

Roxanne Beltran

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Current Appointment

2020-Present **Assistant Professor**, University of California Santa Cruz, Ecology & Evolutionary Biology

Education

- 2018-2019 **Post-Doctoral Researcher, University of California Santa Cruz**
Advisers: Drs. Dan Costa and Erika Zavaleta
- 2018 **PhD, University of Alaska Fairbanks (Biology & Wildlife)**
Bridging the gap between pupping & molt phenology: behavioral & ecological drivers in Weddell seals.
Advisers: Drs. Jenn Burns and Greg Breed
- 2015 **MSc, University of Alaska Anchorage (Biological Sciences)**
An agent-based model for predicting impacts of environmental change on Weddell seals.
Adviser: Dr. Jenn Burns
- 2013 **BSc, University of California Santa Cruz (Marine Biology, Honors)**
Fine-scale calibration of pinniped whisker growth using photogrammetry and stable isotopes.
Advisers: Drs. Colleen Reichmuth and Dan Costa

Awards

- 2021 Nominee, Packard Fellowships for Science and Engineering
- 2020 Forbes 30 under 30 (Science)
- 2019 Selected TEDx Speaker
- 2019 Chancellor's Postdoctoral Fellow, UC Santa Cruz
- 2017 Best Young Researcher in Ecological Modeling
- 2017 National Geographic Young Explorer
- 2017 Best Student Talk, Biologging Symposium, Germany
- 2015 Best Student Talk, Society for Marine Mammalogy, USA
- 2013 Best Student Talk, Society for Marine Mammalogy, New Zealand
- 2013 Thimann Scholarship for "showing the most promise as a future scientist"

Publications

- IN REVIEW*. I Shukla, AM Kilpatrick, RS Beltran. Variation in resting strategies across trophic levels and habitats in mammals. **Oikos**.
- IN REVISION*. KA Keen, RS Beltran, E Pirootta, DP Costa. Emerging themes in Population Consequences of Disturbance models. **Proceedings of the Royal Society B**.
- IN REVISION*. L DeKock, C Oosthuizen, RS Beltran, NP DeBruyn. Determinants of the moult phenology and duration of southern elephant seals (*Mirounga leonina*) at Marion Island. **Scientific Reports**.
- IN REVISION*. A Race, RS Beltran, E Zavaleta. How an early, inclusive field course builds persistence in ecology and evolutionary biology. **Integrative and Comparative Biology**.
- IN REVISION*. MR Cronin (26 authors including RS Beltran). Implementing anti-racist pedagogy and practice in ecology, evolution, and conservation biology departments. **Nature Ecology and Evolution**.

