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Education

- Ph.D. **University Program in Ecology**, 2006, Nicholas School of Environment and Earth Science Duke University Marine Lab, Beaufort, NC
- M.S. **Marine Biology**, 2000, University of North Carolina at Wilmington, Wilmington, NC
- B.A. **Biology**, 1996, High Honors, Anthropology minor, Bates College, Lewiston, ME

Professional History

- National Science Foundation Post-doctoral researcher, Duke University Marine Laboratory, Beaufort, NC 2006-2008
- Research Scientist, Duke University Marine Laboratory, Beaufort, NC 2008-2013
- Senior Research, Southall Environmental Assoc., Aptos, CA 2010-
- Associate Professor, Marine Mammal Institute, Department of Fisheries & Wildlife, Oregon State Univ., Newport, OR 2013-2017
- Researcher, Institute of Marine Sciences, Adjunct Associate Professor, Ocean Sciences & Ecology and Evolutionary Biology, University of California Santa Cruz 2017-
- Director of Research, California Ocean Alliance, Aptos, CA 2018-
- Professor, Ocean Sciences, University of California Santa Cruz 2021-

Peer-reviewed Publications

Accepted/In Press

1. Savoca, M. et al. *In Press*. High-resolution foraging measurements reveal baleen whales as global climate engineers. **Nature**.
2. Trathan, P., Warwick-Evans, V., Young, E., **Friedlaender, A.S.**, Kim, J-H, and N. Kokubun. *In Press*. Ecosystem-based management of the Antarctic krill fishery- the devils are in the detail' at small spatial and temporal scales. **Journal of Marine Systems**.
3. Warwick-Evans, V. et al. *In Press*. Spatially-explicit consumption estimates of Antarctic krill by seabirds and marine mammals within the Antarctic Peninsula ecosystem. **Ecosphere**.
4. Cade, D. Fahlbusch, J., Oestreich, W., Ryan, J., Calambokidis, J., Findlay, K., Friedlaender, A., Hazen, E., Seakamela, M., and J. Goldbogen. *Accepted*. Social

exploitation of extensive, ephemeral, environmentally controlled prey patches by super-groups of rorqual whales. **Animal Behavior**

5. Modest, M., Irvine, L., Andrews-Goff, V., Gough, W., Johnston, D.W., Nowacek, D.P., Pallin, L., Read, A.J., Tyson-Moore, R.B., and A.S. Friedlaender. *In Revision*. Comprehensive assessment of humpback whale migratory behavior from the Antarctic Peninsula to a tropical breeding ground. **Movement Ecology**.
6. Kendall-Barr, J. et al. *Accepted*. Visualizing life in the deep: a creative pipeline for data-driven animations to facilitate marine mammal research, outreach, and conservation. **IEEE VIS**.

In Review

7. Nichols, R....**A.S. Friedlaender**. *In Review*. Intra-seasonal variation in feeding rates and diel foraging behavior in a seasonally fasting mammal, the humpback whale. **Ecology**.
8. Kahane-Rapport, S. et al. *In Review*. Field measurements reveal the exceptional potential for microplastic ingestion by rorqual whales. **Science Advances**.
9. Cade, D. E., Seakamela, S. M., Findlay, K. P., Fahlbusch, J., S., Fukunaga, J., Kahane-Rapport, S.R., Oestreich, W., Ryan, J., Warren, J., Calmbokidis, J., Hazen, E., **Friedlaender, A. S.**, Kotze, D., Meyer, M., McCue, S., Wilke, C., Goldbogen, J. A. *In Review*. Size-selective predation by Antarctic humpback whales. **Frontiers in Marine Science**.
10. Reisinger, R. et al. *In Review*. A circumpolar analysis of habitat use variation among humpback whales in the Southern Ocean. **Ecography**.
11. Pirotta, E. et al. *In Review*. From individual responses to population effects: integrating a decade of multidisciplinary research on blue whales and sonar. **Conservation Letters**.
12. Reisinger, R. et al. *In Review*. Predator-derived bioregions in the Southern Oceans: characteristics, drivers, and representation in Marine Protected Areas. **Proceedings of the Royal Society B**.
13. Bierlich, K., Schick, R., Hewitt, J., Dale, J. Goldbogen, J., Friedlaender A.S., Read, A., and D.W. Johnston. *In Review*. Comparing uncertainty associated with 1-,2-, and 3D aerial photogrammetry-based body condition measurements of baleen whales. **Frontiers in Marine Science**.

14. Nazario, E., Cade, D., Beirlich, K., Czapanskiy, M., Goldbogen, J., Kahane-Rapport, S., Van der Hoop, J., and **A.S. Friedlaender**. *Accepted*. Baleen whale inhalation variability revealed using animal-borne video tags. **Peerj**.
15. Kienle, S., **Friedlaender, A.S.**, Crocker, D.E., Mehta, R.S., and D.P. Costa. *In Review*. Risk reward trade-offs drive sex-specific foraging strategies in a sexually dimorphic predator. **Royal Society Open Science**
16. De la Mare, W, **Friedlaender, AS**, and JA Goldbogen. *In Review*. Developing a functional response using an individual-based energetics model for rorqual foraging dives. **Marine Ecology Progress Series**.
17. Segre, P. *et al.* *In Review*. Scaling of Maneuvering performance in baleen whales. **Journal of Experimental Biology**.
18. Mastick, N. Wiley, D., Ware, C., Parks, S., Cade, D., Goldbogen, J., and **A.S. Friedlaender**. *In Revision*. The Effect of Group Size on Individual Roles and the Potential for Cooperation in Group Bubble-net Feeding Humpback Whales (*Megaptera novaeangliae*). **Marine Mammal Science**.
19. Bowers, M.T., **Friedlaender, A.S.**, et al. *In Review*. A multi-scale approach to understanding the foraging patterns of a pelagic diving predator. **Frontiers in Marine Science**.

Published

1. **Friedlaender, AS**, Joyce, T., Johnston, DW, Read, AJ, Nowacek, DP, Goldbogen, JA, Gales, N, and JW Durban. 2021. Sympatry and resource partitioning between the largest krill consumers around the Antarctic Peninsula. **Marine Ecology Progress Series**. <https://doi.org.10.3354/meps13771>
2. Cade, D. *et al.* 2021. Tools for integrating accelerometry data with video biologgers, including estimation of animal orientation, motion and position. **Animal Biotelemetry**. <https://doi.org/10.1186/s40317-021-00256-w>
3. Reichmuth, C., Casey, C.B., and **A.S. Friedlaender**. 2021. In-situ observations of the sensory hairs of Antarctic minke whales. **Anatomical Record**. <http://doi.org/10.1002/ar.24720>
4. Chenoweth, EM, Boswell, K, **Friedlaender, AS**. Et al. 2021. Confronting assumptions about prey selection by lunge-feeding whales using a process-based model. **Functional Ecology** <http://doi.org/10.1111/1365-2435.13852>

5. Reisinger et al. 2021. Combining regional habitat selection models for large-scale prediction: circumpolar habitat selection of Southern Ocean humpback whales. **Remote Sensing**. <https://doi.org/10.3390/rs13112074>
6. Segre, P., Weir, C., Stanworth, A., Cartwright, S., **Friedlaender, A.S.**, and J.A. Goldbogen. 2021. Biomechanically distinct filter-feeding behaviors distinguish sei whales as a functional intermediate and ecologically flexible species. **Journal of Experimental Biology** <https://doi.org/10.1242/jeb.242680>
7. Pirotta, E. et al. 2021. Context-dependent variability in the predicted daily energetic costs of disturbance for blue whales. **Conservation Physiology**. <https://doi.org/10.1093/conphys/coaa137>
8. Caballero, S. et al. 2021. Migratory connections among breeding grounds off the Eastern Pacific and feeding areas in the Antarctic Peninsula based on genotype matching. **Bulletin of Marine and Coastal Research** 50, 31-40.
9. Cioffi, W. et al. 2021. Adult male Cuvier's beaked whales (*Ziphius cavirostris*) engage in prolonged bouts of synchronous diving. **Marine Mammal Science**. <https://doi.org/10.1111/mms.12799>
10. Bestley, S. et al. 2020. Marine ecosystem assessment for the Southern Ocean: seabirds and marine mammals. **Frontiers in Ecology and Evolution**. <https://doi.org/10.3389/fevo.2020.566936>
11. Flammang, B. et al. 2020. Remoras pick where they stick and surf on blue whales. **Journal of Experimental Biology**. jeb226654 doi: 10.1242/jeb.226654
12. Oestreich, W., Fahlbusch, J., Cade, D., Calambokidis, J., Margolina, T., Joseph, J., **Friedlaender, A.**, McKenna, M., Stimpert, A., Southall, B. Goldbogen, J., and J. Ryan. 2020. Animal-borne measures of behavior enable acoustic detection of migration in dispersed populations. **Current Biology**. <https://doi.org/10.1016/j.cub.2020.08.105>
13. Linksy, J., Wilson, N., Cade, D. Johnston, D.W., Goldbogen, J.A., and A.S. Friedlaender. 2020. The scale of the whale: using video-tag data to evaluate sea ice concentration from the perspective of individual Antarctic minke whales. **Animal Biotelemetry**. <https://doi.org/10.1186/s40317-020-00218-8>
14. Bamford, C.C.G., Kelly, N., Dalla Rossa, L., Cade, D.E., Fretwell, P., Trathan, P.N., Cubaynes, H., Mesquita, A. Gerrish, L., **Friedlaender, A.S.**, and J.A. Jackson. 2020. Space vs Sea: a novel method for estimating baleen whale density. **Scientific Reports**. <https://doi.org/10.1038/s41598-020-69887-y>
15. Kahane-Rapport, S.R., M.S. Savoca, D.E. Cade, P.S. Segre, KC Bierlich, J.A. Calambokidis, J. Dale, **A.S. Friedlaender**, D.W. Johnston, A.J. Werth, and J.A. Goldbogen. 2020. Lunge filter feeding biomechanics constrain rorqual foraging

