JOAQUIN CANAL BOSQUE NUNEZ
Henderson-Harris Fellow in Biology**,** University of Vermont
Curriculum Vitae

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EDUCATION

Post-Doc., University of Virginia, Charlottesville, VA (2020-2023)
Ph.D., Brown University, Providence, RI (2015-2020)
M.Sc., Brown University, Providence, RI (2015-2018)
B.Sc., University of Miami, *Summa Cum Laude*, Coral Gables, FL (2013-2015)
A.A., Miami Dade College, Highest Honors, Miami, FL (2011-2013)

RESEARCH INTERESTS

Fields of expertise: Evolutionary genomics, statistical genomics, population genetics, molecular evolution, computational biology, biogeography, phylogenomics, demographic inference.
Study systems/models: Barnacles (*Semibalanus sp.*), fruit flies (*Drosophila melanogaster; other drosophilids*), minnows (*Fundulus*), water fleas (*Daphnia*), and sea urchins (*Strongylocentrotus*)

PROFESSIONAL APPOINTMENTS

08/2023 – Present	Henderson-Harris Fellow, Dept. of Biology, University of Vermont, Burlington, VT.
08/2020 – 07/2020	Research Associate, Dept. of Biology, University of Virginia, Charlottesville, VA.
07/2017 – 07/2020	NSF Graduate Research Fellow, Dept. of Ecology and Evolutionary Biology, Brown University, Providence, RI.
07/2019 – 10/2019	Visiting Research Fellow, *Sven Lovén centrum för marin infrastruktur*, University of Gothenburg, *Tjärnö*, Sweden.
07/2015 – 07/2017	Reverse Ecology Research Fellow, IGERT traineeship, Dept. of Ecology and Evolutionary Biology, Brown University, Providence, RI.

RESEARCH SUPPORT

"Ontogenetically mediated selection in response to environmental heterogeneity in the acorn barnacle (*Semibalanus balanoides*)", Doctoral Dissertation Enhancement Grant (DDEG), Brown University, Dept. of Ecology and Evolutionary Biology. US $10,000; 2/1/2019 - 2/1/2020. PI(s) **JCB Nunez** and DM Rand

"Evolutionary Genomics of the Northern Acorn Barnacle (*Semibalanus balanoides*)", Graduate Research Fellowship (GRFP). National Science Foundation (NSF), US $138,000; 05/1/2015 - 05/1/2020. PI **JCB Nunez**

"Parallel evolution in the intertidal: investigating genetic responses to zonation", Graduate Research Opportunities Worldwide (GROW). A joint grant from the U.S. National Science Foundation (NSF), and the Swedish Research Council (*Vetenskapsrådet*), US $5,000 and SE *kr* 26,000. 7/2019 – 10/2019. PI(s) **JCB Nunez**, DM Rand, K Johannesson and A Blomberg.

"Tidally-zonated polymorphisms in the northern acorn barnacle in the North Atlantic: parallel evolution or ancient polymorphism?" *Kungliga Vetenskapsakademien* (*KVA*) fund for internationalization and scientific renewal at the Sven Lovén Centre. The Royal Swedish Academy of Sciences, SE *kr* 64,100; 12/21/2018 - 12/1/2019. PI(s) **JCB Nunez** and K Johannesson

"Evolutionary Genomics of the Mitochondrial Genome in *Fundulus*", Small Undergraduate Research Grant Experience (SURGE). Rosenstiel School of Marine and Atmospheric Science, Amount: US $1500; 1/20/2015 - 5/1/2015. PI **JCB Nunez**

"Searching for signatures of natural selection in the mitochondrial genome in *Fundulus heteroclitus*", Small Undergraduate Research Grant Experience (SURGE). Rosenstiel School of Marine and Atmospheric Science, Amount: US $1500; 1/20/2014 - 5/1/2014. PI **JCB Nunez**

RESEARCH GRANTS AWARDED TO MENTEES

"Characterizing the potential of Pool-Seq data for demographic inference." Funded by the Harrison Undergraduate Research Awards (HURA; 2022), US $5,000. Awarded to David J. Bass. Co-Mentored with Alan O. Bergland at the University of Virginia