6. *IN REVISION*. MR Cronin, RS Beltran, E Zavaleta. Why field science needs harassment and assault prevention. Submitted to **Nature Geoscience**.
7. *IN REVISION*. R Condit, RS Beltran, PW Robinson, DP Costa. Birth timing after the long feeding migration in elephant seals. **PLOS ONE**.
8. [2021] T Adachi, A Takahashi, DP Costa, PW Robinson, LA Huckstadt, SH Peterson, RR Holser, RS Beltran, TR Keates, Y Naito. Forced into an ecological corner: round-the-clock deep-foraging on small prey by elephant seals. **Science Advances**. DOI: [10.1126/sciadv.abg3628](https://doi.org/10.1126/sciadv.abg3628)
9. [2021] RS Beltran, GA Breed, AM Kilpatrick, T Adachi, A Takahashi, Y Naito, PW Robinson, WO Smith Jr., AL Kirkham, JM Burns. Seasonal resource pulses and the foraging depth of a Southern Ocean top predator. **Proceedings of the Royal Society B**. <https://doi.org/10.1098/rspb.2020.2817>
10. [2021] SA Wood, PW Robinson, DP Costa, RS Beltran. Accuracy and precision of citizen scientist animal counts from drone imagery. **PLOS ONE**. <https://doi.org/10.1371/journal.pone.0244040>.
11. [2021] RS Beltran, JM Kendall-Bar, E Pirotta, T Adachi, Y Naito, A Takahashi, J Cremers, PW Robinson, DE Crocker, DP Costa. Lightscares of fear: how mesopredators balance starvation and predation in the open ocean. **Science Advances**. Vol. 7, no. 12, eabd9818
12. [2021] AI Race, M De Jesus, RS Beltran, ES Zavaleta. A comparative study between outcomes of an in-person versus online introductory field course. **Ecology and Evolution**. 2021;00:1–11. <https://doi.org/10.1002/ece3.7209>
13. [2020] ES Zavaleta, RS Beltran, AL Borker. How field courses propel inclusion and collective excellence. **Trends in Ecology and Evolution**. <https://doi.org/10.1016/j.tree.2020.08.005>
14. [2020] DC Alvarado, PW Robinson, NC Frasson, DP Costa, RS Beltran. Calibration of aerial photogrammetry to estimate elephant seal mass. **Marine Mammal Science**. <https://doi.org/10.1111/mms.12714>
15. [2020] RS Beltran, E Marnocha, A Race, D Croll, G Dayton, E Zavaleta. Field courses narrow demographic achievement gaps in ecology and evolutionary biology. **Ecology and Evolution**. 10(12).
16. [2019] RS Beltran, AL Kirkham, GA Breed, JW Testa, JM Burns. Reproductive success influences moult phenology in Weddell seals. **Scientific Reports**. 9,5221.
17. [2019] G Frankfurter, RS Beltran, M Hoard, JM Burns. Rapid prototyping and 3D printing of Antarctic seal flipper tags. **The Wildlife Society Bulletin**. WSB964.
18. [2018] RS Beltran, JM Burns, GA Breed. Review: Convergence of biannual moulting strategies across birds and mammals. **Proceedings of the Royal Society of London B**. 20180318.
19. [2018] Z Smeele, JM Burns, K Van Doorsaler, S Kraberger, RS Fontenele, K Waits, D Stainton, MR Shero, RS Beltran, AL Kirkham, G Frankfurter, R Bergartt, P Lefeurve, A Varsani. Diverse papillomaviruses identified in Weddell seals. **General Virology**. 99, 549-557.
20. [2018] RS Beltran, B Ruscher-Hill, AL Kirkham, JM Burns. An evaluation of three-dimensional photogrammetric and morphometric techniques for estimating volume and mass in Weddell seals. **PLOS ONE**.
21. [2017] E Fahsbender, JM Burns, S Kim, S Kraberger, G Frankfurter, A Eilers, MR Shero, RS Beltran, AL Kirkham, R McCorkell, R Bergartt, M Male, K Rosario, G Ballard, DG Ainley, M Breitbart, A Varsani. Diverse and highly recombinant alleloviruses associated with Weddell seals in Antarctica. **Journal of Virus Evolution**. 3,1-11.
22. [2017] RS Beltran, JW Testa, JM Burns. An agent-based model for predicting impacts of environmental change on a top marine predator, the Weddell seal. **Ecological Modelling**. 351, 36-50.
23. [2016] N Lubcker, R Condit, RS Beltran, PJN de Bruyn, MN Bester. Vibrissal growth parameters of southern elephant seals: obtaining fine-scale, time-based stable isotope data. **Marine Ecology Progress Series**. 559, 243-255.

24. [2016] [RS Beltran](#), SH Peterson, EA McHuron, C Reichmuth, LA Huckstadt, DP Costa. Pinnipeds are what they eat, plus what? Determination of trophic discrimination factors in six seal species. **Rapid Communications in Mass Spectrometry**. 30, 1115–1122.
25. [2015] L Schwarz, S Villegas-Amtmann, [RS Beltran](#), DP Costa, C Goetsch, LA Huckstadt, J Maresh, SH Peterson. Comparisons and uncertainty in fat and adipose tissue estimation techniques: The Northern Elephant Seal as a Case Study. **PLOS ONE**.
26. [2015] [RS Beltran](#), MS Connolly, SH Peterson, R Condit, C Reichmuth, DP Costa. Whisker growth dynamics: a validated approach for assigning timescales to stable isotope analyses. **Marine Ecology Progress Series**. 523, 233-241.
27. [2014] M Connolly, [RS Beltran](#) and C Reichmuth. A calibration procedure for measuring pinniped vibrissae using photogrammetry. **Aquatic Mammals**. 40(2), 213-218.
28. [2014] [RS Beltran](#), N Kreidler, D Van Vuren, S Morrison, E Zavaleta, K Newton, B Tershy D Croll. Passive recovery of vegetation from herbivore eradication on Santa Cruz Island, California. **Restoration Ecology**. 22(6), 790-797. Cover photo.