ecology across scale. **Journal of Experimental Biology** jeb:224196
doi:10.1242/jeb.224196

16. Huckstadt, L., Schwarz, L., **Friedlaender, A.S.**, Mate, B., Zerbini, A., Kennedy, A., Robbins, J., Gales, N. and D.P. Costa. 2020. A dynamic approach to estimate the probability of exposure of marine predators to oil exploration seismic surveys over continental shelf waters. **Endangered Species Research**
<https://doi.org/10.3354/esr01048>
17. Riekkola, L., Andrews Goff, V., **Friedlaender, A.S.**, Zerbini, A. and R. Constantine. 2020. Longer migration not necessarily the costliest strategy for migrating humpback whales. **Aquatic Conservation: Marine and Freshwater Ecosystems**.
<https://doi.org/10.1002/aqc.3295>
18. Hindell, M.A., Reisinger, R., *et al.* 2020. Tracking predator communities to protect the Southern Ocean. **Nature**. 10.1038/s41586-020-2126-y
19. Ropert-Coudert, Y., *et al.* 2020. The retrospective analysis of Antarctic tracking data from the Scientific Committee on Antarctic Research. **Scientific Data**.
<https://doi.org/10.1038/s41597-020-0406-x>
20. Segre, P. *et al.* 2020. Energetic and physical limitations on the breaching performance of large whales. **eLife**. 10.7554/eLife.51760
21. Tackaberry JE, Cade DE, Goldbogen JA, Wiley DN, **Friedlaender AS**, Stimpert AK. 2020. From a calf's perspective: humpback whale nursing behavior on two US feeding grounds. **PeerJ** 8:e8538 <https://doi.org/10.7717/peerj.8538>
22. Goldbogen, J.A. *et al.* 2019. Why whales are big but not bigger: physiological drivers and ecological limits in the age of ocean giants. **Science**. DOI: 10.1126/science.aax9044
23. **Friedlaender, A.S.**, Bowers, M.T., Cade, D., Hazen, E.L., Stimpert, A.K., Allen, A., Calambokidis, J., Southall, B.L., and J.A. Goldbogen. 2019. The advantages of diving deep: fin whales quadruple their energy intake when targeting deep krill patches. **Functional Ecology**. <https://doi.org/10.1111/1365-2435.13471>
24. Goldbogen, J.A. *et al.* 2019. Extreme bradycardia and tachycardia in the world's largest animal. **Proceedings of the National Academy of Sciences**.
<https://doi.org/10.1073/pnas.1914273116>
25. Gough, W.T. *et al.* 2019. Scaling of swimming performance in the largest animals. **Journal of Experimental Biology**. doi: 10.1242/jeb.204172
26. Schick, R., Bowers, M.T., DeRuiter, S., **Friedlaender, A.S.**, Joseph, J., Margolina, T., Nowacek, D.P., and B.L. Southall. 2019. Accounting for Positional Uncertainty When Modeling Received Levels for Tagged Cetaceans Exposed to Sonar. **Aquatic Mammals**. Vol 45 (6), pp. 675-690.

27. Risch, D., Norris, T., Curock, M. and **A.S. Friedlaender**. 2019. Minke whales: conservation status and future research directions. **Frontiers in Marine Science**. <https://doi.org/10.3389/fmars.2019.00247>
28. Dunn, D. et al. 2019. A migratory connectivity evidence-base for global ocean policy. **Proceedings of the Royal Society B Biology**. <https://doi.org/10.1098/rspb.2019.1472>
29. Calambokidis, J., Fahlbusch, J., Szesciorka, A., Southall, B.L., Cade, D.E., **Friedlaender, A.S.**, and J.A. Goldbogen. 2019. Differential vulnerability to ship strikes between blue, fin, and humpbacks whales based on dive and movement data from medium duration archival tags. **Frontiers in Marine Science**. doi: 10.3389/fmars.2019.00543
30. Hays, G.C., et al. 2019. Translating marine animal tracking data into conservation policy and management. **Trends in Ecology and Evolution**. doi:10.1242/jeb.190637
31. Rogers, A.D. et al. 2020. Antarctic futures: as assessment of climate-driven changes on ecosystem structure, function and service provision in the Southern Ocean. **Annual Review of Marine Science**. <https://doi.org/10.1146/annurev-marine-010419-011028>
32. Gray, P.C., Bierlich, K.C., Mantell, S.A., **Friedlaender, A.S.**, Goldbogen, J.A., and D.W. Johnston. 2019. Drones and convolutional neural networks facilitate automated and accurate cetacean species identification and photogrammetry. **Methods in Ecology and Evolution**. <https://doi.org/10.1111/2041-210X.13246>
33. Riekkola, L. Andrews-Goff, V., **Friedlaender, A.S.**, Constantine, R., and A. Zerbini. 2019. Environmental drivers of humpback whale foraging behavior in the remote Southern Ocean. **Journal of Experimental Marine Biology and Ecology**. <https://doi.org/10.1016/j.jembe.2019.05.008>
34. Arranz, P., Benoit-Bird, K., **Friedlaender, A.S.**, Hazen, E.L., Goldbogen, J.A., Stimpert, A.K., DeRuiter, S.L., Calambokidis, J., Southall, B.L., Fahlman, A., and P.L. Tyack. 2019. Diving behavior and fine-scale kinematics of free-ranging Risso's dolphins foraging in shallow and deep-water habitats. **Frontiers in Ecology and Evolution**. <https://doi.org/10.3389/fevo.2019.00053>
35. Henley, S. et al. 2019. Variability and change in the west Antarctic Peninsula marine ecosystem: research priorities and opportunities. **Progress in Oceanography**. <https://doi.org/10.1016/j.pocean.2019.03.003>