"Investigating Thermal Selection in the Mitochondria of the Northern Acorn Barnacle." Funded by the Karen T. Romer Undergraduate Teaching and Research Awards (UTRA; 2018), US $3,500, Awarded to David A. Ferranti. Co-Mentored with David M. Rand at Brown University

PUBLICATIONS[1]

Peer Reviewed Journals (Published)

David M. Rand, **Joaquin C. B. Nunez**, Shawn Williams, Stephen Rong, John T. Burley, Kimberly B. Neil, Adam N. Spierer, Wilson McKerrow, David S. Johnson, Yevgeniy Raynes, Thomas J. Fayton, Nicholas Skvir, David A. Ferranti, Maya Greenhill Zeff, Amanda Lyons, Naima Okami, David M. Morgan, Kealohanuiopuna Kinney, Bianca R. P. Brown, Anne E. Giblin, Zoe G. Cardon (2023). Parasite manipulation of host phenotypes inferred from transcriptional analyses in a trematode-amphipod system. *Molecular Ecology*, DOI: https://doi.org/10.1111/mec.17093

Barnard-Kubow K. B., Becker D., Murray C.S., Porter R., Gutierrez G., Erickson P., **Nunez J.C.B.**, Voss E., Suryamohan K., Ratan A., Beckerman A., Bergland A. O., "Genetic variation in reproductive investment across an ephemerality gradient in Daphnia pulex", *Molecular Biology and Evolution*, 2022; msac121, DOI: https://doi.org/10.1093/molbev/msac121

Kapun, M[E]., **J. C. B. Nunez**[E], M. Bogaerts-Márquez[E], J. Murga-Moreno[E], M. Paris[E], J. Outten, M. Coronado-Zamora, C. Tern, O. Rota-Stabelli, M. P. G. Guerreiro, S. Casillas, D. J. Orengo, E. Puerma, M. Kankare, L. Ometto, V. Loeschcke, B. S. Onder, J. K. Abbott, S. W. Schaeffer, S. Rajpurohit, E. L. Behrman, M. F. Schou, T. J. S. Merritt, B. P. Lazzaro, A. Glaser-Schmitt, E. Argyridou, F. Staubach, Y. Wang, E. Tauber, S. V. Serga, D. K. Fabian, K. A. Dyer, C. W. Wheat, J. Parsch, S. Grath, M. S. Veselinovic, M. Stamenkovic-Radak, M. Jelic, A. J. Buendía-Ruíz, M. J. Gómez-Julián, M. L. Espinosa-Jimenez, F. D. Gallardo-Jiménez, A. Patenkovic, K. Eric, M. Tanaskovic, A. Ullastres, L. Guio, M. Merenciano, S. Guirao-Rico, V. Horváth, D. J. Obbard, E. Pasyukova, V. E. Alatortsev, C. P. Vieira, J. Vieira, J. R. Torres, I. Kozeretska, O. M. Maistrenko, C. Montchamp-Moreau, D. V. Mukha, H. E. Machado, A. Barbadilla, D. Petrov, P. Schmidt, J. Gonzalez, T. Flatt and A. O. Bergland (2021). "Drosophila Evolution over Space and Time (DEST) - A New Population Genomics Resource."

[1] Underlined authors are mentees, undergraduates are indicated as [U]. Equal author contributions are indicated as [E].

Molecular Biology and Evolution, msab259, DOI: https://doi.org/10.1093/molbev/msab259/. **Featured as the Journal Cover of the Feb 2022 Issue (Volume 39, Issue 2)**

Nunez JCB, Rong S., Ferranti DA[U], Damian-Serrano A., Neil K.B., Glenner H., Elyanow R.G., Brown. BRP, Rosenblad MA, Blomberg A., Johannesson K., and Rand DM, 'From tides to nucleotides: genomic signatures of adaptation to environmental heterogeneity in barnacles.' *Molecular Ecology*, DOI: https://doi.org/10.1111/mec.15949

Nunez JCB, Rong S, Damian-Serrano A, Burley JT, Elyanow RG, Ferranti DA[U], Neil KB, Glenner H, Rosenblad MA, Blomberg A, Johannesson K, Rand DM. (2020) "Ecological load and balancing selection in circumboreal barnacles", *Molecular Biology and Evolution*, msaa227, DOI: https://doi.org/10.1093/molbev/msaa227