Children's Book

[RS Beltran](#) and PW Robinson. *A Seal Named Patches*, **Snowy Owl Press**, ISBN 1602233314.
 2018 Moonbeam Award in Environmental Issues, Silver
 2017 DeBary Children's Science Book Award
 School Library Journal Star for Children's Book

Book Chapter

[IN PRESS] [RS Beltran](#), MA Hindell, CR McMahon. *The elephant seal: linking phenotypic variation with behavior and fitness in a sexually dimorphic phocid*. In *Ethology and Behavioral Ecology of Earless or True Seals, the Phocids*. **Springer**.

Grants > \$25,000

2021	\$600,000	Beckman Young Investigator Award
2021	\$1,203,543	National Science Foundation, Division of Integrative Organismal Systems
2020	\$50,000	California Conservation Genomics Program
2018	\$138,000	NSF Post-Doctoral Research Fellowship in Biology (Diversity & Inclusion)
2017	\$29,794	National Geographic Changing Planet
2015	\$138,000	NSF Graduate Research Fellowship
2015	\$25,000	National Geographic Wildlife
2014	\$35,000	NIH IDeA Networks of Biomedical Research Excellence Fellowship

Small Grants

2020	\$10,000	Institute of Marine Sciences Packard Endowment for Ocean Sciences
2019	\$8,800	UCSC Online Education Course Development Grant
2017	\$4,500	National Geographic Young Explorers Grant
2017	\$2,000	American Cetacean Society Baldrige Award
2017	\$1,100	Society for Ecological Modeling
2016	\$8,700	LGL Graduate Student Research
2016	\$5,000	NSF Graduate Research Internship Program
2016	\$1,000	Nicholas F. Hughes Memorial

2016	\$600	College of Natural Science & Math
2015	\$7,560	National Geographic Waitt
2015	\$5,769	Alaska INBRE
2015	\$1,200	Erich Follmann Memorial Award
2015	\$1,000	PADI Foundation, Outreach & Education
2015	\$1,100	Society for Marine Mammalogy
2014	\$1,500	SCAR AnT-ERA
2014	\$1,200	Biomedical Learning and Student Training
2014	\$500	SCAR State of the Antarctic Ecosystem
2014	\$1,000	PADI Foundation, Marine Mammals
2013	\$3,000	Kenneth and Ann Thimann Scholarship
2013	\$500	Myers Oceanographic Trust
2013	\$500	Stevenson College
2012	\$500	Friends of Long Marine Lab
2012	\$1,000	Women Divers Hall of Fame
2012	\$500	UCSC Department of Student Affairs
2012	\$900	UC Natural Reserve System

Graduate Student & Postdoc Mentees/Committees

2020-Present	Keith Hernandez, Postdoc	Co-adviser with Carlos Garza
2020-Present	Florencia Vilches, PhD Student	Co-adviser with Dan Costa
2020	Haley Robb, PhD Student	Comprehensive exams committee chair

Lab & Field Technicians

2020-2021	Diana Alvarado
2021	Claire Nasr

Undergraduate Mentees

2021	Raquel Lozano	STEM Diversity CAMP Scholar
2021	Maia Smith	
2021	Cara Munro	
2021	Jean-Marc Beddow	
2020	Heather Lee	
2020	Milagros Rivera	
2020	Ishana Shukla	
2020	Xaun Wilson	Doris Duke Conservation Scholar
2019	Emily Nazario	
2019	Alex Yuen	
2019	Sarah Wood	CAMINO Intern
2019	Christina Langford	
2018	Laura Christianson	
2018	Diana Alvarado	STEM Diversity Packard Fellow
2017	Shannon Bent	
2016	Kaitlyn Martinez	
2016	Kelly Shrader	
2016	Jeanette Pirlo	
2016	Nadja DiMartino	
2015	Clara Woolner	NSF Research Experience for Undergraduates
2015	Brandi Ruscher-Hill	

Working Groups

2021 – Present Spatial & Genomic Connectivity working group

Teaching

2021	Co-Instructor	UCSC BIOE286; Graduate Statistics & Experimental Design
2017	Instructor	UCSC BIOE108; Marine Ecology
2017	Teaching Assistant	UCSC BIOE128L; Field Methods in Large Marine Vertebrates
2017	Learning Assistant	UCSC BIOE20B; Development & Physiology of Organisms
2013	Instructor	UAA BIOL179; Oceanography Laboratory