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37. Arranz, P. Benoit-Bird, K.J., Southall, B.L., Calambokidis, J., **Friedlaender, A.S.**, and Tyack. P.L. 2018. Risso's dolphins plan foraging dives. **Journal of Experimental Biology**. doi: 10.1242/jeb.165209
38. Bowers, MT, **Friedlaender, AS**, Janik , VM, Nowacek, DP, Quick, NJ, Southall, BL, and AJ Read. 2018. Selective reactions to different killer whale call categories in two delphinid species. **Journal of Experimental Biology** jeb162479
doi: 10.1242/jeb.162479
39. **Friedlaender, AS**, Modest, M, and C, Johnson. 2018. Whales of the Antarctic Peninsula: science and conservation for the 21st Century. **World Wildlife Fund Report, Antarctica**.
40. Kirchner, T. Wiley, D. Hazen, E. Parks, S. Torres, L. and **A.S. Friedlaender**. 2018. Spatial associations between humpback whales and their prey in the Southern Gulf of Maine. **Marine Ecology Progress Series**.
<https://doi.org/10.3354/meps12789>
41. Lewis, L., Calambokidis, J., Stimpert, A.K., Fahlbusch, J., **Friedlaender, A.S.**, McKenna, M., Mesnick, S., Oleson, E., Southall, B.L., Szesciorka, A., and A. Sirovic. 2018. Context-dependent variability in blue whale acoustic behavior. **Royal Society Open Science**. DOI: 10.1098/rsos.180241.
42. Nazaraki, T. Isojunno, S., Nowacek, D., Swift, R., **Friedlaender, AS.**, Ramp, C., Smout, S., Aoki, K., Katsufumi, S., and PJO Miller. 2018. Body Density of humpback whales in feeding aggregations estimated from hydrodynamic gliding performance. **PLoS One**. □ <https://doi.org/10.1371/journal.pone.0200287>
43. Pallin, L., Baker, C.S., Steel, D., Keller, N.M., Robbins, J., Johnston, D.W., Nowacek, D.P., Read, A.J., and **A.S. Friedlaender**. 2018. High pregnancy rates in humpback whales around the Western Antarctic Peninsula, evidence of a rapidly growing population. **Royal Society Open Science** 5: 180017.<http://dx.doi.org/10.1098/rsos.180017>
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45. Pickett, EP, Fraser, WR, Patterson D, Cimino, MA, Torres, LG, and **AS Friedlaender**. 2018. Foraging niche separation of Adelie and Gentoo penguins during the breeding season at Palmer Station, Antarctica. **Ecology and Evolution**.
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47. Segre, P. Cade, D. Calambokidis, J., Fish, F., **Friedlaender, A.**, Potvin, J, and J Goldbogen. 2018. Body flexibility enhances maneuverability in the world's largest predator. **Journal of Integrative and Comparative Biology**. <https://doi.org/10.1093/icb/icy121>
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- world's largest predator: 360 rolling maneuvers by lunge feeding blue whales. **Biology Letters**. DOI: 10.1098/rsbl.2012.0986
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101. Wiley, D, Ware, C, Bocconcelli, A, Cholewiak, D, **Friedlaender, AS**, Thompson, M, Weinrich, M. 2011. Underwater components of humpback whale bubble-net feeding behavior. **Behaviour** 148:575-602
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- large-scale climatic indices across the North Atlantic. **Progress in Oceanography** 86:261-266
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111. **Friedlaender, A.S.**, W.R. Fraser, D. Patterson, S.S. Qian, P.N. Halpin. 2008. The effects of prey demography on cetacean community structure around the Western Antarctic Peninsula. **Polar Biology** 31:1217-1224
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115. Estep, J.S....**A.S. Friedlaender**. 2005. Malignant seminoma with metastasis, sertoli cell tumor, and pheochromocytoma in a spotted dolphin (*Stenella frontalis*) and malignant seminoma with metastasis in a bottlenose dolphin (*Tursiops truncatus*). **Veterinary Pathology** 42:357-359.
116. Thiele, D....**A.S. Friedlaender**. 2004. Seasonal variability in whale encounters in the Western Antarctic Peninsula. **Deep-Sea Research II** 51(17-19): 2311-2326.

117. Thayer, V.G...**A.S. Friedlaender**. 2003. Reproductive Seasonality of Western Atlantic Bottlenose Dolphins off North Carolina, USA. **Marine Mammal Science** 19(4).
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119. McLellan, W.A., **A.S. Friedlaender**, J.G. Mead, C.W. Potter, and D.A. Pabst. 2002. Analysis of Bottlenose Dolphin Strandings Along the U.S. Atlantic Coast, 1972-1997. **Journal of Cetacean Research and Management** 4(3).

Current & Pending Support

Title: Friedlaender (PI) Measuring the impacts of changes in human activities from the COVID-19 global pandemic on stress levels in whales

Source of Support: National Geographic Society

Status: Active

Project Duration: 10/1/21-9/31/22

Amount: \$37,971

Title: Friedlaender (PI) RAPID Proposal: Assessing changes in humpback whale stress hormone levels in response to COVID19-related decreases in ocean noise and vessel traffic.

Source of Support: National Science Foundation

Status: Active

Project Duration: 8/1/20 – 7/31/21

Amount: \$106,594

Title: Friedlaender (Co-PI) LTER: Land-Shelf-Ocean Connectivity, Ecosystem Resilience and Transformation in a Sea-Ice Influenced Pelagic Ecosystem on the Western Antarctic Peninsula.

Source of Support: National Science Foundation

Status: Active

Project Duration: 9/1/14 – 8/31/20 (renewal submitted)

Amount: \$720,000 (of \$4,200,000)

Title: Friedlaender (PI) Looking Below the Surface: understanding human threats to humpback whales.

Source of Support: Volgenau Foundation

Status: Active

Project Duration: 1/1/10-12/31/21

Amount: \$15,000/annually

Title: Friedlaender (PI) Collaborative Research: foraging behavior and ecological role of the least studied Antarctic krill predator, the Antarctic Minke Whale.

Source of Support: National Science Foundation

Status: Active
Project Duration: 6/1/17-5/31/20
Amount: \$706,732

Title: Friedlaender (Co-PI) Collaborative Research: A new baseline for Antarctic blue and fin whales.

Source of Support: National Science Foundation
Status: Active
Project Duration: 9/1/19-8/31/22
Amount: \$482,199

Title: Friedlaender (Co-PI) Collaborative Research: Scaling of unsteady Locomotor Performance and maneuverability

Source of Support: National Science Foundation
Status: Active
Project Duration: 6/1/17-5/31/20
Amount: \$547,595

Title: Friedlaender (Co-PI) Experimental measures of behavioral responses of small delphinid cetaceans to operational military mid-frequency sonar

Source of Support: Office of Naval Research
Status: Active (Through Southall Environmental Associates)
Project Duration: 1/1/19-12/31/22
Amount: \$1,900,000

Title: Friedlaender (PI) Assessing changes in baleen whale stress hormone levels in response to COVID19-related decreases in ocean noise and vessel traffic

Source of Support: Office of Naval Research
Status: Pending,
Project Duration: 5/1/21-9/30/22
Amount: \$307,014

Title: Friedlaender (PI) A multi-purpose research platform for ecological and applied research on cetaceans in California.

Source of Support: Defense University Research Instrumentation Program
Status: Awarded
Amount: 197,031

Title: Friedlaender (Co-PI) Measuring heart rate to assess the stress response in large whales

Source of Support: Office of Naval Research
Status: Active
Project Duration: 3/1/19-9/30/21
Amount: \$824,486

Title: Friedlaender (Co-PI) Is migratory connectivity of humpback whales in the Central and Eastern South Pacific changing? A decadal comparison by DNA profiling.

Source of Support: IWC Southern Ocean Research Partnership

Status: Active

Project Duration: 9/1/18-3/31/2020

Amount: \$35,606

Title: Friedlaender (PI) Pregnancy rates in Southern Ocean humpback whales: implications for population recovery and health across multiple populations.

Source of Support: IWC Southern Ocean Research Partnership

Status: Active

Project Duration: 9/1/18-3/31/2020

Amount: \$26,978

Title: Friedlaender (PI) A circumpolar analysis of foraging behaviour of baleen whales in Antarctica: Using state-space models to quantify the influence of oceanographic regimes on behaviour and movement patterns.

Source of Support: IWC Southern Ocean Research Partnership

Status: Active

Project Duration: 9/1/18-8/31/2020

Amount: \$46,859

Title: Friedlaender (Co-PI) Implementation of humpback whales for Antarctic sea-ice ecosystem monitoring; Inter-program methodology transfer for effective circumpolar surveillance.

Source of Support: IWC Southern Ocean Research Partnership

Status: Active

Project Duration: 9/1/18-8/31/2020

Amount: \$69,600

Title: Friedlaender (PI) Using novel technologies to uncover the associations between humpback whales and California sea lions forging together in Monterey Bay: partners in crime or tolerant neighbors

Source of Support: Packard Family Foundation

Status: Active

Amount: \$10,000

Title: Friedlaender (PI) Protecting the Antarctic Peninsula by removing competition between whales and humans.

Source of Support: Schmidt Foundation

Status: Pending

Amount: \$730,500

Title: Friedlaender (PI) Assessing changes in humpback whale stress hormone levels in response to COVID19-related decreases in ocean noise and vessel traffic.

Source of Support: Morris Animal Foundation

Status: Pending

Amount: \$74,697

Recent Support

Title: Friedlaender (Co-PI) Southern California Behavioral Response Study.

Source of Support: Office of Naval Research

Project Duration: 1/1/10 – 12/31/17

Amount: \$51,673 annually (of \$965,000 annually)

Commitment: 3 months calendar year/annually

Title: Friedlaender (PI) Tracking Antarctica 2018: The state of cetaceans around the Antarctic Peninsula

Source of Support: World Wildlife Fund

Project Duration: 1/1/18-12/31/2018

Amount: \$20,000

Title: Friedlaender (PI) Rates of pregnancy in humpback whales in the Southern Ocean: implications for population recovery and health across multiple populations

Source of Support: National Science Foundation, Graduate Research Opportunities Worldwide

Project Duration: 1/1/11-12/31/2019

Amount: \$5,000

Title: Friedlaender (PI) On the trail of the great whales.

