

JOAQUIN CANAL BOSQUE NUNEZ
Curriculum Vitae

Department of Biology
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PUBLONS: publons.com/a/1534937

EDUCATION

Ph.D., Brown University, Providence, RI. 2020
M.Sc., Brown University, Providence, RI. 2018
B.Sc., University of Miami, *Summa Cum Laude*, Coral Gables, FL. 2015
A.A., Miami Dade College, Highest Honors, Miami, FL. 2013

RESEARCH INTERESTS

Ecological and evolutionary genomics, population genetics, molecular evolution, computational biology, reproducible workflows in bioinformatics, biogeography, marine genomics, marine ecology. Focus on understanding the genetic basis of adaptation to highly fluctuating environments. I have conducted case studies in flies (*Drosophila*), barnacles (*Semibalanus*), minnows (*Fundulus*), and water fleas (*Daphnia*).

PROFESSIONAL APPOINTMENTS

08/2020 – Present	Post-Doctoral 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, <i>Sven Lovén centrum för marin infrastruktur</i> , University of Gothenburg, <i>Tjörnö</i> , 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. Lead 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. Lead 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. Lead 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. Lead 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. Lead 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. Lead PI **JCB Nunez**

RESEARCH GRANTS AWARDED TO MENTEES

Undergraduate Mentees

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

PUBLICATIONS¹

Peer Reviewed Journals

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-Ruiz, 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. Alatorsev, 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." *Molecular Biology and Evolution*, msab259, DOI: <https://doi.org/10.1093/molbev/msab259>

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, Rosenblad 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](#)

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

[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

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

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>

Submitted works and Preprints

Karen Barnard-Kubow; Dörthe Becker; Connor Murray; Robert Porter; Grace Gutierrez; Priscilla Erickson; **Joaquin C.B. Nunez**; Erin Voss; Kushal Suryamohan; Aakrosh Ratan; Andrew Beckerman; Alan Bergland. "Polygenic variation in sexual investment across an ephemerality gradient in *Daphnia pulex*." bioRxiv. DOI: <https://doi.org/10.1101/2021.06.23.449662> (In Revision at MBE).

AWARDS & ACCOLADES

Professional accolades

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

Scholastic accolades

Honors in Marine Science (2015), President's Honor Roll (2013-2015), Provost's Honor Roll (2013-2015), and Dean's List (2013-2015), University of Miami

Honors in Biology (2013), Dean's List (2011-2013), Miami Dade College

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

Scholarships

Rosenstiel School General Scholarship, University of Miami, 2014

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

SIGMA Scholarship, National Science Foundation & Miami Dade College, 2012

James M. Ragen Jr. Scholarship, Miami Dade College, 2012

ACADEMIC PRESENTATIONS

Invited Talks

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

2020: University of Virginia, Dept. of Biology, EEB seminar, VA, USA

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

Contributed Talks

2022: Nunez JCB, A. Bangerter, C. S. Murray, Y. Yu, B. A. Lenhart, P. A. Erickson, A. O. Bergland. 'Do supergenes mediate seasonal adaptation in overwintering *Drosophila*?' 63rd *Drosophila* Research Conference. April 6-10, 2022. San Diego, CA, USA (Upcoming)

2019: Nunez JCB, Flight PA, Neil KB, Ferranti DA, Rosenblad MA, Blomberg A, and Rand DM. 'From classic allozymes to whole genomes: characterizing the genetic basis of adaptation to heterogeneous environments in intertidal barnacles.' 2019 Gordon Conference (GRC) and Gordon Research Seminar (GRS): Ecological & Evolutionary Genomics. Southern New Hampshire University, Manchester NH. July 13-19, 2019

Nunez JCB, Flight PA, Neil KB, Ferranti DA, Rosenblad MA, Blomberg A, and Rand DM. 'Ecological genetics of a classic allozyme polymorphism: *Mpi* in intertidal barnacles.' *Evolution* 2019, Providence RI. June 21-25, 2019

2018: Nunez JCB, and Rand DM. 'Natural selection shapes functional genetic variation at intertidal microhabitats in the Northern Acorn Barnacle'. *Marine Evolution* 2018, Marcus Wallenberg Symposium. Centre for Marine Evolutionary Biology at University of Gothenburg, Strömstad, Sweden, May 15 – 17, 2018

Nunez JCB, Elyanow RG, Brown BR, Rand DM. 'Ecological Genomics of microhabitat adaptations in the Northern Acorn Barnacle'. 2018 Annual Binghamton University Biology Department Symposium. Binghamton University, Binghamton, NY, January 12 –13, 2018.