Guest Lectures

2021	New York University Oceanography and the Environment
2021	Mills College Biology
2019-Present	Santa Cruz R User Base Group (2x)
2018	UC Santa Cruz BIOE200B
2018-Present	UC Santa Cruz BIOE129 Marine Mammals (2x)
2015-Present	UC Santa Cruz BIOE128L Field Methods in Large Marine Vertebrates (6x)
2014	U Alaska BIOLA490 Antarctic Ecology
2013	U Alaska BIOLA170 Oceanography

Invited Presentations

2022	American Society of Mammalogists Symposium, <i>Mammal Life History in an Era of Global Change: Insights using New Tools and Emerging Datasets</i>
2021	Cornell University, Discipline-based Education Research Seminar, <i>How and why a field course closes demographic gaps</i>
2021	North Dakota State University, Department of Biological Sciences Seminar, <i>Physiological constraints and risk-reward tradeoffs drive marine mammal behavior</i>
2021	Consortium of Universities for the Advancement of Hydrologic Science, <i>How and why a field course closes demographic gaps</i>
2021	University of California Davis, <i>Physiological constraints and risk-reward tradeoffs drive marine mammal behavior</i>
2021	Animal Behavior Society, <i>Weaving the Future of Animal Behavior: Technological Advances to Reveal the Secret Lives of Animals</i>
2020	University of California Berkeley, <i>Physiology and Biomechanics Seminar</i>
2019	Harvard University, <i>Physiological constraints and life history trade-offs drive marine mammal behavior</i>
2019	TEDx Santa Cruz, <i>How learning in nature helps diverse students succeed</i>
2019	Moss Landing Marine Labs, <i>Physiological constraints and life history trade-offs drive marine mammal behavior</i>
2019	California Academy of Sciences, <i>Fashionable fur and feathers</i>
2017	National Institute of Polar Research, <i>Antarctica, as viewed by instrumented seals</i>

- 2017 Seymour Marine Discovery Center Science Sunday, *What Weddell seals taught us about life at the bottom of the world*
- 2017 International Society for Ecological Modeling, *Individual-based modeling of a top polar predator*
- 2016 Harvard University, PRISE Distinguished Speaker, *Predicting impacts of climate change on polar marine mammals*
- 2016 International Statistical Ecology Conference, *A simulation model for quantifying the resilience of a polar predator*

Contributed Presentations

- 2020 Animal Behavior Society, *Photoperiod and body condition modify rest timing in a migrating mesopredator*
- 2020 President's Postdoctoral Fellowship Program Symposium, *Migration routes in a changing ocean*
- 2019 Society for Marine Mammalogy, *Variation, selection, and heritability of foraging strategies and their influence on lifetime reproductive success in northern elephant seals*
- 2018 POLAR SCAR/Arctic Summit Conference, *Molt phenology mediates colony attendance in Weddell seals*
- 2017 Biologging Symposium, *Reconstructing the year-round foraging behavior of Weddell seals*
- 2017 Society for Marine Mammalogy Conference, *Weddell seal dives suggest a vertical ecosystem shift concurrent with seasonal phytoplankton blooms*
- 2017 SCAR Biology Conference, *Reproductive effort affects the annual dive behavior of adult, female Weddell seals*
- 2016 Biomedical Research Conference, *Ecophysiology in a top polar predator*
- 2015 Society for Marine Mammalogy, *Agent-based models predict responses of top predators to environmental change*
- 2015 Animal Behavior Conference, *Diving deeper into the over-summer foraging behavior of a top polar predator*
- 2015 Ecological Society of America, *An agent-based model for predicting resilience to global change*
- 2014 Biologging Symposium, *Using simple biologging metrics to inform dynamic bioenergetics models*
- 2014 SCAR Open Science Conference, *A generalized bioenergetic model for pinnipeds*
- 2013 Society for Marine Mammalogy, *Whisker growth dynamics: a validated approach for assigning timescales to stable isotope analyses*
- 2013 UCSC Undergraduate Research Symposium, *Body size impacts on hierarchical dominance in male northern elephant seals*
- 2013 Monterey Bay National Marine Sanctuary Symposium, *A calibration procedure for pinniped whisker length estimation using photogrammetry*
- 2012 Seymour Center Continuing Education Workshop, *Everything you always wanted to know about sex in the sea*

Science Communication

- Training**
- Chancellor's Dear SLUG Teaching Square (10 hours)
 - SEPAL Scientific Teaching for Diverse Learners Workshop (1 day)
 - UC Santa Cruz New Faculty Teaching Academy (2 days)
 - National Geographic Science-telling Bootcamp (5 days)
 - Alan Alda Workshop for Communicating Science (3 days)

