

## CURRICULUM VITAE

### **Jeremy A. Goldbogen**

Associate Professor of Oceans, and by courtesy, Biology  
Hopkins Marine Station of Stanford University  
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### **A. Academic History**

#### Education:

2010 Ph.D. in Zoology, University of British Columbia (advisor: Robert Shadwick)  
2005 M.S. in Marine Biology, Scripps Institution of Oceanography, UC-San Diego  
2002 B.S. in Zoology, University of Texas at Austin

#### Scholarships and Awards:

2017 Stanford University, Terman Fellowship  
2016 Office of Naval Research, Young Investigator Award  
2015 Hoagland Award for Teaching Innovation, Stanford University, VPUE, H&S Dean  
2011 Banting Postdoctoral Fellowship, NSERC, University of Guelph (declined)  
2010 Governor General's Gold Medal, UBC  
2010-2012 Scripps Postdoctoral Fellowship (Director's Award), UCSD (2<sup>nd</sup> year declined)  
2010 Faculty of Science Graduate Prize, 2010  
2005-2009 UBC Fellowships (5 different awards) 2005-09  
2009 Michael A. Bigg Award, Vancouver Aquarium, 2009  
2008 Best Oral Presentation, UBC Zoology Graduate Student Symposium, 2008  
2001 Christopher Schulze Scholarship in Zoology, UT-Austin, 2001  
2001, 2002 National Science Foundation REU Fellow, 2001, 2002

#### Post-doctoral training:

2010-2011 Scripps Institution of Oceanography, UC San Diego, La Jolla, CA (advisor: Paul Ponganis)  
2011-2013 Cascadia Research, Olympia, WA (advisor: John Calambokidis)

### **B. Employment history**

2022 – present Professor, Hopkins Marine Station, Oceans Department, Stanford University  
2020 – 2022 Co-Director, Hopkins Marine Station, Department of Biology, Stanford University  
2021 – 2022 Associate Professor, Hopkins Marine Station, Department of Biology, Stanford University  
2014 – 2020 Assistant Professor, Hopkins Marine Station, Department of Biology, Stanford University

### **C. Public and professional service**

#### Editorial boards:

2015-2020      *Functional Ecology*

#### Manuscript reviews:

Performed 100+ reviews to date for journals including (most frequently): *Journal of Experimental Biology*, *Proceedings of the Royal Society B: Biological Sciences*, and *Current Biology*.

Reviews completed for the following journals: *American Naturalist*, *Animal Biotelemetry*, *Aquatic Biology*, *Behaviour*, *Behavioral Ecology*, *Biology Letters*, *Biological Journal of the Linnean Society*, *Current Biology*, *eLife*, *Functional Ecology*, *Frontiers in Aquatic Physiology*, *Frontiers in Marine Science*, *Journal of Animal Ecology*, *Journal of the Acoustical Society of America*, *Journal of Experimental Biology*, *Journal of Fish Biology*, *Journal of the Royal Society Interface*, *Marine Ecology Progress Series*, *Marine Technology Society Journal*, *Marine Mammal Science*, *Oceanography*, *Proceedings of the Royal Society B*, *PLOS ONE*, *Science*, *Scientific Reports*, *Science Advances*, *Zoologia*, *Zoology*.

#### Grant reviews:

National Science Foundation: Integrative Organismal Systems (including panel review in DC)  
National Science Foundation: Office of Polar Programs  
National Science Foundation: Ocean Technology and Interdisciplinary Coordination Program  
California Sea Grant Program and Alaska Sea Grant Program

#### Professional Societies:

Regular conference attendance, contributed presentations and papers at the following:

- The Annual Meeting for the Society for Integrative and Comparative Biology
- The Biennial Conference of the Biology of Marine Mammals
- The International Bio-logging Science Symposium

#### Local Research Network:

- NOAA Monterey Bay National Marine Sanctuary Research Activity Panel, 2015-present.