Nunez JCB, Flight PA, Neil KB, Rong S., Ericksson LA, Ferranti DA[U], Ronsenblad MA, Blomberg, A, Rand DM. (2020) "Footprints of natural selection at the mannose-6-phosphate isomerase locus in barnacles." *Proc Natl Acad Sci USA*. 201918232. DOI: www.pnas.org/cgi/doi/10.1073/pnas.1918232117. Media coverage: *News from Brown*: Barnacles offer genetic clues on how organisms adapt to changing environments (Mar 2020); Brown University *Kudos* (Feb 2020); NSF YouTube channel: How do barnacles survive environmental changes?

Brown BRP, **Nunez JCB**, Rand DM. (2020) 'Characterizing the cirri and gut microbiomes of the intertidal barnacle *Semibalanus balanoides.*' *anim microbiome 2, 41.* DOI: https://doi.org/10.1186/s42523-020-00058-0

Nunez JCB, Biancani L, Flight PA, Rand DM, Crawford DL, and Oleksiak MF. (2018) 'Stable genetic structure and connectivity in pollution-adapted and nearby pollution-sensitive populations of *Fundulus heteroclitus*.' *Royal Society Open Science* (5): 171532. DOI: http://dx.doi.org/10.1098/rsos.171532.

Nunez JCB and Oleksiak MF. (2016) 'A Cost-Effective Approach to Sequence Hundreds of Complete Mitochondrial Genomes'. *PLoS ONE* 11(8): e0160958. DOI: https://doi.org/10.1371/journal.pone.0160958.

Nunez JCB[E], Seale TP[E], Fraser MA[E], Burton TL[E], Fortson TN[E], Hoover D, Travis J, Oleksiak MF, Crawford DL. (2015) 'Population Genomics of the Euryhaline Teleost *Poecilia latipinna'*. *PLoS ONE* 10(9): e0137077. DOI: https://doi.org/10.1371/journal.pone.0137077.

Chapters in Books (Published)

Nunez JCB, Elyanow RG, Ferranti DA[U], Rand DM, 'Population Genomics and Biogeography of the Northern Acorn Barnacle (*Semibalanus balanoides*) using Pooled-Sequencing Approaches.' In *Population Genomics*: Marine Organisms Series, edited by Marjorie Oleksiak and Om Rajora, Springer, Cham. DOI: https://doi.org/10.1007/13836_2018_58.

Technical Notes (Published, Not Peer reviewed)

Nunez, JCB., M. Paris, H. Machado, M. Bogaerts, J. Gonzalez, T. Flatt, M. Coronado, M. Kapun, P. Schmidt, D. Petrov and A. Bergland (2021). "Note: Updating the metadata of four misidentified samples in the DrosRTEC dataset." bioRxiv 2021.01.26.428249. DOI:https://doi.org/10.1101/2021.01.26.428249

Pre-prints (Not Published; Texts available in bioRxiv)

Nunez JCB, Lenhart BA, Bangerter A, Murray CS, Yu Y, Nystrom TL, Tern C, Erickson PA, Bergland AO, "A cosmopolitan inversion drives seasonal adaptation in overwintering *Drosophila",* bioRxiv 2022.12.09.519676; doi: https://doi.org/10.1101/2022.12.09.519676

AWARDS & ACCOLADES

Accolades

2022 Future Faculty Program, University of Vermont (UVM)

2022 DeLill Nasser Award, The Genetics Society of America (GSA)

2015 Honors in Marine Science, University of Miami

2014 Honorable Mention, Goldwater scholarship competition, Barry M. Goldwater Foundation

2013 Honors in Biology, Miami Dade College

Scholarships

2014 Rosenstiel School General Scholarship, University of Miami

2013 *Phi Theta Kappa* (ΦΘK) Presidential Scholarship, University of Miami

2012 SIGMA Scholarship, National Science Foundation & Miami Dade College,
James M. Ragen Jr. Scholarship, Miami Dade College

ACADEMIC PRESENTATIONS

Invited Talks

2022: University of Oregon, Institute of Ecology and Evolution, Eugene, OR, USA
University of Virginia, Department of Biology, EEB seminar, VA, USA