Source of Support: Antarctic and Southern Ocean Coalition/Hogwarts Running Club

Project Duration: 1/1/18-12/31/2018

Amount: \$100,000

Title: Friedlaender (Co-PI) Behavioral and physiological response of baleen whales to ships and ship noise.

Source of Support: Office of Naval Research

Project Duration: 1/1/14-5/31/17

Amount: \$387,000 (Cascadia Research Collective)

Commitment: 0.5 months calendar year/annually

Title: Friedlaender (PI) Using baleen whale tag data to inform ecosystems models.

Source of Support: International Whaling Commission

Project Duration: 1/1/15-6/30/17

Amount: \$28,000

Commitment: no salary

Title: Friedlaender (PI) Broad-scale foraging ecology of humpback whales in relation to krill catches around the Antarctic Peninsula.

Source of Support: Antarctic Wildlife Research Fund

Project Duration: 10/1/16-9/30/17

Amount: \$95,846

Commitment: no salary

Title: Friedlaender, A.S. (PI) RAPID: Linking the movement patterns and foraging behavior of humpback whales to their prey across multiple spatial scales within the LTER study region.

Source of Support: National Science Foundation

Project Duration: 1/1/13-12/31/13

Amount: \$70,393 (Duke University)

Commitment: 2 months calendar year/annually

Title: Friedlaender (Co-PI) The ecological role of a poorly studied Antarctic krill predator, the humpback whale.

Source of Support: National Science Foundation

Project Duration: 8/1/11-12/31/11

Amount: \$983,674 (Duke University)

Commitment: 3 month calendar year/annually

Title: Friedlaender (Co-PI) Linking interannual variability in sea ice conditions and available breeding habitat for harp seals to large-scale climatic indices in the North Atlantic.

Source of Funding: International Fund for Animal Welfare

Project Duration: 1/1/2009-12/31/2012

Amount: \$64,000

Commitment: 1 month/ year

Title: Friedlaender (PI) Foraging ecology and predator-prey interactions between baleen whales and krill: a multi-scale comparative study across Antarctic regions.

Source of Funding: International Whaling Commission/Southern Ocean Research Partnership

Project Duration: 2/1/2011-12/31/2012

Amount: \$24,000

Commitment: 2 months

Title: Friedlaender (PI). Fine-scale foraging ecology of humpback whales in Monterey Bay, California.

Source of Support: National Geographic Society

Project Duration: 4/1/11 – 8/31/12

Amount: \$19,000 (Duke University)

Commitment: 0

Title: Friedlaender (Co-PI) Investigating the foraging behavior of fin whales in an island wake using high-resolution digital recording tags.

Source of Support: National Geographic Society

Project Duration: 1/1/10-12/31/11

Amount: \$25,000 (Duke University)

Commitment: 0 month calendar year/annually

Title: Friedlaender (Co-PI) Assessing the spatial and temporal overlap between fisheries and foraging grey seals using high-resolution cell phone (GSM) technology.

Source of Support: International Fund for Animal Welfare

Project Duration: 1/1/09-12/31/11

Amount: \$40,309 (Duke University)

Commitment: 1 month calendar year/annually

Title: Friedlaender (PI) Visualizing and studying the foraging behavior of humpback whales in the Stellwagen Bank National Marine Sanctuary.

Source of Support: International Fund for Animal Welfare

Project Duration: 1/1/11-12/31/11

Amount: \$15,000 (Duke University)

Commitment: 0 month calendar year/annually

Title: Friedlaender (PI) Foraging ecology and predator-prey interactions between baleen whales and krill: a multi-scale comparative study across Antarctic regions.

Source of Support: International Whaling Commission/Southern Ocean Research Partnership

Project Duration: 1/1/11-12/31/12

Amount: \$47,250 (Duke University)

Commitment: 2 month calendar year/annually

Research Experience (selected field projects & skills outside of current support)

- Chief Scientist/PI, National Science Foundation Office of Polar Programs, Linking the movement patterns and foraging behavior of humpback whales to their prey across multiple spatial scales within the LTER study region. WHALE TAGGING, BEHAVIORAL OBSERVATIONS, AND BIOPSY SAMPLING 2012-present
- Chief Scientist/PI, National Science Foundation Office of Polar Programs, Linking the movement patterns and foraging behavior of humpback whales to their prey across multiple spatial scales within the LTER study region. WHALE TAGGING, BEHAVIORAL OBSERVATIONS, AND BIOPSY SAMPLING 2012-present
- Principal Investigator, Palmer Long-Term Ecological Research Program, Cetacean Ecology, WHALE TAGGING, BIOPSY, PREY MAPPING, VISUAL SURVEY 2013-present
- Chief Scientist/PI, Ocean Foundation, foraging ecology of humpback whales across ecological regions, AK. WHALE TAGGING AND BIOPSY SAMPLING 2012-present
- Co-Chief Scientist, National Science Foundation Office of 2009-2011

- Polar Programs, Multi-scale and Interdisciplinary Study of Humpbacks and Krill. WHALE TAGGING, BIOPSY, PREY MAPPING, VISUAL SURVEY
- Co-PI Delphinid Cetaceans: Quantifying Behavioral Ecology and Response to Predators Using a Multi-Species Approach, NC. WHALE TAGGING, BIOPSY SAMPLING, BEHAVIORAL OBSERVATIONS 2011-present
 - Chief Scientist/PI Fine-scale foraging ecology of humpback whales in Monterey Bay, California. WHALE TAGGING AND BIOPSY SAMPLING 2010-present
 - PI Interactions among behavioral responses of baleen whales to acoustic stimuli, oceanographic features, and prey availability. WHALE TAGGING 2010-present
 - Co-PI Behavioral Response Study, SOCAL, CA. WHALE TAGGING, PREY MAPPING, VISUAL OBSERVATION 2010-present
 - Behavioral Response Study, AUTEK, Bahamas. WHALE TAGGING AND BIOPSY SAMPLING 2007-2008
 - Tagging and characterizing foraging habitat of deep diving odontocete cetaceans. HI. WHALE TAGGING 2008
 - Pilot Whale Foraging and Long-line Interaction Study, NC. WHALE TAGGING AND BIOPSY SAMPLING 2006-2010
 - Behavioral response study, killer whales, Norway. WHALE TAGGING 2006
 - SO GLOBEC Antarctic Whale Ecology. WHALE BIOPSY SAMPLING 2001-2003
 - Right Whale Behavioral Response to Alarm Calls and Ship Noise using non-invasive Digital Acoustic Tags, NB. WHALE TAGGING 2001-2002
 - Mid-Atlantic large whale take reduction team 1998-2000
 - International Whaling Commission Marine Mammal Observer 1999-2002
 - Antarctic Pack Ice Seal Survey, Australian Antarctic Division 1999-2000
 - Chief Marine Mammal Observer, Australian Antarctic Division 1997-2001
 - Bottlenose Dolphin Take Reduction Team 1998-2000
 - Harbor porpoise weir release program 1998-2005
 - National Institute of Standards and Technology, marine mammal tissue sample collection, AK 1998-2001
 - North Carolina Marine Mammal Stranding Coordinator NECROPSY, TISSUE SAMPLING 1997-2006
 - Mote Marine Lab/Sarasota Dolphin Biology Research 1997-present

- Institute health assessment and live captures
- Expedition Leader/Naturalist, OneOcean Expeditions, Antarctica 2013-present
- Naturalist/Group leader, Travel Dynamics, Antarctica 2011-present
- Naturalist, World Discoverer, Antarctica 2004

Teaching Experience

- Marine Mammal Scientist in Training course developer, instructor 2017-present
- Marine Mammal On-Line Experience course developer and instructor 2020-present
- Cachalot, digital course for IPad, developer, contributor, instructor 2010-present
- Antarctic Marine Ecology, Instructor, Oregon State University 2016-2017
- Whales and Whaling, Lecturer, Oregon State University 2014-2017
- Marine Mammal Biology, Lecturer, Duke & Oregon State University 2008-2017
- Bio-Telemetry of Marine Mammals, Lecturer, Stanford University 2015-2017
- Marine Mammals and Climate Change, Instructor, Duke University 2014
- Field Methods for Marine Mammal Research & Marine Mammals, Lecturer, UC Santa Cruz 2013-present
- Marine Mammal Scientist in Training Program, California Ocean Alliance, Instructor and Developer 2018-

Professional Development/Honors/Organizations

- World Wildlife Fund Antarctic Ambassador
- Current nominee, Pew Charitable Trusts Marine Fellowship
- Keynote speaker, Gordon Research Conference, Polar Marine Science
- US Delegate to the International Whaling Commission
- US Scientific Review Group, Alaska Region
- John Ostrom 'Nature's Narrators' invited lecture, Peabody Museum of Natural History, Yale University
- National Science Foundation Post-Doctoral Researcher
- CCAMLR and Pew working group and planning committee for Antarctic Peninsula MPA development.