#### Departmental and University Service (2014 - present):

- Postdoctoral Researchers Advised: Megan Jensen (NSF Fellow), Nicholas Carey, Jody Beers, Paolo Segre, Danuta Wisniewska, Matthew Savoca (NSF Fellow)
- PhD Students Advised: David Cade (graduated 2019), William Gough, Shirel Kahane-Rapport, William Gough, James Fahlbusch, Max Czapanskiy, William Oestreich
- PhD Student Committee Member: Benjamin Burford, Rachel Crane, Tom Hata, Paul Leary, Diana Li
- Undergraduate Honors Students Advised: Emily Dial, Julia Hafer, Amalia Saladrigas
- Oceans Department Staffing Committee
- Oceans Department Faculty Search Committee Chair
- Co-Director, Hopkins Marine Station
- Hopkins Marine Station External Review Report Committee
- Hopkins Marine Station Strategic Planning Committee
- Website Renovation Committee, Hopkins Marine Station

- Stanford Interdisciplinary Graduate Fellowship Selection Committee
- IT Renovation Committee, Hopkins Marine Station
- Boating & Marine Operations Committee, Hopkins Marine Station
- Graduate Admissions Coordinator, Hopkins Marine Station
- Graduate Student Relations Committee, Hopkins Marine Station
- Faculty College, Renewing the Hopkins Marine Station Curriculum: Challenges & Solutions
- Data Science Committee for Senior Associate Dean for the Natural Sciences, Kathryn Moler
- Graduate Studies Committee for the Chair of the Biology Department, Tim Stearns
- Undergraduate “Biology Garage” Committee for the Chair of the Biology Department, Tim Stearns
- Visioning and Planning Committee for the Hopkins Marine Station
- Organized the 2016 Blinks Physiology Lecture, Peter Madsen, Aarhus University, Denmark

#### D. Scholarly publications

##### Original works (peer reviewed):

Goldbogen, J.A., Pyenson, N.D., Madsen, P.T. How whales dive, feast, and fast: The ecophysiological drivers and limits of foraging in the evolution of cetaceans. In Press. *Annual Review of Ecology, Evolution, and Systematics*.

Videsen, S. K., Simon, M., Christiansen, F., Friedlaender, A., Goldbogen, J., Malte, H., Segre, P.S., Wang, T., Johnson, M.J., Madsen, P. T. 2023. Cheap gulp foraging of a giga-predator enables efficient exploitation of sparse prey. *Science Advances*, 9(25), eade3889.

Cade, D. E., Kahane-Rapport, S. R., Gough, W. T., Bierlich, K. C., Linsky, J. M., Calambokidis, J., Johnston, D.W., Goldbogen, J., Friedlaender, A. S. (2023). Minke whale feeding rate limitations suggest constraints on the minimum body size for engulfment filtration feeding. *Nature Ecology & Evolution*, 7(4), 535-546.

Clayton, H., Cade, D. E., Burnham, R., Calambokidis, J., & Goldbogen, J. 2023. Acoustic behavior of gray whales tagged with biologging devices on foraging grounds. *Frontiers in Marine Science*.

Segre, P. S., Martin, J., Irschick, D. J., & Goldbogen, J. A. 2023. A three-dimensional, dynamic blue whale model for research and scientific communication. *Marine Mammal Science*. 39(3), 1011–1018.

Vandenberg, M. L., Cohen, K. E., Rubin, R. D., Goldbogen, J. A., Summers, A. P., Paig-Tran, E. M., & Kahane-Rapport, S. R. 2023. Formation of a fringe: A look inside baleen morphology using a multimodal visual approach. *Journal of Morphology*, 284(4), e21574.

Ryan, J.P, Benoit-Bird, K.J., Oestreich, W.K., Leary, P., Smith, K.B., Waluk, C.M., Cade, D.E., Fahlbusch, J.A., Southall, B., Joseph, J.E., Margolina, T., Calambokidis, J., DeVogelaere, A., Goldbogen, J.A. Oceanic giants dance to atmospheric rhythms: Ephemeral wind-driven resource tracking by blue whales. 2022. *Ecology Letters*. 25, 2435–2447.

Pirotta, E., Booth, C.G., Calambokidis, J., Costa, D.P., Fahlbusch, J.A., Friedlaender, A.S., Goldbogen, J.A., Harwood, J., Hazen, E.L., New, L., Santora, J.A., Watwood, S.L., Wertman, C. and Southall, B.L. 2022. From individual responses to population effects: Integrating a decade of multidisciplinary research on blue whales and sonar. *Animal Conservation*. 25: 796-810.

Fahlbusch, J.A., Czapanskiy, M.F., Calambokidis, J., Cade, D.E., Abrahms, B., Hazen, E.L. and Goldbogen, J.A., 2022. Blue whales increase feeding rates at fine-scale ocean features. *Proceedings of the Royal Society B*, 289(1981), p.20221180.

Czapanskiy, M.F., Ponganis, P.J., Fahlbusch, J.A., Schmitt, T.L. and Goldbogen, J.A., 2022. An accelerometer-derived ballistocardiogram method for detecting heart rate in free-ranging marine mammals. *Journal of Experimental Biology*, 225(10), p.jeb243872.

