Josué Barrera Redondo

Assistant Professor | Center for Research and Advanced Studies, Irapuato Unit

PERSONAL INFORMATION

WORK ADDRESS: Libramiento Norte Carretera Irapuato León Kilómetro 9.6, Carretera Panamericana Irapuato León, 36821 Irapuato, Guanajuato, Mexico.
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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

01/2025-present **Assistant Professor**, Center for Research and Advanced Studies, Irapuato Unit.

11/2022-10/2024 **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.

PEER-REVIEWED PUBLICATIONS

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

1. Sánchez-de la Vega, G., Castellanos-Morales, G., **Barrera-Redondo, J.**, Martínez-González, C., Gasca-Pineda, J., Villafán, E., Aguirre-Planter, E., Hernández-Rosales, H.S., Lira, R., Eguiarte, L.E. (2025). An evolutionary genomics view of wild and domesticated *Cucurbita* species from Mexico. *In: Casas, A., Peroni, N., Parra-Rondinel, F., Lema, V., Aguirre-Dugua, X., Arévalo-Marín, E., Alvarado-Sizzo, H., Blancas, J. Biodiversity Management and Domestication in the Neotropics.* **Chapter 3**, 1st ed., Springer, Cham, pp. 1-27.
2. **Barrera-Redondo, J.**[#], Lipinska, A.P.[#], Liu, P., Dinatale, E., Cossard, G.G., Bogaert, K.A., Hoshino, M., Craig, R.J., Avia, K., Leira, G., Avdievich, E., Liesner, D., Luthringer, R., Godfroy, O., Heesch, S., Nehr, Z., Brillet-Guéguen, L., Peters, A.F., Hoarau, G., Pearson, G., Aury, J.M., Wincker, P., Denoeud, F.,

Cock, M.J., Coelho, S.M.* (2025). Origin and evolutionary trajectories of brown algal sex chromosomes. *Nature Ecology & Evolution*, **9(11),** 2127-2144.

3. **Barrera-Redondo, J.***, Coelho, S.M.* (2025). An evolutionary continuum between non-coding and coding DNA. *Nature Reviews Genetics*, **26(9),** 584.
4. 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 short-scale chemical soil variation to local adaptation in a tropical montane forest tree. *Evolutionary Applications*, **18(7),** e70116.
5. Caña-Bozada, V.H.*, Dawoud, A.A., de la Cruz, I.R., Flores-Méndez, L.C., **Barrera-Redondo, J.**, Briones-Mendoza, J., Yañez-Guerra, L.A.* (2025). Global analysis of ligand-gated ion channel conservation across Platyhelminthes. *General and Comparative Endocrinology*, **366,** 114718.
6. Liesner, D.*, Cossard, G., Zheng, M., Godfroy, O., **Barrera-Redondo, J.**, Haas, F.B., Coelho, S.M.* (2025). Developmental pathways underlying sexual differentiation in the U/V sex chromosome system of giant kelp. *Developmental Cell*, **60(8),** 1142-1152.
7. Denoeud, F.[#], Godfroy, O.[#], Cruaud, C., Heesch, S., Nehr, Z., Tadrent, N., Couloux, A., Brillet-Guéguen, L., Delage, L., Mckeown, D., Motomura, T., Sussfeld, D., Fan, X., Mazéas, L., Terrapon, N., **Barrera-Redondo, J.**, Petroll, R., Reynes, L., Choi, S.W., Jo, J., Uthanumallian, K., Bogaert, K., Duc, C., Ratchinski, P., Lipinska, A., Noel, B., Murphy, E.A., Lohr, M., Khatei, A., Hamon-Giraud, P., Vieira, C., *et al.* (2024). Evolutionary genomics of the emergence of brown algae as key components of coastal ecosystems. *Cell*, **187(24),** 6943-6965.
8. Liu, P., Vigneau, J., Craig, R.J., **Barrera-Redondo, J.**, Avdievich, E., Martinho, C., Borg, M., Haas, F.B., Liu, C., Coelho, S.M.* (2024). 3D chromatin maps of a brown alga reveal U/V sex chromosome spatial organization. *Nature Communications*, **15(1),** 9590.
9. 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.* (2024). Repeated co-option of HMG-box genes for sex-determination in brown algae and animals. *Science*, **383(6689),** eadk5466.
10. 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. (2023). Population genomics of domesticated *Cucurbita ficifolia* reveals a recent bottleneck and low gene flow with wild relatives. *Plants,* **12(23),** 3989.
11. 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.
12. **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.
13. 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.
14. 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.
15. **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.
16. **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.

17. **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.
18. 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.
19. 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.
20. **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.
21. 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.
22. **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.
23. 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.
24. 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.
25. 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.
26. **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.
27. 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.

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

1. Leong, J.X., **Barrera-Redondo, J.,** Haas, F.B., Igreja, C., Coelho, S.M.* (2026). Ribosome profiling reveals widespread translational control across developmental stages in the brown alga *Ectocarpus*. *Under review*. https://doi.org/10.64898/2026.04.17.719139

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

1. **Barrera-Redondo, J.*,** Leong, J.X., Papadopoulos, C., Igreja, C., Luthringer, R., Haas, F.B., Albà, M.M. Coelho, S.M.* The U/V sex chromosomes of brown algae act as genomic cradles for new genes that emerge *de novo*. *In preparation*.
2. Durán-Suárez del Real, A.P., Baños, B.E., Gasca-Pineda, **J., Barrera-Redondo**, J., Jaramillo-Correa, J.P., Cortez, D., Eguiarte, L.E.* Comparative genomics of hummingbirds: unraveling the genomic basis of nimiaturization and metabolic specialization. *Under review.*

FUNDING

05/2026-04/2031 **Max Planck Partner Group** (€ 100,000.00 EUR)
Granted by the Max Planck Society (Germany)

02/2026-12/2026 **Special assignment from the state budget** ($ 210,000.00 MXN)
Granted by the Center for Research and Advanced Studies (Mexico)

02/2025-01/2026 **Humboldt Return Fellowship** (€ 7,000.00 EUR).
Granted by the Alexander von Humboldt Foundation (Germany).