- National Science Foundation Antarctic Service Medal
- Scientific Advisory Board, American Cetacean Society
- National Board of Directors, Director of Research, American Cetacean Society
- International Whaling Commission, Invited Participant: Ecological Modeling, Southern Hemisphere, Environment, and Genetics sub-committees
- Associate Editor, Royal Society Open Science
- Associate Editor, Marine Mammal Science
- Associate Editor, Frontiers of Marine Science
- Editor Marine Megafauna Collection, PLoS Biology
- Conservation Committee, Society for Marine Mammalogy
- National Science Foundation, Office of Polar Programs Review Panel
- National Research Council/National Academy of Sciences Frontiers in Understanding Climate Change and Polar Ecosystems panelist
- Expert group of Marine Mammals and Seabirds, Scientific Committee for Antarctic Research
- Steering Committee and Project Coordinator, Southern Ocean Research Partnership
- US GLOBEC Young Scientist Keynote Speaker
- Scientific Committee on Antarctic Research Keynote Speaker
- American Cetacean Society invited Keynote Speaker
- IMBER-IMBIZO IGBP-SCOR invited panelist and speaker
- Scientific Program Committee, Society for Marine Mammalogy Biennial Conference on the Biology of Marine Mammals
- National Geographic Explorer
- Martha T. Muse Prize for Antarctic Science Nominee
- Hopkins School Alumni Fellow
- Foote School Environmental Hero

Affiliations/Memberships

- Society for Marine Mammalogy
- Ecological Society of America
- Scientific Committee for Antarctic Research
- American Cetacean Society
- Animal Behavior Society

Graduate Student Mentoring, Advisory Committees & Staff

Post-Doctoral

- David Cade, UC Santa Cruz 2019-
- Ryan Reisinger, UC Santa Cruz 2019-

- Renee Albertson, Oregon State University (2015-2016)
- Matthew Bowers, Oregon State University (2016-2017)
- Trevor Joyce, Oregon State University/UCSC (2016-2020)
- Ben Weinstein, Oregon State University/UCSC (2016-2018)

PhD

- Logan Pallin, UCSC (current) Advisor
- Michelle Modest, UCSC (current) Advisor
- Selene Fergosi, Oregon State University (2020)
- Kristyn Shreve, Oregon State University (2019)
- Julia Burrows, Duke University (2017)
- Ellen Chenoweth, University of Alaska (2018)
- Matthew Bowers, Duke University (2016)
- Maria Isabel Garcia Rojas, Deakin University (2013)
- David Cade, Stanford University (2019)
- Reny Tyson, Duke University (2013)
- Jason John, University of California Santa Cruz (2020)
- Sarah Keinle, University of California Santa Cruz (2020)
- Sarah Labrousse, University Piere and Marie Curie, Paris (2016)
- Seth Sykora-Bodie, Duke University (current)
- K.C. Bierlich, Duke University (current)
- Greg Larsen, Duke University (current)
- Kelly Keen, UCSC (current) co-advisor
- Ricardo Avlarez, UNSW (current)

Masters

- Natalie Mastick, Oregon State University (2016) advisor
- Theresa Kirchner, Oregon State University (2016) advisor
- Erin Pickett, Oregon State University (2016) advisor
- Logan Pallin, Oregon State University (2016) advisor
- Lucy Romeo, Oregon State University (2014)
- Dani Crain, Duke University (2012)
- Brynn Davis, Old Dominion University (2017)
- Jessica Lee, University of Delaware (2017)
- Ross Nichols, UC Santa Cruz (current) advisor

Research Assistants/Associates

- Susan Heaslip, Oregon State University
- Susan Miles, Oregon State University
- Sarah Hamilton, Bowdoin University
- Ross Nichols, UCSC
- Jake Linksy UCSC
- Emma Levy, UCSC

Undergraduates

- Emily Nazario, UCSC
- Chloe Lew, UCSC
- Tang Veng, UCSC
- Vanessa Zobell, UCSC
- Amanda Plesa, UCSC
- Larissa Tawil, UCSC
- Nicole Wilson UCSC
- Sarah Faraone UCSC
- Sarah Weindorf UCSC

Books & Book Chapters

Whales, Dolphins and Porpoises: a natural history and species guide. Ed. A. Berta. Contributing writer and photographs.

Marine Mammals of the World. Eds. T. Jefferson, M. Webber and R. Pitman. Contributing writer and photographs.

Whales of Atlantic Canada and the Northeastern United States. Eds. J. Hannah and D. Johnston. Photographs.

Encyclopedia of Marine Mammals. Eds. W. Perrin, B. Wursig, and J.G.M. Thewissen. Chapter writer and photographs.

Whale Watching Above and Below the Ice. World Wildlife Fund. Writer and photographs.

The Whale Dreamer. L. Lamb. Editor and content consultant.

Back From Near Extinction: Humpback Whales. Eds. M. Anderson, A.S. Friedlaender.

Beaked Whales. Eds. J. Mead and R. Ellis. Contributing photographer.

Unframable. **Ari S. Friedlaender.** 2014. Design: Aufuldish & Warriner, Imaging: Color Folio, Printing: Ocean Graphic International. ISBN: 978-0-9907311-0-8.

Whales, Dolphins, and Porpoises: A natural history and species guide. 2015) Ivy Press. A. Berta (ed.). ISBN-10:022618319X.

Marine Mammals of the World. Elsevier. ISBN: 978-0-12-409542-7.

Recent Scientific Presentations

Biennial Conference on the Biology of Marine Mammals, Halifax, Nov. 2017

- Friedlaender et al. Turning left to stay right: a unique test of lateralization across the full range of three-dimensional foraging maneuvers in blue whales.
- Fahlbusch et al. Intra and inter-species interactions among humpback whales in Monterey Bay: competition and not just cooperation
- Kirchner et al. Hierarchically structured foraging strategies of a large marine suspension feeder.
- Szesciorka et al. Medium-duration archival tags provide unique insights into baleen whale behavior
- Weinstein et al. Identifying overlaps between humpback whale foraging grounds and the Antarctic krill fishery
- Chenoweth et al. Calculating the most efficient prey patches for humpback whales.
- DeRuiter et al. Software tools for analysis of data from high-resolution animal-borne tags
- Southall et al. Controlled exposure experiments with full-scale military mid-frequency sonars in four cetacean species
- Pallin et al. Pregnancy rates of humpback whales along the Western Antarctic Peninsula: links to a changing ecosystem
- Joyce et al. Divergent spatial and vertical habitat use associated with prey preferences in four killer whale ecotypes
- Cade et al. Dense, spatially limited but vertically extensive patches of krill drive the formation of super-groups of humpback whales off South Africa's wet coast.
- Wiley et al. Vulnerability of humpback whales to ship strike and entanglement in the Southern Gulf of Maine.
- Goldbogen et al. Living in a whale's boundary layer: swimming hydrodynamics of large vertebrates generates low-drag ecological niche for commensal marine organisms

International Whaling Commission Scientific Committee, Bled, Slovenia (2014) and San Diego, CA (2015).

- Ecological modeling of the potential for competition between baleen whales. **A.S. Friedlaender**, et al.
- Optimal foraging strategies of blue whales: behavioral switching between oxygen consumption and energy gain. **A.S. Friedlaender**, E. Hazen, & J.A. Goldbogen.
- Baleen whale foraging ecology around the Western Antarctic Peninsula, Southern Ocean Research Partnership update. **Ari S. Friedlaender**

- Mixed-stock analysis and genetic identification of humpback whales (*Megaptera novaeangliae*) in the nearshore waters of western Antarctic Peninsula. **Ari S. Friedlaender**, et al.
- State-space movement models of Antarctic minke and humpback whales around the Antarctic Peninsula. **Ari S. Friedlaender**, et al.