2017: Nunez JCB, Elyanow RG, Brown BR, Rand DM. 'Ecological genomics of thermal adaptation: Genome wide screens in acorn barnacles reveal multiple loci responding to thermal gradients at tidal microhabitats.' 2017 Gordon Conference (GRC): Ecological & Evolutionary Genomics. University of New England, Biddeford, ME, 07/16/2017 - 07/21/2017

2016: Nunez JCB, Elyanow RG, Brown BR, Rand DM. 'Transatlantic population genomics of the northern acorn barnacle (*Semibalanus balanoides*): a comparison of F_{ST} outliers using different reference assemblies.' Evolution 2016, Austin, Texas, June 16 – 21, 2016

Nunez JCB, Barnes L, Flight P, Rand DM, Crawford DL, Oleksiak MF. 'Populations of *Fundulus heteroclitus* adapted to pollution show high levels of genetic diversity'. RI NSF EPSCoR Research Symposium. University of Rhode Island, Narragansett, RI, April 14, 2016.

2015: Nunez JCB, Baris TZ, Crawford DL, Oleksiak MF, 'Genetic Variation in Mitochondrial Genomes from Populations of *Fundulus heteroclitus* Distributed Along a Thermal Cline', Integrative and Comparative Biology 55, E134-E134, January 5, 2015.

2014: Nunez JCB, Baris TZ, Crawford DL, Oleksiak MF, 'Mitochondrial Genomes and Oxidative Phosphorylation from Populations of *Fundulus heteroclitus* Distributed Along a Thermal Cline', American Physiological Society (APS): Comparative Approaches to Grand Challenges in Physiology. San Diego, CA, October 6, 2014.

TEACHING

Instructor of Record: Evolutionary Genomics (2022, BIOL 4585, J-term), University of Virginia, Charlottesville, VA. This is an upper-level courses aimed at training students on cutting edge genomic techniques to understand how studying whole genomes can shed light into the fundamental processes which allow natural populations to survive and thrive in the context of complex ecological interactions. As part of this course, students engage in analyses of real and simulated genomic data. Each meeting is divided in three portions. First a lecture, second a student-lead discussion on a selected paper, lastly a practicum on genomics data. This course enrolls 10-15 students and awards 3 credits. Course website: <https://www.jcbnunez.org/biol4585j>

Invited co-Instructor: Ecological Genomics (2019, BIOL 2440) University, Providence, RI. This is an upper-level seminar which I co-taught with my PhD advisor, Prof. David M. Rand. This course was open to graduate students and advanced undergraduates at Brown (15-20 students). This was a hybrid course with both a theory and a hands-on component. The theory portion consist of lectures covering an assortment of topics in bioinformatics: principles of bioinformatics, a primer on genome assembly, population genetic analysis with genomic data using *R*. The hands-on portion of the course included analysis of real datasets (brought by graduate students) with the goal of producing a scientific publication. For the year 2019, which I taught, the course worked on RNA-seq analysis of a parasitic trematode and its amphipod host. This course enrolls 10-15 students and awards graduate credit.

Head Teaching Assistant & Invited Lecturer: Evolutionary Biology (2015-2018, BIOL 048), Brown University, Providence, RI. I served as head teaching assistant for this course for two years (2015-2016), and as invited lecturer for all 4 years. As teaching assistant, I lead weekly recitation sections and office hours, as well as exam and homework grading. This course is an introductory course in evolution in which students gain a fundamental understanding of micro- and macro-evolutionary forces with applications to ecology and human health. As a guest lecturer, I taught the lectures on "The math and theory of Natural Selection", and "Applied Evolutionary biology: Conservation Genomics". This course enrolls 60-80 students and awards undergraduate credit.