Gough, W.T., Cade, D.E., Czapanskiy, M.F., Potvin, J., Fish, F.E., Kahane-Rapport, S.R., Savoca, M.S., Bierlich, K.C., Johnston, D.W., Friedlaender, A.S. and Szabo, A., 2022. Fast and Furious: Energetic Tradeoffs and Scaling of High-Speed Foraging in Rorqual Whales. *Integrative Organismal Biology*.

Casey, C.B., Weindorf, S., Levy, E., Linsky, J.M.J., Cade, D.E., Goldbogen, J.A., Nowacek, D.P. and Friedlaender, A.S., 2022. Acoustic signalling and behaviour of Antarctic minke whales (*Balaenoptera bonaerensis*). *Royal Society Open Science*, 9(7), p.211557.

Nazario, E.C., Cade, D.E., Bierlich, K.C., Czapanskiy, M.F., Goldbogen, J.A., Kahane-Rapport, S.R., van der Hoop, J.M., San Luis, M.T. and Friedlaender, A.S., 2022. Baleen whale inhalation variability revealed using animal-borne video tags. *PeerJ*, 10, p.e13724.

Oestreich, W. K., Abrahms, B., McKenna, M. F., Goldbogen, J. A., Crowder, L. B., & Ryan, J. P. 2022. Acoustic signature reveals blue whales tune life-history transitions to oceanographic conditions. *Functional Ecology*. 36, 882– 895.

Pallin, L. J., Botero-Acosta, N., Steel, D., Baker, C. S., Casey, C., Costa, D. P., Goldbogen, J. A., Johnston, D. W., Kellar, N. M., Modest, M., Nichols, R., Roberts, D., Roberts, M., Savenko, O., & Friedlaender, A. S. 2022. Variation in blubber cortisol levels in a recovering humpback whale population inhabiting a rapidly changing environment. *Scientific Reports*. 12, 20250

Bierlich, K.C., Hewitt, J., Schick, R.S., Pallin, L., Dale, J., Friedlaender, A.S., Christiansen, F., Sprogis, K.R., Dawn, A.H., Bird, C.N., Larsen, G.D., Nicols, R., Shero, M.R., Goldbogen, J.A., Read, A.J., Johnston, D.W. 2022. Seasonal gain in body condition of foraging humpback whales along the Western Antarctic Peninsula. *Frontiers in Marine Science*, 9, p.1036860.

Cade, D.E., Fahlbusch, J.A., Oestreich, W.K., Ryan, J., Calambokidis, J., Findlay, K.P., Friedlaender, A.S., Hazen, E.L., Seakamela, S.M. and Goldbogen, J.A., 2021. Social exploitation of extensive, ephemeral, environmentally controlled prey patches by supergroups of rorqual whales. *Animal Behaviour*, 182, 251-266.

Segre, P.S., Gough, W.T., Roualdes, E.A., Cade, D.E., Czapanskiy, M.F., Fahlbusch, J., Kahane-Rapport, S.R., Oestreich, W.K., Bejder, L., Bierlich, K.C., Burrows, J.A., Calambokidis, J., Chenoweth, E.M., di Clemente J., Durban, J.W., Fearnbach, H., Fish, F.E., Friedlaender, A.S., Hegelund, P., Johnston, D.W., Nowacek, D.P., Oudejans, M.G., Penry, G.S., Potvin, J., Simon, M., Stanworth, A., Straley, J.M., Szabo, A., Videsen, S.K.A., Visser, F., Weir, C.R., Wiley, D.N., Goldbogen, J.A. 2022. Scaling of maneuvering performance in baleen whales: larger whales outperform expectations. *Journal of Experimental Biology*, 225(5), jeb243224.

Cade, D. E., Kahane-Rapport, S. R., Wallis, B., Goldbogen, J. A., & Friedlaender, A. S. (2022). Evidence for Size-Selective Predation by Antarctic Humpback Whales. *Frontiers in Marine Science*, 33.