Biennial Conference on the Biology of Marine Mammals, San Francisco, Dec. 2015

- The dynamics of group bubble net foraging behavior of humpback whales in Alaska and Massachusetts. N Mastick, **A.S. Friedlaender et al.**
- Short-finned Pilot Whales and Risso's Dolphins Respond Strongly and Divergently to Biphonic calls of Mammal-Eating Killer whales. M.T. Bowers, **A.S. Friedlaender**, et al.
- Expansion rates of ventral groove blubber in lunge-feeding blue whales. D. Cade, **A.S. Friedlaender**, J. Calambokidis, & J.A. Goldbogen.
- Humpback whales prey upon juvenile salmon at Alaskan hatchery release sites. E. Chenoweth, **A.S. Friedlaender**, & J. Straley.
- Sound production and associated behavior of tagged fin whales (*Balaenoptera physalus*) in the Southern California Bight. A.K. Stimpert, **A.S. Friedlaender**, et al.
- Using state-space models to compare the foraging ecology of humpback and minke whales around the Antarctic Peninsula. **A.S. Friedlaender, et al.**
- Satellite telemetry reveals foraging areas and migratory pathways for Antarctic humpback and minke whales. **A.S. Friedlaender.**
- Insights into the underwater behavior, species interactions, and biomechanics of baleen whales using integrated video and inertial sensors. J.A. Goldbogen, **A.S. Friedlaender**, et al.
- Kinematics & energetics of breaching whales. M. Jensen, **A.S. Friedlaender**, et al.
- Measuring Instantaneous Energetic Costs in Highly Maneuverable Marine Mammals. J. John, **A.S. Friedlaender**, et al.
- Body density of feeding aggregations of humpback whales (*Megaptera novaeangliae*) in Antarctica and the Gulf of St Lawrence estimated from hydrodynamic gliding performances. T. Narazaki, **A.S. Friedlaender**, et al.
- Progesterone Levels of Humpback Whales Along the Western Antarctic Peninsula. L Pallin, **A.S. Friedlaender**, et al.
- Mixed-stock analysis and genetic identification of humpback whales (*Megaptera novaeangliae*) in the nearshore waters of western Antarctic Peninsula. G.R. Albertson, **A.S. Friedlaender**, et al.
- Distribution and relative density estimates of humpback whales (*Megaptera novaeangliae*) for the Western Antarctic Peninsula derived from satellite-based location data using a Markov chain approach. S. Heaslip, **A.S. Friedlaender**, et al.
- Fine scale foraging behavior of humpback whales (*Megaptera novaeangliae*) in Sitka Sound, Alaska. J. Burrows, **A.S. Friedlaender**, et al.
- Complimentary analyses of behavioral responses to sonar in blue whales (*Balaenoptera musculus*). S. DeRuiter, **A.S. Friedlaender**, et al.

Biennial Conference on the Biology of Marine Mammals, New Zealand, Nov. 2013:

- Echolocation behavior of foraging Risso's dolphins from DTag recordings. Arranz, P*, **Friedlaender, A.S.**, et al.

- Fine-scale foraging behavior of humpback whales (*Megaptera novaeangliae*) in Southeast Alaska. Burrows, J*. **Friedlaender, A.S.**, et al.
- Don't feed the whales: Humpback whale predation at Alaska's salmon hatcheries, Chenoweth, E*. **Friedlaender, A.S.**, et al.
- A quantitative analysis of the response of shortfinned pilot whales, *Globicephala macrorhynchus*, to biopsy sampling. Crain, D*. **Friedlaender, A.S.**, et al.
- Ecomorphological and behavioral analysis of the ultimate mouthful and consequences for niche partitioning in rorqual whales, Goldbogen, J.A., and **Friedlaender, A.S.**
- Blue whale (*Balaenoptera musculus*) lunge kinematics as a function of fine-scale metrics of krill schools, Hazen, **Friedlaender, A.S.**, et al.
- Statistical and earth simulation model forecasts of changing sea ice cover in the breeding habitats of harp seals (*Pagophilus groenlandicus*), Jones, H.* **Friedlaender, A.S.**, et al.
- Entanglement risk assessment for humpback whale bottom-feeding behavior. Kirchner, T*. **Friedlaender, A.S.**, et al.
- Behavioral response of short-finned pilot whales to the calls of predators. Bowers, M*. **Friedlaender, A.S.**, et al.
- Measuring Cetacean Responses to Military Sonar: Behavioral Response Studies in southern California (SOCAL-BRS). Southall, B., **Friedlaender, A.S.**, et al.
- Acoustic and diving behavior of a tagged Baird's beaked whale (*Berardius bairdii*) exposed to simulated sonar. Stimpert, A.K.* **Friedlaender, A.S.**, et al.
- Baleen Whales and Tubenose Seabirds—A Chemosensory Comparison? Straley, J., **Friedlaender, A.S.**, et al.
- Do optimal foraging theory and prey density predict the fine-scale foraging behaviors of humpback whales in the Western Antarctic Peninsula? Goldbogen, J.A. **Friedlaender, A.S.**, et al.
- Modeling distribution and abundance of humpback whales (*Megaptera novaeangliae*) in the Western Antarctic Peninsula during the late autumn. Johnston, D.W., **Friedlaender, A.S.**, et al.

National Science Foundation, Palmer Long-Term Ecological Research Project Annual Meeting, Rutgers University, September 2016.

- **Friedlaender, A.S.** How is the ecosystem responding to the cessation of commercial whaling and subsequent long-term recovery of whales?
- Fraser, W. and **A.S. Friedlaender**. Top-down controls and shifting baselines in the Palmer LTER.
- Pickett, E. Fraser, W. and **A.S. Friedlaender**. Evidence of resource partitioning between Adelie and Gentoo penguins during the breeding season at Palmer Station, Anvers Island.
- Weinstein, B., and **A.S. Friedlaender**. Exploring whale foraging in a dynamic ocean environment.
- Pallin, L. and **A.S. Friedlaender**. Demography and pregnancy rates of humpback whales along the western Antarctic Peninsula: links to a changing ecosystem.
- Johnston, W.J., and **A.S. Friedlaender**. Enhancing the Palmer LTER research program using unoccupied aerial systems.

- **Friedlaender, A.S.** et al. New insights regarding the movement ecology of baleen whales in the LTER study region.
- Bierlich, K.C., Johnston, W.J., and **A.S. Friedlaender**. The whale microbiome.

Public Outreach, Education, and Media (recent examples)

- MBARI EARTH (<https://www.mbari.org/products/educational-resources/earth/>) workshop presenter and participant (2016-2018)
- Scientist in the Classroom: mentoring students in science 2016-2018
- National Geographic Society Video and Immersive Experiences consultant/collaborator 2018
- Seymour Discovery Center Docent Training 2017-2018
- National Geographic Society Science Communication Camp, Malibu, CA 2017

Examples of recent paper metrics from Altmetric:

Hazen, Friedlaender, and Goldbogen:

<http://advances.sciencemag.org/content/1/9/e1500469>

- Top 5% of all research outputs scored by Altmetric
- 35 News stories
- 100,000+ Tweets

Pallin et al. : <http://rsos.royalsocietypublishing.org/content/5/5/180017.article-info>

- Top 5% of all research outputs scored by Altmetric
- 18 News stories
- 100,000+ tweets

Examples of recent news articles on current research:

- <https://www.nationalgeographic.com/magazine/2018/11/antarctica-climate-change-western-peninsula-ice-melt-krill-penguin-leopard-seal/>
- https://issuu.com/batescollege/docs/bates_magazine_fall_2018/44
- <https://www.pri.org/stories/2018-07-14/humpback-whale-population-recovering>
- <https://phys.org/news/2018-06-threatened-whales-dolphins-predatory-killer.html>
- <https://loe.org/shows/segments.html?programID=18-P13-00025&segmentID=3>
- <http://www.bates.edu/news/2018/05/11/bates-club-of-antarctica-its-a-whales-world/>
- <https://www.sfgate.com/science/article/Blue-whales-left-right-handed-UCsc-feeding-krill-12372028.php>
- <http://www.sci-news.com/biology/handedness-blue-whales-05457.html>
- <https://www.sciencenews.org/article/most-blue-whales-are-righties-except-one-move>

- <http://oregonstate.edu/terra/2015/09/in-the-eye-of-antarctica/>
- <http://oregonstate.edu/terra/2015/09/antarctica-photo-gallery-by-ari-friedlaender/>
- <http://www.hakaimagazine.com/article-short/blob-northeast-pacific-ocean>
- <http://www.bbc.co.uk/programmes/b068w44v>
- http://www.swissinfo.ch/eng/race-for-water-odyssey_using-drones-to-hunt-for-the-oceans--plastic-pollution/41379106
- <https://phys.org/news/2017-11-scientists-blue-whales-right-handedexcept-upward.html>
- <https://www.sciencedaily.com/releases/2017/11/171120120943.htm>
- <http://www.sci-news.com/biology/handedness-blue-whales-05457.html>

