes-Hernández, S., Lira-Saade, R., Eguiarte, L.E.* (2018): Historical biogeography and phylogeny of *Cucurbita*: Insights from ancestral area reconstruction and niche evolution. *Molecular Phylogenetics and Evolution,* **128,** 38-54.
16. **Barrera-Redondo, J.**, Ramírez-Barahona, S., Eguiarte, L.E.* (2018): Rates of molecular evolution in tree ferns are associated with body size, environmental temperature, and biological productivity. *Evolution,* **72(5),** 1050-1062.

17. Ramírez-Barahona, S.*, **Barrera-Redondo, J.**, Eguiarte, LE. (2016): Rates of ecological divergence and body size evolution are correlated with species diversification in scaly tree ferns. *Proceedings of the Royal Society B: Biological Sciences,* **283(1834),** 20161098.

PAPERS UNDER REVIEW OR IN PREPARATION (* = Corresponding author) (# = Equal contribution)

1. **Barrera-Redondo, J.**[#], Lipinska, A.P.[#], Luthringer, R., Liu, P., Dinatale, E., Bogaert, K.A., Hoshino, M., Leira, G., Avia, K., Godfroy, O., Cossard, G.G., Zheng, M., Avdievich, E., Liesner, D., Heesch, S., Denoeud, F., Destombe, C., Valero, M., Cock, M.J., Coelho, S.M.[*] Origin and evolution of sexual systems in the brown algae. *In preparation.*
2. **The PhaeoExplorer Consorsium**. Exploring the evolution of biological complexity in the brown algae through the establishment of a multi-scale genomic data resource. *In preparation.*
3. Liesner, D., Haas, F.B., **Barrera-Redondo, J.**, Müller, D.G., Zheng, M., Godfroy, O., Coelho, S.M.* Unveiling mechanisms of sexual differentiation using feminized males of the giant kelp *Macrocystis pyrifera*. *In preparation.*
4. Lipinska, A.P., Cossard, G.G., Epperlein, P., Krueger, S., Godfroy, O., Ayres, L., Mauger, S., Scornet, D., Marchi, F., Lavaut, E., Destombe, C., Plestino, E., Oliveira, M., **Barrera-Redondo, J.**, Guillemin, M.L., Valero, M., Coelho, S.M.* Scarlet tide: the first report of sex chromosomes in red algae. *In preparation.*
5. Arenas, S., Cruz-Nicolas, J., Giles-Pérez, G., **Barrera-Redondo, J.**, Reyes-Galindo, V., Mastretta-Yanes, A., Aguirre-Planter, E., Eguiarte, L.E., Jaramillo-Correa, J.P.* Contribution of range-wide and local edaphic variation to genetic differentiation in a tropical montane forest tree. *In preparation.*
6. Luthringer, R.[#], Raphalen, M.[#], Guerra, C., Colin, S., Martinho, C., Zheng, M., Hoshino, M., Badis, Y., Lipinska, A.P., Haas, F.B., **Barrera-Redondo, J.**, Alva, V., Coelho, S.M.* Repeated co-option of HMG-box genes for sex-determination across the tree of life. *Under review*.
7. Aguirre-Dugua, X.*, **Barrera-Redondo, J.**, Gasca-Olvera, J., Vázquez-Lobo, A., López-Camacho, A., Sánchez-de la Vega, G., Castellanos-Morales, G., Scheinvar, E., Aguirre-Planter, E., Lira-Saade, R., Eguiarte, L.E. Population genomics of domesticated *Cucurbita ficifolia* reveals a recent bottleneck and low gene flow with wild relatives. *Under review.*

FELLOWSHIPS

11/2022-present	**Humboldt Research Fellowship for Postdocs** (€ 83,280.00). Granted by the Alexander von Humboldt Foundation (Germany).
08/2015-07/2020	**Graduate Research Fellowship** (approx. € 42,890.00). Granted by the Mexican Council of Science and Technology (Mexico).

MENTORSHIP

08/2021-12/2022	**Co-supervisor** of Carla Sofia Reis Guerra: "Unravelling the role of High Mobility Group (HMG) domain gene (Ec-13_001750) in sex determination of *Ectocarpus* brown alga" (Master thesis, Universidade do Porto).

TEACHING

05/2023	**Invited lecturer** for the course "Genomics for species conservation" at ECOSUR Posgrado.