- Segre, P.S., di Clemente, J., Kahane-Rapport, S.R., Gough, W.T., Mejer, M.A., Lombard, A.T., Goldbogen, J.A. and Penry, G.S., 2022. High-speed chases along the seafloor put Bryde's whales at risk of entanglement. *Conservation Science and Practice*, e12646.
- Burford, B.P., Williams, R.R., Demetras, N.J., Carey, N., Goldbogen, J., Gilly, W.F., Harding, J. and Denny, M.W., 2022. The limits of convergence in the collective behavior of competing marine taxa. *Ecology and Evolution*, 12(3), p.e8747.
- Cade, D.E., Fahlbusch, J.A., Oestreich, W.K., Ryan, J., Calambokidis, J., Findlay, K.P., Friedlaender, A.S., Hazen, E.L., Seakamela, S.M. and Goldbogen, J.A., 2021. Social exploitation of extensive, ephemeral, environmentally controlled prey patches by supergroups of rorqual whales. *Animal Behaviour*, 182, pp.251- 266.
- Cade, D.E., Gough, W.T., Czapanskiy, M.F., Fahlbusch, J.A., Kahane-Rapport, S.R., Linsky, J.M., Nichols, R.C., Oestreich, W.K., Wisniewska, D.M., Friedlaender, A.S. and Goldbogen, J.A., 2021. Tools for integrating inertial sensor data with video bio-loggers, including estimation of animal orientation, motion, and position. *Animal Biotelemetry*, 9(1), pp.1-21.
- Savoca, M.S., M.F. Czapanskiy, S.R. Kahane-Rapport, W.T. Gough, J.A. Fahlbusch, K.C. Bierlich, P.S. Segre, J. Di Clemente, G.S. Penry, D.N. Wiley, J. Calambokidis, D.P. Nowacek, D.W. Johnston, N.D. Pyenson, A.S. Friedlaender, E.L. Hazen, and J.A. Goldbogen. 2021. Baleen whale prey consumption based on high-resolution foraging measurements. *Nature*, 599(7883), pp.85-90.
- Bierlich, K.C., Schick, R.S., Hewitt, J., Dale, J., Goldbogen, J.A., Friedlaender, A.S. and Johnston, D.W., 2021. Bayesian approach for predicting photogrammetric uncertainty in morphometric measurements derived from drones. *Marine Ecology Progress Series*, 673, pp.193-210.
- Friedlaender, A.S., Joyce, T., Johnston, D.W., Read, A.J., Nowacek, D.P., Goldbogen, J.A., Gales, N. and Durban, J.W., 2021. Sympatry and resource partitioning between the largest krill consumers around the Antarctic Peninsula. *Marine Ecology Progress Series*, 669, pp.1-16.
- Watanabe, Y.Y. and Goldbogen, J.A., 2021. Too big to study? The biologging approach to understanding the behavioural energetics of ocean giants. *Journal of Experimental Biology*. 224(13), p.jeb202747.
- Gough, W.T., Smith, H.J., Savoca, M.S., Czapanskiy, M.F., Fish, F.E., Potvin, J., Bierlich, K.C., Cade, D.E., Clemente, J.D., Kennedy, J. and Segre, P., 2021. Scaling of oscillatory kinematics and Froude efficiency in baleen whales. *Journal of Experimental Biology*. 224, jeb237586.
- Czapanskiy, M.F., Savoca, M.S., Gough, W.T., Segre, P.S., Wisniewska, D.M., Cade, D.E. and Goldbogen, J.A., 2021. Modelling short-term energetic costs of sonar disturbance to cetaceans using high-resolution foraging data. *Journal of Applied Ecology*. 58: 1643– 1657.
- Segre, P.S., Weir, C.R., Stanworth, A., Cartwright, S., Friedlaender, A.S. and Goldbogen, J.A., 2021. Biomechanically distinct filter-feeding behaviors distinguish sei whales as a functional intermediate and ecologically flexible species. *Journal of Experimental Biology*, 224(9), p.jeb238873.
- Kashiwabara, L.M., Kahane-Rapport, S.R., King, C., DeVogelaere, M., Goldbogen, J.A. and Savoca, M.S., 2021. Microplastics and microfibers in surface waters of monterey Bay National marine sanctuary, California. *Marine Pollution Bulletin*, 165, p.112148.

Cade, D.E., Seakamela, S.M., Findlay, K.P., Fukunaga, J., Kahane-Rapport, S.R., Warren, J.D., Calambokidis, J., Fahlbusch, J.A., Friedlaender, A.S., Hazen, E.L., Kotze, D., McCue, S., Meyer, M., Oestreich, W. K., Oudejans, M., G., Wilke, C. and Goldbogen, J. A. 2021. Predator-scale spatial analysis of intra-patch prey distribution reveals the energetic drivers of rorqual whale super-group formation. *Functional Ecology*, 35(4), pp.894-908.

Goldbogen, J.A. and Madsen, P.T., 2021. The largest of August Krogh animals: Physiology and biomechanics of the blue whale revisited. *Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology*, p.110894.