Head Teaching Assistant & Invited Lecturer: Biostatistics (2017, BIOL 0495), Brown University, Providence, RI. This is the core statistics requirement of the biology program at Brown University. This course covers fundamental statistical theory with applications to Biology. I gave invited lectures on "Fundamentals of the R programming language." As teaching assistant, I lead weekly statistic "clinics" (i.e., a space for students to work on math problems and debug code), weekly office hours, as well as exam and homework grading. This course enrolls ~40 students and awards undergraduate credit.

Seminar Leader: First Readings Seminar (2016), a seminar for first year students at Brown University discussing assigned summer readings. This is a day-long workshop for Brown first-year students. In this workshop students reflect on an assigned summer reading before coming to campus. For 2016, the assigned reading was Justice Sonia Sotomayor's "My Beloved World." No credit awarded, but this is part of new student orientation.

Teaching Assistant: Introductory Biology (2014, BIL 161), University of Miami, Coral Gables, FL. This is the laboratory section which accompanies the introductory biology course. This is a general laboratory where students learn a wide array of techniques: from microscopy to DNA sequencing/PCR. This course enrolls ~20 students and awards 1 credit.

MENTORING

The following are students with whom I work closely and provide support under the guidance of the lab P.I.

During my Post-Doctoral position at the University of Virginia:

Connor Murray (2020-Present), Ph.D. *candidate in Biology*, University of Virginia; Faculty advisor/PI: Alan O. Bergland. Project: *Population genomics and biogeography of Daphnids*.

Adam Lenhart (2020-Present), Ph.D. *candidate in Biology*, University of Virginia; Faculty advisor/PI: Alan O. Bergland. Project: *Population genetics and physiology of starvation resistance in D. melanogaster*.

While completing my PhD at Brown University:

Ian Light (2019-2020), Sc.B. Biology, Brown University with honors; Faculty advisor: David M. Rand. Project: *Chromosomal segregation in flies with different mitotypes*. Light's work was recognized with the James Kidwell Prize in Genetics and Population Biology

David Ferranti (2017-2019), Sc.B. Biology, Brown University with honors; Faculty advisor: David M. Rand. Project: *Trans-arctic demography of the acorn barnacle*. Ferranti was awarded a Karen T. Romer Undergraduate Teaching and Research Awards (UTRA), US \$3,500

CERTIFICATIONS

Professional

"GENETICS Peer Review Training Program". Genetic Society of America (GSA). Jan 19, 2022-Present. The basics of peer-review (Taught by Prof. James Birchler, Editorial Board). **[Certification in process]**

"Reproducible Data Science for Population Genetics." Lead by Dr. Thibaut Jombart and Dr. Zhian Kamvar. Hosted by PR Statistics. October 23rd to 27th, 2017, at Margam Discovery Centre, Wales, United Kingdom.

"Triple A Workshop for Genome Sequence analysis: How to Assemble, Annotate and Analyze whole genome sequence data." Hosted by the Swiss Federal Institute of Technology (*ETH Zürich*) – Congressi Stefano Francini: January 15 to January 20, 2017, Monte Verita, Ascona, Switzerland.

Initiative to Maximize Student Development (IMDS) seminars completed: "Scientific Writing Key Principles" (July 2015), "Reading Scientific Publications" (August 2015), and "The Three Rs: Research

Data Management, Reproducibility and Researcher Recognition” (January 2016). “Mentoring in Science” (June 2019). Brown University, Providence, RI.

Teaching

“Teaching Certificate II: course design.” Hosted by the Harriet W. Sheridan Center for Teaching and Learning: Spring 2019. Brown University, Providence, RI.

“Teaching Certificate I: critical reflection and inclusive classrooms, rhetorical practice and classroom, communication, learning design, engaged learning.” Hosted by the Harriet W. Sheridan Center for Teaching and Learning: Fall 2016. Brown University, Providence, RI.

“Teaching with Technology Institute: a weeklong seminar exploring the relationship between pedagogy and technology”. Attended with faculty mentor David M. Rand. May 23 – 27, 2016, Brown University, Providence, RI. This led to re-tooling of the Discussion Sections of the course BIOL048 with more flipped content and active learning materials.