- Current Museum exhibits featuring research
 - Sandt Ocean Hall, Smithsonian Institution, permanent display and kiosk
 - *Whales: Giants of the Deep*. National Geographic Society (Washington, DC), National Museum of Natural History (New York, NY), California Academy of Sciences, (San Francisco, CA).
 - Mystic Seaport/Aquarium
 - North Carolina Museum of Natural Sciences
 - North Carolina Aquariums
 - Seymour Marine Discovery Center, Santa Cruz, CA
 - National Marine Sanctuaries Offices

- Gallery Exhibitions/ Photography Shows
 - Ocean Institute, Dana Point, CA
 - Yale University, New Haven, CT
 - Third Place, Raleigh, NC
 - Seymour Science Learning Center, Santa Cruz, CA
 - Australian Antarctic Division, Tasmania, AUS
 - Color Folio, Sebastapol, CA
 - Art Space, Vail, CO
 - Society for Marine Mammalogy, San Francisco, CA
 - American Cetacean Society, Long Beach, CA

- Good News Café, Middlebury, CT
- 80+ magazines and on-line articles
- Documentary Films
 - *Continent 7*, National Geographic Channel
 - *Whale Detectives*, BBC/PBS
 - *Map to Paradise*, Blue Bottle Films
 - BBC/PBS *Big Blue Live* featured scientist and live presenter.
 - <http://www.pbs.org/big-blue-live/home/>
 - *Antarctic Edge: 70° South*
 - Best in Festival, Princeton Environmental Film Festival 2015
 - <https://beyondtheice.rutgers.edu/>
 - <http://news.1ternet.edu/Article3233.html>
 - BBC: *Ocean Giants*, presenter, featured science
 - *World's Biggest Beasts*, National Geographic Channel/Smithsonian Networks, presenter and featured science
 - *Blue Serengeti*, Discovery Channel
 - *Animal Cam*, National Geographic Channel Wild
 - *Antarctica: Life on Ice*, National Geographic Studios
 - *Ocean Mysteries*, Jeff Corwin and Georgia Aquarium
- Hazen, Friedlaender, and Goldbogen, Science Advances media coverage and metrics
 - Cover, Science Advances: <http://advances.sciencemag.org/>
 - Over 170 news articles and features on the manuscript including:
 - CBC (<http://www.cbc.ca/news/technology/blue-whales-meal-planning-revealed-1.3255162>)
 - Washington Post (<https://www.washingtonpost.com/news/speaking-of-science/wp/2015/10/05/study-reveals-how-the-biggest-animals-on-the-planet-manage-to-live-on-teeny-tiny-shrimp/>),

- Gizmodo (<http://gizmodo.com/how-blue-whales-are-able-to-maintain-their-monstrous-si-1734729469>).
- NPR Science Friday (<http://www.sciencefriday.com/segment/10/02/2015/paxil-reanalysis-mouse-drug-avatars-and-pricey-patties.html>)
- Canadian Discovery channel (<https://review.bellmedia.ca/view/1332361446>)
- Tech Times <http://www.techtimes.com/articles/91517/20151005/krill-feeding-study-reveals-how-blue-whales-become-so-big.htm>
- Der Spiegel <http://www.spiegel.de/wissenschaft/natur/blauwale-krill-futtern-mit-strategie-a-1056172.html>
- Twitter: Article tweeted at >1.9 million followers (as of 9 October 2015)
- Top 5% of all articles scored by Almetric AAAS article tracking metrics of quality and quantity of online attention (out of 4,339,889 articles)
- High score (98th percentile) compared to articles of the same age
- Among the highest-scoring articles from AAAS Almetric
- Race for Water Scientific Advisor for ocean plastic mapping and GIS analysis using UAS technology
 - <http://www.raceforwater.com/>
 - http://www.swissinfo.ch/eng/race-for-water-odyssey_using-drones-to-hunt-for-the-oceans--plastic-pollution/41379106
 - <http://www.ecorazzi.com/2015/04/14/scientists-use-drones-to-map-out-all-trash-in-the-ocean/>
 - <http://publicradioeast.org/post/local-marine-lab-uses-drones-marine-debris-research>
- Antarctic minke whale diving behavior
 - <http://news.nationalgeographic.com/news/2014/08/140813-minke-whale-feeding-antarctica-animals-ocean-science/>
 - <http://news.sciencemag.org/biology/2014/08/minke-whales-extreme-feeding-habits-observed-first-time>
 - <http://www.abc.net.au/news/2014-08-15/scientists-spy-on-antarctic-minke-whales-eating-habits/5673620>
 - <http://discovermagazine.com/2014/julyaug/5-frolicking-with-the-whales>
 - <http://news.stanford.edu/news/2014/august/minke-whales-feeding-081414.html>

- <http://www.japantimes.co.jp/news/2014/08/16/world/science-health-world/minke-whales-feeding-frenzy-observed/>
- <http://www.futurity.org/whales-size-evolution-feeding-748022/>
- <http://www.redorbit.com/news/science/1113213553/minke-whale-feeding-behavior-081514/>
- <http://www.redorbit.com/news/science/1113213553/minke-whale-feeding-behavior-081514/>
- <http://theconversation.com/minke-whales-discovered-to-skim-below-sea-ice-to-feed-30522>
- <http://www.businessinsider.com.au/incredible-video-shows-researchers-chasing-and-tagging-minke-whales-in-the-antarctic-2014-8>
- <http://phenomena.nationalgeographic.com/2014/08/13/little-giant-whales-take-100-gulps-an-hour/>
- <http://www.delhidailynews.com/news/Tags-reveal-feeding-habits-of-Minkes-1408163342/>
- <http://phys.org/news/2014-08-minke-whales-lunge-hour-sea.html>
- <http://thenewage.co.za/135002-1021-53-Study-reveals-Antarctic-minke-whales-feeding-frenzy>
- <http://technology.iafrica.com/news/954852.html>
- <http://www.sciencecodex.com/minke-whales-lunge-100-times-hour-to-feed-under-sea-ice-139539>
- <http://nicholas.duke.edu/news/minke-whales-lunge-100-times-hour-feed-under-sea-ice>
- <http://www.antarctica.gov.au/news/2014/krill-on-the-menu-for-antarctic-minke-whales-lunge-diet>
- <http://news.stanford.edu/news/2014/august/minke-whales-feeding-081414.html?view=print>
- <http://www.themercury.com.au/news/tasmania/minkes-tracked-going-for-the-krill/story-fnj4f7k1-1227026146584>
- <http://www.dailynewsen.com/science/minke-whales-lunge-100-times-per-hour-to-feed-under-sea-ice-h2548665.html>
- <http://www.sciencefriday.com/video/12/07/2012/blue-whale-barrel-roll.html>
- <http://www.tested.com/science/life/454367-awesome-jobs-meet-ari-friedlaender-whale-tagger/>
- <http://www.livescience.com/21979-humpback-whales-antarctica-migration.html>
- <http://ocean.si.edu/blog/humpback-whales-antarctica-what-are-whales-doing>
- http://www.nbcnews.com/id/48407880/ns/technology_and_science-science/t/humpback-whales-linger-antarctica/#.VaVDiLdcOSs
- <http://wunc.org/post/less-ice-more-krill-more-whales>
- http://news.bbc.co.uk/earth/hi/earth_news/newsid_8340000/8340706.stm
- <http://www.slushpilemag.com/ari-friedlaender/>
- http://www.nationalgeographic.com/sealab/antarctica/week_6.html
- <http://oceanbites.org/the-antarctic-minke-whale-foraging-strategy/>
- <http://loe.org/shows/segments.html?programID=14-P13-00014&segmentID=1>
- <http://www.earthtimes.org/nature/humpback-whales-super-aggregation-antarctica/776/>