Bierlich, K.C., Hewitt, J., Bird, C.N., Schick, R.S., Friedlaender, A., Torres, L.G., Dale, J., Goldbogen, J., Read, A.J., Calambokidis, J. and Johnston, D.W., 2021. Comparing Uncertainty Associated With 1-, 2-, and 3D Aerial Photogrammetry-Based Body Condition Measurements of Baleen Whales. *Frontiers in Marine Science*, p.1729. doi.org/10.3389/fmars.2021.749943

McKenna, M.F., Baumann-Pickering, S., Kok, A., Oestreich, W.K., Adams, J.D., Barkowski, J., Fristrup, K.M., Goldbogen, J.A., Joseph, J., Kim, E.B., Kügler, A... Hatch, L. T. 2021. Advancing the interpretation of shallow water marine soundscapes. *Frontiers in Marine Science*. doi.org/10.3389/fmars.2021.719258

Potvin, J., Cade, D.E., Werth, A.J., Shadwick, R.E. and Goldbogen, J.A., 2021. Rorqual Lunge-Feeding Energetics Near and Away from the Kinematic Threshold of Optimal Efficiency. *Integrative Organismal Biology*, 3(1), p.obab005.

Pirotta, E., Booth, C.G., Cade, D.E., Calambokidis, J., Costa, D.P., Fahlbusch, J.A., Friedlaender, A.S., Goldbogen, J.A., Harwood, J., Hazen, E.L. and New, L., 2021. Context-dependent variability in the predicted daily energetic costs of disturbance for blue whales. *Conservation physiology*, 9(1), p.coaa137.

Kahane-Rapport, S. R. Savoca, M. S. Cade, D. E., P.S., Bierlich, K. C. Calambokidis, J. Dale, J., Fahlbusch, J. A., Friedlaender, A. S. Johnston, D. W. Werth, A. J., Goldbogen, J.A. 2020. Lunge filter feeding biomechanics constrain rorqual foraging ecology across scale. *Journal of Experimental Biology*. 223: jeb224196

Flammang, B. E., Marras, S., Anderson, E. J., Lehmkuhl, O., Mukherjee, A., Cade, D. E., Beckert, M., Nadler, J. H., Houzeaux, G., Vázquez, M., Amplo, H. E., Calambokidis, J., Friedlaender, A. S., Goldbogen, J.A.. 2020. Remoras pick where they stick on blue whales. *Journal of Experimental Biology*. 223: jeb226654

Cade, D. E., Domenici, P., Potvin, J. Goldbogen, J. A. 2020. Predator-informed looming stimulus experiments reveal how large filter feeding whales capture highly maneuverable forage fish. *Proceedings of the National Academy of Sciences*. 117 (1) 472-478.

Oestreich, W. K., Fahlbusch, J. A., Cade, D. E., Calambokidis, J., Margolina, T., Joseph, J., Friedlaender, A. S., McKenna, M. F., Stimpert, A. K., Southall, B. L., Goldbogen, J. A., Ryan, J. P. 2020. Animal-borne metrics enable acoustic detection of blue whale migration. *Current Biology*. 10.1016/j.cub.2020.08.105

Linsky, J. M., Wilson, N., Cade, D. E., Goldbogen, J. A., Johnston, D. W., & Friedlaender, A. S. (2020). The scale of the whale: using video-tag data to evaluate sea-surface ice concentration from the perspective of individual Antarctic minke whales. *Animal Biotelemetry*, 8(1), 1-12.

Tackaberry, J. E., Cade, D. E., Goldbogen, J. A., Wiley, D. N., Friedlaender, A. S., Stimpert, A. K. 2020. From a calf's perspective: humpback whale nursing behavior on two US feeding grounds. *PeerJ*. 8:e8538

Potvin, J., Cade, D. E., Werth, A. J., Shadwick, R. E., Goldbogen, J. A. A perfectly inelastic collision: Bulk prey engulfment by baleen whales and dynamical implications for the world's largest cetaceans. 2020. *American Journal of Physics*. 88:10, 851-863.

Segre, P.S., Potvin, J., Cade, D. E., Calambokidis, J., Di Clemente, J., Fish, F. E., Friedlaender, A. S., Gough, W. T., Kahane-Rapport, S. R., Oliveira, C., Parks, S. E., Penry, G. S., Simon, M., Stimpert, A. K., Wiley, D. N., Madsen, P. T., Goldbogen, J. A. 2020. Energetic and physical limitations on the breaching performance of large whales. *eLife*. 9:e51760

Goldbogen, J.A., Cade, D. E., Wisniewska, D. M., Potvin, J., Segre, P.S., Savoca, M. S., Hazen, E. L., Czapanskiy, M. F., Kahane-Rapport, S. R., DeRuiter, S. L., Gero, S., Tønnesen, P. H., Gough, W. T., Hanson, M. B., Holt, M. M., Jensen, F. H., Simon, M., Stimpert, A. K., Arranz, P., Johnston, D. W., Nowacek, D. P., Parks, S. E., Visser, F., Friedlaender, A. S., Tyack, P. L., Madsen, P. T., Pyenson, N. D. 2019. Why whales are big but not bigger: physiological drivers and ecological limits in the age of ocean giants. *Science*. 366: 1367-1372.