11/2022-10/2024 **Humboldt Research Fellowship for Postdocs** (€ 83,280.00 EUR).
Granted by the Alexander von Humboldt Foundation (Germany).

AWARDS

01/2024 **Winner of the Alfonso Caso Medal for outstanding PhD theses of 2020.**
Awarded by the Universidad Nacional Autónoma de México.

09/2020 **Latin honors (*cum laude*) for Ph.D. dissertation.**
Awarded by the Universidad Nacional Autónoma de México.

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 the sex determination of *Ectocarpus* brown alga" (Master thesis, Universidade do Porto).

TEACHING

03/2026 **Lecturer** for the course "Evolution of Genomic Architecture" at CINVESTAV Irapuato (15-hour course).

01/2026 **Lecturer** of the course "Bioinformatics and Biostatistics" at CINVESTAV Irapuato (12-hour course).

09/2025 **Lecturer** for the course "Introduction to Genomics" at CINVESTAV Irapuato (15-hour course).

03/2025	**Lecturer** for the course "Evolution of Genomic Architecture" at CINVESTAV Irapuato (15-hour course).
05/2024	**Invited lecturer** for the course "Conservation Genomics" at ECOSUR Posgrado.
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

07/2026	**Poster:** "Mode and tempo of *de novo* gene birth in the brown alga *Ectocarpus*". Presented at the *Society for Molecular Biology and Evolution 2026* (Copenhagen, Denmark).
11/2025	**Talk:** "Origin and evolutionary trajectories of brown algal sex chromosomes". Presented at the *1st Mexican Congress on Evolution* (Mexico City, Mexico).
10/2025	**Talk:** "Max Plank Partner Groups in Mexico". Presented at the *Meeting for the Cooperation between the Max Planck Society and Latin America* (São Paulo, Brazil).
07/2024	**Talk:** "The U/V sex chromosomes of brown algae act as genomic cradles for new genes that evolve *de novo*". Presented at the *Society for Molecular Biology and Evolution 2024* (Puerto Vallarta, Mexico).
11/2023	**Talk: "**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 **Talk:** "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 **Talk:** "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 *VII Mexican Conference of Ecology* (Queretaro, Mexico).

08/2019 **Talk:** "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 **Talk:** "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 **Talk:** "Higher rates of molecular evolution in tree ferns are associated with shorter body sizes, warmer climates and less productive environments". Presented at the *VI Mexican Conference of Ecology* (León, Mexico).

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

09/2016 **Talk:** "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).

OUTREACH

04/2026 **TEDx talk:** "Lo que las algas pardas pueden enseñarnos sobre la evolución y el origen de los genes". Presented at the *TEDxIPN UPIIG* (Guanajuato, Mexico).

03/2026 **Talk:** "Brown algae as a model to study the evolution of orphan genes". Presented at the *International Laboratory for Human Genome Research, UNAM* (Juriquilla, Mexico).

09/2025 **Talk:** "The evolutionary dynamics of brown algal sex chromosomes". Presented at the *Cinvestav Advanced Genomics Unit* (Irapuato, Mexico).

08/2025 **Radio show:** Invited speaker at the Radio show "Atala en W" (Guanajuato, Mexico).

07/2025 **Science fair:** Hands-on workshop "Bioinformatics". Given to high-school and undergraduate students at the *Ciencia Viva* science fair (Irapuato, Mexico).

04/2025 **Science fair:** Hands-on workshop "Concept of common ancestry". Given to teachers and middle-school students at Cinvestav Irapuato (Irapuato, Mexico).

04/2025 **Science cafe: "**Lo que las algas pardas pueden enseñarnos sobre la evolución y el origen de los genes". Presented at the *15th session of BeerTalks* (Irapuato, Mexico).

04/2025 **Podcast:** Invited speaker on the podcast "La Nave de Argos" (*in Spanish*). (https://open.spotify.com/episode/036d1xYydj0SCgZhohJbi7?si=Z8sjcBRmQi-sO-gReIDAiw)

09/2024 **Workshop:** Guest speaker for the Journal club 2024 of the RSG-Mexico.

05/2024 **Science cafe: "**What seaweeds can tell us about evolution and the origin of genes". Presented at the *Pint of Science Tübingen 2024* (Tübingen, Germany).

02/2023 **Talk:** "Rastreando la evolución de los genes huérfanos en las algas marrones". Presented at the *Institute of Ecology UNAM* (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

11/2025-present	**Associate Editor** in *Genome Biology and Evolution*.
11/2023-present	**Member** of the Mexican Network of Evolutionary Biology (ReMBE).
01/2023-present	**Member** of the Society for Molecular Biology and Evolution (SMBE).
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.
06/2017-present	**Member** of the Mexican Scientific Society of Ecology (SCME).