- <http://www.journeys-magazine.co.uk/South%20America%20Features/Antarctica2.html>
-
- New York Times Humpback Whale Foraging
 - <http://www.nytimes.com/2012/08/21/science/earth/close-to-cape-cod-shore-humpback-whales-are-far-from-safe.html?pagewanted=all>
 - <http://green.blogs.nytimes.com/2012/08/22/managing-the-ocean-for-humans-and-whales/>
- Antarctic Minke Whale acoustics
 - <http://www.livescience.com/45033-mystery-of-ocean-duck-sound-revealed.html>
 - <http://www.abc.net.au/science/articles/2014/04/23/3989875.htm>
 - <https://www.sciencenews.org/article/submariners-bio-duck-probably-whale>
 - <http://www.bbc.com/news/science-environment-27117669>
 - <http://news.sciencemag.org/biology/2014/04/scienceshot-mystery-quacking-caller-antarctic-solved?rss=1>
 - <http://www.independent.co.uk/news/science/50year-mystery-of-the-ocean-quack-finally-solved-by-scientists-9277824.html>
 - <http://www.zeit.de/wissen/umwelt/2014-04/antarktis-zwergwal-gerauesch-walfang>
 - http://www.fisheries.noaa.gov/podcasts/2014/04/minke_whales.html#.U1e9kqYUC-4
 - <http://news.discovery.com/earth/oceans/mysterious-underwater-sounds-that-have-stumped-scientists-140423.htm>
 - <http://phys.org/news/2014-04-mysterious-bio-duck-southern-ocean-minke.html>
 - http://www.huffingtonpost.com/2014/04/23/bio-duck-sound-antarctic-minke-whales_n_5198053.html
 - <http://www.csmonitor.com/Science/2014/0423/Scientists-unravel-mystery-of-bizarre-bio-duck-sound>
 - <http://newswatch.nationalgeographic.com/2014/04/23/whales-animals-sounds-bioduck-science-antarctica/>
 - <http://www.theguardian.com/environment/2014/apr/23/whales-ocean-quacking-sound?commentpage=1>
 - <http://www.journeys-magazine.co.uk/South%20America%20Features/Antarctica2.html>
 -
- Blue Whale foraging behavior
 - <http://www.nytimes.com/2012/12/04/science/acrobatic-blue-whales-can-sneak-up-on-krill.html>
 - http://www.msnbc.msn.com/id/49987245/ns/technology_and_science-science/t/blue-whales-use-underwater-ballet-trick-their-prey/
 - <http://news.discovery.com/animals/blue-whales-roll-121127.html>
 - <http://www.bbc.co.uk/nature/20509831>
 - <http://www.bbc.co.uk/newsround/20527084>
 - <http://marinesciencetoday.com/2012/11/30/blue-whales-are-surprisingly-acrobatic/>

- http://www.sciencenews.org/view/generic/id/346683/title/Blue_whales%E2%80%99_diet_and_exercise_rolled_into_one
-
- Recent interviews or news on Antarctic research and climate change:
 - <http://www.cbc.ca/quirks/episode/2011/04/30/april-30-2011/>
 - <http://www.plumtv.com/videos/vail-work-ari-friedlander>
 - <http://www.youtube.com/watch?v=8le3BPiZJoY>
 - <http://www.sciencedaily.com/releases/2011/04/110427171503.htm>
 - <http://news.sciencemag.org/sciencenow/2011/04/biggest-ever-assemblage-of-whale.html>
- Examples of exhibited photography:
 - www.colorfolio.com/showcase/featuredartist.htm
 - <http://www.oregonstate.edu/terra/2015/09/antarctica-photo-gallery-by-ari-friedlaender/>
- Example of teaching tools and educational development:
 - <http://superpod.ml.duke.edu/cachalot/>
 - <http://www.wired.com/wiredscience/2012/01/flow-digital-textbooks/>
- Examples of blogs from current research
 - <http://www.nicholas.duke.edu/antarctica>
 - <http://sea-inc.net/socal-brs/>
- Examples of recent coverage of current research:
 - May 11, 2011 The Green Grok.com, Whale Confab in the Antarctic
 - May 6, 2011 Earthweek.com, Whales Gather for All-You-Can Eat Buffet
 - May 6, 2011 Antarctic Sun, Whale of a Number
 - May 5, 2011 FIS World News, Amazing Numbers of Krill, Whales Shed Light on Climate Changes Effects
 - Note: This story also appeared in 8 other international online media outlets.
 - May 4, 2011 Cordis Europa.com, Study Sheds Light on Ecological Ties of Whales and Krill
 - Note: This story also appeared in 14 other European media outlets, both traditional and online.
 - May 3, 2011 Gadling.com, Record Numbers of Humpback Whales Spotted Near Antarctica
 - May 2, 2011 The New York Times, An Antarctic Buffet Where Whales Gather to Feast
 - Note: This story was distributed by the NY Times Newswire and its new NY Times Newswire API online news feed and appeared in 43 other newspapers and approximately 50 science blogs.
 - May 2, 2011 YouTube.com, Krill Buffet for Whales
 - May 2, 2011 Futurity.org, Whale Mob: All-U-Can-Eat Krill
 - April 28, 2011 Science, Biggest Ever Assemblage of Whales Isn't Necessarily Good News
 - April 28, 2011 Science News , Antarctic Humpbacks Make a Krill Killing
 - April 28, 2011 Medill Reports News Wire, Whale of a Find: Krill Feast in

- Antarctica
- Note: This story also appeared in 17 other media outlets, both traditional and online.
 - April 28, 2011 International Business Times, Super-Aggregation of Whales and Krill in Antarctic Bays
 - April 28, 2011 Planet Save.com, Super-Aggregation of Whales and Krill in Antarctic Bays
 - Note: This story also appeared in 31 other U.S. media outlets, mostly online.
 - April 28, 2011 Scientific Computing, Record Number of Whales, Krill Found in Antarctica
 - April 28, 2011 Irish Weather Online, Super-Aggregation of Whales and Krill in Antarctic
 - April 28, 2011 Environmental News Network, Krill and Whales in Antarctica
 - Note: ENN distributes news to 40 other online news sites and media outlets.
 - April 28, 2011 WUNC.FM, Less Ice=More Krill=More Whales,
 - Note: This report also aired on 13 other NPR affiliate stations in the Carolinas.
 - April 27, 2011 Our Amazing Planet.com, Whale of a Record: 306 Humpbacks Spotted Near Antarctica
 - April 27, 2011 Earth and Sky, National Public Radio
 - Note: This story also appeared in 11 other online U.S. media outlets.

Recent Invited Lectures (past 24 months)

- Pew Charitable Trust, Climate change impacts on Antarctic marine ecosystems, Oxford, UK.
- UCSC Institute for Arts and Sciences, LASER talk
- Art Electronica, UCLA, Water Bodies
- Radius Gallery, Santa Cruz, CA
- LAZNIA Center for Contemporary Art, Poland
- G.E.H. Barrett-Hamilton Memorial Lecture, University of Manitoba
- Seymour Discovery Center, Science Sunday
- Ocean First Dive and Education Center, Boulder, CO
- Lindsay Wildlife Center, Conservation Icons. Walnut Creek, CA.
- John Ostrom 'Nature's Narrators', Peabody Museum of Natural History, Yale University
- Smithsonian Institution, Washington, DC

- National Geographic Society, Research, Conservation and Exploration, Washington, DC
- National Science Foundation, Office of Polar Programs, Washington, DC
- Office of Naval Research, Washington, DC
- Marine Mammal Commission, Washington, DC
- International Whaling Commission Scientific Committee on Ecological Modeling
- International Whaling Commission Scientific Committee on Southern Hemisphere Cetaceans
- International Whaling Commission Scientific Committee on Genetics
- Columbia University/Wildlife Conservation Society, New York, NY
- SUNY Stony Brook, Stony Brook, NY
- Scripps Institute of Oceanography, La Jolla, CA
- Bates College, Lewiston, ME
- Seymour Science Learning Center, Santa Cruz, CA
- Moss Landing Marine Laboratory, Moss Landing, CA
- Bowdoin College, Brunswick, ME
- Ocean Institute, Dana Point, CA
- American Cetacean Society Annual Meeting, Los Angeles, CA
- American Cetacean Society San Francisco Chapter, CA
- Cabrillo Aquarium, Long Beach, CA
- Spanish Fort High School, Fair Hope, AL
- Page and Palate, Fair Hope, AL
- Fisheries and Wildlife Department, Oregon State University, Corvallis, OR
- Science on Tap, Rogue Brewery, Newport, OR
- UC Santa Cruz, Santa Cruz, CA
- Marine Mammal Center, Petersburg, AK
- The Preserve, Santa Lucia, CA

- Past locations: UNC Wilmington, North Carolina State University, Slivka Center Yale University, Savannah State University, Elizabeth City University, Monterey Bay Aquarium Research Institute, New England Aquarium, NOAA Southwest Fisheries Science Center, Sitka Sound Science Center, National Science Foundation, Office of Naval Research