Goldbogen, J. A., Cade, D. E., Calambokidis, J., Czapanskiy, M. F., Fahlbusch, J., Friedlaender, A. S., Gough, W. T., Kahane-Rapport, S. R., Savoca, M. S., Ponganis, K. V., Ponganis, P. J. 2019. Extreme bradycardia and tachycardia in the world's largest animal. *Proceedings of the National Academy of Sciences*. 116 (50) 25329-25332.

Friedlaender, A. S., Bowers, M. T., Cade, D. E., Hazen, E. L., Stimpert, A. K., Allen, A. N., Calambokidis, J., Fahlbusch, J., Segre, P., Visser, F., Southall, B. L., Goldbogen, J. A. 2019. The advantages of diving deep: fin whales quadruple their energy intake when targeting deep krill patches. *Functional Ecology*. doi: 10.1111/1365-2435.13471

Gough, W. T., Segre, P. S., Bierlich, K. C., Cade, D. E., Potvin, J., Fish, F. E., Dale, J., di Clemente, J., Friedlaender, A. S., Johnson, D. W., Kahane-Rapport, S. R., Kennedy, J., Long, J. H., Oudejans, M., Penry, G., Savoca, M. S., Simon, M., Videsen, S. K. A., Visser, F., Wiley, D. N., Goldbogen, J. A. 2019. Scaling of swimming performance in baleen whales. *Journal of Experimental Biology*. doi: 10.1242/jeb.204172

Guilpin, M., Lesage, V., McQuinn, I., Goldbogen, J.A., Potvin, J., Jeanniard-du-Dot, T., Doniol-Valcroze, T., Michaud, R., Moisan, M. and Winkler, G., 2019. Foraging energetics and prey density requirements of western North Atlantic blue whales in the Estuary and Gulf of St. Lawrence, Canada. *Marine Ecology Progress Series*. 625: 205-223.

Calambokidis, J., Fahlbusch, J. A., Szesciorka, A. R., Southall, B. L., Cade, D. E., Friedlaender, A. S., Goldbogen, J. A. 2019. Differential vulnerability to ship strikes between day and night for blue, fin, and humpback whales based on dive and movement data from medium duration archival tags. *Frontiers in Marine Science*. 6:543. doi: 10.3389/fmars.2019.00543

Gray, P. C., Bierlich, K. C., Mantell, S. A., Friedlaender, A. S., Goldbogen, J. A., Johnston, D. W. 2019. Drones and convolutional neural networks facilitate automated and accurate cetacean species identification and photogrammetry. *Methods in Ecology and Evolution*. 10: 1490-1500.

Pirotta, E., Mangel, M., Costa, D.; Goldbogen, J. A., Harwood, J., Hin, V., Irvine, L., Mate, B., McHuron, E., Palacios, D., Schwarz, L., New, L. 2019. Anthropogenic disturbance in a changing environment: modelling lifetime reproductive success to predict the consequences of multiple stressors on a migratory population. *Oikos*. 128: 1340-1357.

Abrahms, B., Hazen, E. L., Aikens, E. O., Savoca, M. S., Goldbogen, J. A., Bograd, S., Jacox, M., Irvine, L. M., Palacios, D. M., Mate, B. R. 2019. Memory and resource tracking drive blue whale migrations. *Proceedings of*

*the National Academy of Sciences*. 116 (12): 5582-5587.

Southall, B. L., DeRuiter, S. L., Friedlaender, A. S., Stimpert, A. K., Goldbogen, J. A., Hazen, E. L., Casey, C., Fregosi, S., Cade, D. E., Allen, A. N., Harris, C. M., Schorr, G., Moretti, D., Guan, S., Calambokidis, J. 2019. Behavioral responses of individual blue whales (*Balaenoptera musculus*) to mid-frequency military sonar. *Journal of Experimental Biology*. 222, jeb190637

Burford, B. P., Carey, N., Gilly, W. F., Goldbogen, J. A. 2019. Grouping reduces metabolic demand of a social squid. *Marine Ecology Progress Series*. 612: 141-150.