2021: *DrosEU*: European Drosophila Population Genomics Consortium, Virtual Conference
Miami Dade College, STEM ARCOS Program, Miami, FL, USA

2020: University of Virginia, Department of Biology, EEB seminar, VA, USA

2019: University of Gothenburg, *Tjärnö* Marine Laboratory, Sweden
University of Gothenburg, Department of Chemistry and Molecular Biology, Sweden
University of Vermont, Department of Biology, VT, USA

Contributed Abstracts (T = Talk; P = Poster)

2023: P: 'A chromosomal Inversion facilitates seasonal adaptation in *Drosophila'* Gordon Research Conference and Seminar (GRC/GRS): Ecological & Evolutionary Genomics (Rhode Island, USA).

2022: T: 'The not-so-secret life of flies: seasonal cycles of boom-and-bust demography drive evolution in *Drosophila*. Evolution meeting (Ohio, USA).

T: 'Do supergenes mediate seasonal adaptation in overwintering *Drosophila*?' 63rd Drosophila Research Conference (California, USA).

2019: P: 'From classic allozymes to whole genomes: characterizing the genetic basis of adaptation to heterogeneous environments in intertidal barnacles.' Gordon Research Conference and Seminar (GRC/GRS): Ecological & Evolutionary Genomics (New Hampshire, USA).

T: 'Ecological genetics of a classic allozyme polymorphism: *Mpi* in intertidal barnacles.' Evolution meeting (Rhode Island, USA).

2018: T: 'Natural selection shapes functional genetic variation at intertidal microhabitats in the Northern Acorn Barnacle'. Marine Evolution 2018 (Strömstad, Sweden)

T: 'Ecological Genomics of microhabitat adaptations in the Northern Acorn Barnacle'. Annual Binghamton University Biology Department Symposium (NY, USA).

2017: T: 'Ecological genomics of thermal adaptation: Genome wide screens in acorn barnacles reveal multiple loci responding to thermal gradients at tidal microhabitats.' Gordon Research Conference and Seminar (GRC/GRS): Ecological & Evolutionary Genomics (Maine, USA)

2016: P: 'Transatlantic population genomics of the northern acorn barnacle (*Semibalanus balanoides*): a comparison of F_{ST} outliers using different reference assemblies.' Evolution meeting (Texas, USA).

P: 'Populations of *Fundulus heteroclitus* adapted to pollution show high levels of genetic diversity'. RI NSF EPSCoR Research Symposium (Rhode Island, USA)

2015: T: 'Genetic Variation in Mitochondrial Genomes from Populations of *Fundulus heteroclitus* Distributed Along a Thermal Cline', Society of Integrative and Comparative Biology (Florida, USA).

2014: P: 'Mitochondrial Genomes and Oxidative Phosphorylation from Populations of *Fundulus heteroclitus* Distributed Along a Thermal Cline', American Physiological Society (California, USA).

TEACHING

Instructor of Record:

Evolutionary Biology (2023 Fall, BIOL1305), University of Vermont. 40 Students (3 credits). https://www.jcbnunez.org/biol1305

Evolutionary Genomics (2022 J-term, BIOL4585), University of Virginia. Upper-level seminar. 10 students (3 credits). Course website: https://www.jcbnunez.org/biol4585j

Teaching Assistantships:

Evolutionary Biology (2015-2018, BIOL048), Brown University. 60-80 students (undergraduate credit).

Biostatistics (2017, BIOL0495), Brown University. 40 students (undergraduate credit)

Introductory Biology (2014, BIL161), University of Miami. Laboratory section. 20 students (1 credit).

MENTORING

Graduate Students:

Andrew McCracken (2023-Present), Ph.D. student in Biology, University of Vermont; Co-advised with Melissa Pespeni. Project: *Evolutionary genomics of purple urchins.*

Undergraduate honors projects:

Katelyn Sullivan (2023-present), Sc.B. student Biology, University of Vermont; Project: *Settlement dynamics in barnacles.*

Giovanni Mazzeo (2023-present), Sc.B. student Mathematical and Biology, University of Virginia; Co-advised with Alan O. Bergland. Project: *Assessing the role of chromosomal inversion in relatedness matrices in selection inference.*

David J. Bass (2022-2023), Sc.B. Statistics, University of Virginia; Co-advised with Alan O. Bergland. Project: *Developing a framework for demographic inference using Pool-Seq.*

David A. Ferranti (2017-2019), Sc.B. Biology, Brown University with honors; Co-advised with David M. Rand. Project: *Trans-arctic demography of the acorn barnacle.*

CERTIFICATIONS

Scientific

2022 "GENETICS Peer Review Training Program". Genetic Society of America.