Service

“Introduction to Equity Literacy.” A 4-hour professional course hosted by the Equity Literacy Center. Issued on: 2021-04-24. Certificate ID: <https://www.equitylearn.com/certificates/potnnfmvfk>

“Understanding Equity and Inequity.” A 4-hour professional course hosted by the Equity Center Institute. Issued on: 2021-04-24. Certificate ID: <https://www.equitylearn.com/certificates/wtrgszqfbt>

Institutional

CITI training: “*Conflicts of Interest*” (ID 45507375). Delivered by the *Collaborative Institutional Training Initiative*. Training on Oct 6, 2021. Expires Oct 5, 2025. University of Virginia, Charlottesville, VA.

CITI training: “*Undue Foreign Influence: Risks and Mitigations*” (ID 45507376). Delivered by the *Collaborative Institutional Training Initiative*. Training on Oct 6, 2021. Does not expire. University of Virginia, Charlottesville, VA.

SERVICE

To the Profession:

Reviewer for Scientific Journals: *Molecular Ecology*; *Journal of Heredity*; *Scientific Reports*, *Biological Journal of the Linnean Society*, *Evolutionary Applications*.

Find all verified reviews at my **Publons profile**: publons.com/a/1534937/

External reviewer for the Woods Hole Sea Grant Competition. <https://seagrant.whoi.edu/>

To the University:

Co-lead of lesson plan committee for the leadership essentials training module: *The Myth of Biological of Race in the USA* (With Alan O. Bergland). July 2021 – February 2022 (<https://hr.virginia.edu/career-development/education-and-training/programs>). University of Virginia, Charlottesville, VA

Member of the executive organizing committee for the 2021 UVA post-doc research symposium, July 2021 – November 2021. University of Virginia, Charlottesville, VA

Ad hoc Reviewer, Inclusive Excellence Plan Review Committee”, University of Virginia, Charlottesville, VA, January 2021 – present.

Member of the Postdoctoral diversity, equity and inclusion committee, University of Virginia, Charlottesville, VA, 2020 – present.

Ad hoc Reviewer, job search for position of Director of Diversity Education, University of Virginia, Charlottesville, VA, April 2021.

As part of this assignment, I received training on various topics such as: *employment equity, mitigating cognitive errors in hiring, and permissible lines of inquiry in employment.*

Member of the diversity, equity, and inclusion task force “Diversity Influencers”, University of Virginia, Charlottesville, VA, August 2020 – August 2021.

Programming and Events led:

1. **2021 COVID in Context:** A multidisciplinary discussion bringing together experts from 5 fields: Medicine, Data Science, History, Education, and Media to discuss how misinformation regarding the COVID-19 pandemic exacerbates disparities among historically underrepresented groups. March 31, 2021
2. **Facilitator of the Doctoral Diversity Dinner 2021:** I managed a breakout room with 10 graduate students during the diversity dinner. My goal as moderator is to facilitate conversations about belonging and other DEI topics.
3. **2020 Diversity and Inclusion Winter social:** An event to reflect and connect about various issues of diversity and inclusion among graduate and post-docs at UVA. Nov 13, 2020

Organizer of the EEB Brown Bag Seminar Series, Dept. of Ecology and Evolutionary Biology, Brown University, Providence, RI. Spring 2016, Fall 2018

Graduate Student Observer to the Faculty Meetings. University committee of the Graduate Student Council, Brown University, Providence, RI. Fall 2016 – Spring 2018

Graduate Student Council Representative for the department of Ecology and Evolutionary Biology, Brown University, Providence, RI. Fall 2016 – Spring 2017

Founder member and mentor to first year students, The Wolf-pack mentoring program. STEM-FYE program, Miami Dade College, 2012-2013.

To the Community

Project Coordinator, Backyard Evolution Citizen Science Project, University of Virginia, Charlottesville, VA. 08/2020 – present

Mentor to two undergraduate students at the Evolution 2019 meeting, Undergraduate Diversity program of the Society for the Study of Evolution. Providence, RI. 2019

Brown Junior Researcher Program (BJRP) with Boys & Girls Club of Providence, East Providence and Providence, RI. 2016 – 2017

SACNAS Educational Outreach Program with 1st Grade Students, Hennessey Elementary, East Providence, RI, Fall 2015

Invited Lecture for High School Students: The Wheeler School, Providence, RI. Fall 2015

Mentor for High School Students, STEM FYE program, Miami Dade College, Miami, FL. Summers from 2012 to 2015