Arranz, P., Benoit-Bird, K. B., Friedlaender, A. S., Hazen, E. L., Goldbogen, J. A., Stimpert, A. K., DeRuiter, S. L., Calambokidis, J., Southall, B. L., Fahlman, A., Tyack, P. L. 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*. 7:53. doi: 10.3389/fevo.2019.00053.

Kahane-Rappoport, S. R. and Goldbogen, J. A. 2018. Allometric scaling of morphology and engulfment capacity in rorqual whales. *Journal of Morphology*. 1-13. doi.org/10.1002/jmor.20846.

Werth, A. J., Potvin, J., Shadwick, R. E., Jensen, M. M., Cade, D. E., Goldbogen, J. A. 2018. Filtration area scaling and evolution in mysticetes: trophic niche partitioning and the curious cases of sei and pygmy right whales. *Biological Journal of the Linnean Society*. 125(2): 264-279.

Cade, D. E., Barr, K. R., Calambokidis, J., Friedlaender, A. S., Goldbogen, J. A. 2018. Determining forward speed from accelerometer jiggle in aquatic environments. *Journal of Experimental Biology*. 221:jeb170449.

Pirotta, E., Mangel, M., Costa, D. P., Mate, B., Goldbogen, J. A., Palacios, D. M., Huckstadt, L., McHuron, E. A., Schwarz, L., New, L. 2018. A dynamic state model of migratory behavior and physiology to assess the consequences of environmental changes and anthropogenic disturbance on marine vertebrates. *American Naturalist*. 191(2): E40-E56.

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Shadwick, R. E., Potvin, J., Goldbogen, J. A. 2019. Lunge feeding in rorqual whales. *Physiology*. 34: 409-418.

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Shadwick, R. E. and Goldbogen, J. A. 2012. Muscle function and swimming in sharks. For a special issue: The Current Status of Elasmobranchs: Biology, Fisheries and Conservation. *Journal of Fish Biology*. 80: 1904-1939.

Book chapters (not peer reviewed):

Goldbogen, J. A., Potvin, J., Fish, F. E. 2015. Hydrodynamics. In “**Marine Mammal Physiology: Requisites for Ocean Living**”. Editors: Michael Castellini and Jo-Ann Mellish. pp 3-28. CRC Press. (2<sup>nd</sup> edition published 2023)

Marshall, C. M. and Goldbogen, J. A. 2015. Feeding Mechanisms. In “**Marine Mammal Physiology: Requisites for Ocean Living**”. Editors: Michael Castellini and Jo-Ann Mellish. pp 95-118. CRC Press. (2<sup>nd</sup> edition published 2023)

Scientific magazine articles (not peer reviewed):

Goldbogen, J. A. 2010. The Ultimate Mouthful: Lunge Feeding in Rorqual Whales. *American Scientist*. 98: 124-131.

Formal comment (peer reviewed):

Tyack, P. L., Calambokidis, J., Friedlaender, A., Goldbogen, J., & Southall, B. (2015). Formal Comment on Schorr GS, Falcone EA, Moretti DJ, Andrews RD (2014) First Long-Term Behavioral Records from Cuvier’s Beaked Whales (*Ziphius cavirostris*) Reveal Record-Breaking Dives. *PLOS ONE*. 9 (3): e92633. doi:10.1371/journal.pone.0092633.

Invited commentary (not peer reviewed):

Goldbogen, J. A. Physiological constraints on marine mammal body size. 2018. *Proceedings of the National Academy of Sciences*. 115 (16) 3995-3997.

Goldbogen, J. A. and Meir, J. U. 2014. Origin of the time-depth recorder: the device that revolutionized marine organismal biology. *Journal of Experimental Biology*. 217:167-168.

## **E. Grants**

Current grants:

### **Office of Naval Research, Marine Mammal Biology**

Title: Measuring heart rate to assess the stress response

Funding Period: 07/01/2019 - 11/30/2022

### **Stanford Woods Institute for the Environment (EVP Grants)**

Title: Reconstructing ecological regime shifts in the Southern Ocean as a blueprint for pelagic ocean restoration

Funding Period: 10/1/2022-9/30/2024

### **Human Frontier Science Program**

Title: Integrating materials, behavior, robotics and architecture in giant filter-feeding sharks

Funding Period: 12/01/2020 - 11/30/2023

### **MAC3 Philanthropies**

Title: Are whales global climate engineers? Using new tagging and remote sensing technologies to understand how the largest animals from the Antarctic can impact the global carbon cycle