03/2022	**Invited lecturer** for the topic "The evolution of genomes and the origin of new genes" at the Institute of Ecology UNAM.
06/2021	**Invited lecturer** for the topic "Phylogenies and their applications" at the Institute of Ecology UNAM.
02/2021	**Invited lecturer** for the topic "The source of new genes in genomes" at Universidad Autónoma del Estado de Morelos.
10/2020	**Invited lecturer** for the topic "Analysis of structural variants and whole-genome duplications" at the Institute of Ecology UNAM.
04/2020	**Invited lecturer** for the topic "Molecular substitution rates" at the Doctorado en Ciencias Biomédicas UNAM.
03/2020	**Invited lecturer** for the topic "Structural and functional annotation of genes in genomes" at the Doctorado en Ciencias Biomédicas UNAM.
11/2019	**Invited lecturer** for the topic "Mode and tempo of plant molecular evolution" at the Doctorado en Ciencias Biomédicas UNAM.
05/2018-06/2018	**Teacher** for the Introductory workshop on Genomics and Bioinformatics at the Institute of Ecology UNAM.
05/2018	**Invited lecturer** for the topic "Evolutionary genomics and domestication of pumpkins" at the Instituto Tecnológico Superior de Xalapa.
05/2017	**Invited lecturer** for the topic "The importance of genomics for conservation biology" at the Doctorado en Ciencias Biomédicas UNAM.
02/2016-05/2016	**Teaching assistant** for the postgraduate course "Advanced Evolution" at the Doctorado en Ciencias Biomédicas UNAM (64-hour course).
02/2015-04/2015	**Invited lecturer** throughout the Introductory courses on Next Generation Sequencing at the Institute of Ecology UNAM.

CONFERENCES

11/2023	**Oral presentation: "**Tracking down the evolution and functional integration of *de novo* emerged genes in the brown algae". Presented at the *SMBE Satellite Meeting on De Novo Gene Birth* (Texas, USA).
07/2023	**Poster:** "Uncovering gene-family founder events during major evolutionary transitions in eukaryotes using GenEra". Presented at the *Society for Molecular Biology and Evolution 2023* (Ferrara, Italy).
01/2023	**Oral presentation:** "Uncovering gene-family founder events during major evolutionary transitions in animals, plants and fungi using GenEra". Presented at the *Population Genetics Group Meeting 2023* (London, England).
10/2019	**Oral presentation:** "The genome of *Cucurbita argyrosperma* (silver-seed gourd) reveals faster rates of protein-coding gene and long noncoding RNA turnover and neofunctionalization within *Cucurbita*". Presented at the *7th Mexican Conference of Ecology* (Queretaro, Mexico).
08/2019	**Oral presentation:** "Macro and Microevolutionary patterns in pumpkins: rhythms of genomic evolution and domestication*".* Presented at the *8th student symposium of the Institute of Ecology* (Mexico City, Mexico).
02/2019	**Workshop:** "The genome of *Cucurbita argyrosperma* (silver-seed gourd) reveals faster rates of protein-coding gene and long noncoding RNA turnover and neofunctionalization within *Cucurbita*". Presented at the *Plant Animal Genome XXVII* (California, USA).
10/2017	**Poster:** "Comparative genomics of Domestication in the squash Argyrosperma clade". Presented at the *Plant Genome Evolution 2017* (Barcelona, Spain).

08/2017 **Oral presentation:** "Higher rates of molecular evolution in tree ferns are associated with shorter body sizes, warmer climates and less productive environments". Presented at the *6th Mexican Conference of Ecology* (León, Mexico).

08/2017 **Oral presentation:** "Comparative genomics of Domestication in the squash Argyrosperma clade". Presented at the *6th Mexican Conference of Ecology* (León, Mexico).

09/2016 **Oral presentation:** "Morphological and environmental variables associated to changes in the molecular substitution rate of ferns". Presented at the *XX Mexican Conference of Botany* (Mexico City, Mexico).

SOFTWARE DEVELOPMENT

GenEra

`https://github.com/josuebarrera/GenEra`

GenEra is a fast and easy-to-use command-line tool that estimates the age of the last common ancestor of protein-coding gene families.

PROFESSIONAL ASSOCIATIONS

11/2023-present **Member** of the Mexican Network of Evolutionary Biology (ReMBE).

11/2022-present **Member** of the Alexander von Humboldt society.

01/2022-12/2022 **External postdoc representative** of the Max Planck Institute for Biology Tübingen.

01/2020-present **Reviewer** for *Molecular Plant* (1), *New Phytologist* (2), *Horticulture Research* (1), *PeerJ* (1), *Plant Molecular Biology* (1), *Plant Biotechnology Reports* (1), *PLANTA* (1), *Frontiers in Plant Science* (3) and *Frontiers in Ecology and Evolution* (1).

06/2017-present **Member** of the Mexican Scientific Society of Ecology (SCME).