Seymour Center Docent Training (11 days)

K-12 Co-Founder of Alaska K-12 Classroom Visits (4,000 students)
Panelist for Tech Museum Youth Climate Action Summit (500 students)
Co-Founder of California K-12 Classroom Visits with Virtual Reality (300 students)
Young Scientists Club K-6 Visit (100 students)
Ambassador for “Kids2College” (100 students)
Visitor for “Skype a Scientist” (50 students)
Visitor for “WhaleTimes” Skype (30 students)
Participant in “Letters to a Pre-Scientist” for underprivileged students (3 students)

Public Live PolarTREC Webinar from Antarctica (4,000 viewers)
University of Alaska STEM Expo (1,000 visitors)
“Sealebration” Año Nuevo State Park Outreach Event (600 visitors)
CA State Parks Live Periscope Interview (600 viewers)
Animal Behavior Society Outreach Fair (200 visitors)
Seymour Center Fish Fins and Flukes festival (175 visitors)
Presentation at Alaska Department of Fish and Game (100 people)
Presentation at Opportunities for Lifelong Education Alaska (75 people)
Host, “Seal Count” public outreach event
Seymour Center “Labside Chats”
Presentation at Seymour Center Ocean Explorers (50 students)
Santa Cruz Public Library Citizen Science event
Contributor to PolarTREC Lessons, Journals, and Blog
Contributor to [National Geographic Open Explorer Blog](#)
Contributor to State Park PORTS (Parks Online Resources for Teachers) Program
Mentor for Kassy Gerhard, Stockton University, New Jersey

Media

Online [Science](#), [The Conversation](#), [UCSC](#), [Hakai Magazine](#), [Phys.org](#), [Yahoo News](#), [Earth.com](#)
Video BBC film “Supergiant Animals”; KTVF 11 Fairbanks TV, BBC “Animals with Cameras”
National Geographic “Crittercams”
Radio Canadian Broadcasting Corporation All Points West; KQSD 90.7 “Santa Cruz Naturalist”
Podcast; Wild Lens “Eyes On Conservation” Podcast; KFBX AM 970; KIAK 102.5FM;
Canadian Broadcasting Corporation Quirks and Quarks
Print [SF Chronicle](#), Interior Alaska News Miner (2x); UCSC News Center (4x); UC Natural Reserve
System News (3x), Santa Cruz Sentinel, Medium

Service to the University

Member PBSci Division Diversity, Equity, and Inclusion Committee
EEB Department Inclusion, Diversity, Equity, and Action Committee
Participant UC Santa Cruz Diversity and Inclusion Certificate Program (24 hours)
UC Santa Cruz BIOE82 Career Panel (x2)
UC Santa Cruz Sociology “Ideas of Nature” Panel
Permit Author National Marine Fisheries Service Marine Mammal Permit (Costa, #23188)
Institutional Review Board for Human Subjects Research (Zavaleta, #HS3230)

Service to the Community

Leadership	Member, International Biologging Society Education and Training Committee Councilmember, Association of Polar Early Career Scientists Council (3 years) Co-Creator and Facilitator, Workshop on Sexual Harassment and Assault in the Field Mentor, Animal Behavior Society
Grant Reviewer	National Science Foundation DBI PRFB Advisory panel National Science Foundation Arctic Natural Sciences Program, ad-hoc National Geographic Explorer Advisory Panel National Geographic Grants Program North Pacific Research Board Natural Reserve System Field Science Fellowship program UC President's Postdoctoral Fellowship Program University of Strasbourg Institute for Advanced Study Institute of Marine Science Packard Awards
Journal Reviewer	Proceedings of the Royal Society B (x3) Global Change Biology Nature Scientific Reports Marine Ecology Progress Series (x3) Frontiers in Marine Science Deep Sea Research Pt II Endangered Species Research Mammalian Biology Marine Mammal Science Ecology and Evolution (x3) Ecological Modeling Rapid Communications in Mass Spectrometry Ibis Ecosphere Oecologia
Participant	Drone Camp (4 days)
Consultant	National Geographic Exploration Technology Lab 2021 Strategic Plan

Professional Societies

2018-Present	Animal Behavior Society
2015-Present	Biologging Society
2013-Present	Society for Marine Mammalogy