2017 "Reproducible Data Science for Population Genetics." PR statistics, Wales, United Kingdom.

"Triple A Workshop for Genome Sequence analysis: How to Assemble, Annotate and Analyze whole genome sequence data." Swiss Federal Institute of Technology (*ETH Zürich*) Ascona, Switzerland.

Teaching

2019 "Teaching Certificate II: course design." Brown University

2016 "Teaching Certificate I: critical reflection and inclusive classrooms, rhetorical practice and classroom, communication, learning design, engaged learning." Brown University

"Teaching with Technology Institute: a weeklong seminar exploring the relationship between pedagogy and technology". Brown University

Service

2022 "Ending genetics essentialism through genetics education." University of Virginia

2021 "Introduction to Equity Literacy." Certificate ID: https://www.equitylearn.com/certificates/potnnfmvfk

"Understanding Equity and Inequity." Certificate ID: https://www.equitylearn.com/certificates/wtrgszqfbt

Institutional

2022 "Biomedical Responsible Conduct of Research (RCR)" (ID 48766728).

2021 "Conflicts of Interest (COI)" (ID 45507375).

"Undue Foreign Influence: Risks and Mitigations" (ID 45507376).

SERVICE

To the Profession:

Grant review:

National Science Foundation (NSF): Division of Environmental Biology, National Oceanic and Atmospheric Administration (NOAA): Sea Grant.

Scientific journal review:

Science Advances, Molecular Ecology, *Genetics*, *Trends in Genetics, Journal of Heredity*, *Scientific Reports, Biological Journal of the Linnean Society*, *Evolutionary Applications, Peer J*

Conferences and Symposia:

2025: Co-chair of the *Gordon Research Seminar* (GRS) in Ecological and Evolutionary Genomics. Joint with Dr. Charikleia Karageorgiou

To the University:

2022–2023 Member of the Building Community Committee, Biology Department, UVA

2022 Mentor for the Louis Stokes Alliances for Minority Participation program. UVA

2021–2023 Co-instructor and member of the planning committee for the *leadership essentials* training module: *The Myth of Biological of Race in the USA* (With Alan O. Bergland). Courses taught on: Spring 2022, Fall 2022, Spring 2023, Upcoming Fall 2023. At UVA.

2021: Executive organizing committee for the 2021 UVA post-doc research symposium. UVA

2021: *Ad hoc* Reviewer, Inclusive Excellence Plan Review committee. UVA

2021: Member of the diversity, equity, and inclusion task force “Diversity Influencers”
Organized the 2021 seminar, **COVID in Context**: how the COVID-19 pandemic exacerbates disparities among historically underrepresented groups. UVA

2020–2021 Member of the Postdoctoral diversity, equity, and inclusion committee, UVA

2020–2021 *Ad hoc* Reviewer, job search for the Director of Diversity Education at UVA

2016–2018 Dept. Seminar Organizer, Dept. of Ecology and Evolutionary Biology, Brown

2016–2018 Graduate Student Observer to the Faculty Meetings, Brown

2016–2017 Graduate Student Council Representative for dept. of Ecology and Evolutionary Biology, Brown

2012–2013 Founder and mentor, The Wolf-pack mentoring program. Miami Dade College

To the Community

2020–present Project Coordinator, Backyard Evolution Citizen Science Project, University of Virginia

2019, 2022 Mentor to undergraduate students. Undergraduate Diversity program of the Society for the Study of Evolution

2016–2017	Brown Junior Researcher Program (BJRP) with Boys & Girls Club of Providence, East Providence and Providence, RI.
2015	SACNAS Educational Outreach Program with 1st Grade Students, Hennessey Elementary, East Providence, RI
2015	Invited Lecture for High School Students: The Wheeler School, Providence, RI.
2012–2015	Mentor for High School Students, STEM FYE program, Miami Dade College