Funding Period: 10/21/2020 – present

### **Kelp Marine Research (Prime Sponsor Office of Naval Research)**

Title: Quantifying the effect of anthropogenic noise sources on cetaceans fine-scale diving biomechanics and its energetic and physiological implications

Funding Period: 9/1/2022-2/28/2024

**Southall Environmental Associates (Prime Sponsor: Internal Association of Oil and Gas Producers)**

Title: Quantifying Behavioral Reactions of Very Low Frequency Cetaceans to Marine Vibrators.  
Funding Period: 4/1/2023-12/31/2024

**Southall Environmental Associates (Prime Sponsor: Internal Association of Oil and Gas Producers)**

Title: Quantifying Behavioral Reactions of Very Low Frequency Cetaceans to Marine Vibrators.  
Funding Period: 4/1/2023-12/31/2024

**Oregon State University (Prime Sponsor: Bureau of Ocean Energy Management)**

Title: “Tag You’re It!” Habitat Use of Whales of the U.S. West Coast and Hawai’i  
Funding Period: 10/1/2022-2/28/2024

Completed grants:

**National Oceanic Atmospheric Administration**

Title: Sanctuary acoustic data project: Quantifying marine sanctuary soundscapes to build effective management and outreach tools  
Funding Period: 09/01/2020 - 09/30/2020

**National Science Foundation, Office of Polar Programs**

Title: Collaborative Research: Foraging behavior and ecological role of the least studied Antarctic krill predator, the Antarctic minke whale (*Balaenoptera bonaerensis*)  
Funding Period: 06/01/2017 - 05/31/2020

**National Science Foundation, Integrative Organismal Systems**

Participating Investigators: Jean Potvin, St Louis University; Frank Fish, West Chester University  
Title: Collaborative Research: Scaling of unsteady locomotor performance and maneuverability  
Funding Period: 05/15/2017 - 04/30/2020

**Office of Naval Research, Young Investigator Award**

Title: Biomechanical and energetic analyses of whale-borne tag sensor data to assess the population consequences of acoustic disturbance  
Funding Period: 06/01/2016 - 05/31/2019

**Cascadia Research (Prime Sponsor: Department of the Navy)**

Title: Southern California Cetacean Behavioral Response Study  
Funding Period: 01/01/2014 - 09/30/2018

**Department of Defense, Defense University Research Instrumentation Program**

Title: A mobile active acoustic system for measuring baleen whale prey fields to distinguish behavioral responses to military sonar from ecological dynamics  
Funding Period: 07/15/2016 - 07/14/2017

**Stanford Woods Institute for the Environment (EVP Grants)**

Title: Natural and Virtual Realms: An Integrative Approach Towards Understanding Natural and Anthropogenic Drivers of Animal Behavior and Energetics in Marine Ecosystems  
Funding Period: 10/01/2014 - 09/30/2016

**Southall Environmental Associates, Inc. (Prime Sponsor: Department of the Navy)**

Title: Southern California Cetacean Behavioral Response Study – Using Tags and Scientific Echosounders to Study Predator-Prey Interactions

Funding Period: 07/01/2015 - 12/31/2015

**Natural Sciences and Engineering Research Council of Canada\***

Title: A Production and consumption of krill in the Gulf of St. Lawrence: toward an ecosystem-based stock assessment

Funding Period: 11/18/2013 - 09/05/2016

\*No funds acquired because Goldbogen moved to the USA.

**F. Oral presentations**

Scientific meetings and symposia:

Keynote Speaker – The 8<sup>th</sup> International Bio-logging Science Symposium, Tokyo, March, 2024  
Invited Speaker – Journal of Experimental Biology Symposium – Integrating Biomechanics, Energetics and Ecology in Locomotion, Mürren, Switzerland, March, 2024  
Marconi – SCPNT Symposium on Advances in Communications, Palo Alto, CA, November 2016  
Society for Experimental Biology, How energy constrains ecology, Brighton, UK, July 2016  
Southern California Academy of Sciences, Los Angeles, CA, May 2016  
American Association of Anatomists, San Diego, CA, April 2016  
AAAS Meeting, Special Session: Evolution of Giants - The Great Whales, Boston, MA, February 2013  
World Congress of Biomechanics, Evolutionary of Animal Locomotion, Boston, July 2014  
The 5<sup>th</sup> Bio-logging Science Symposium, Strasbourg, France, September 2014  
SICB Symposium: Novel methods for the analysis of animal movement, Charleston, SC, January 2012  
Society for Experimental Biology: physiology of diving in endotherms, Austria, June 2012 (declined)  
On-Animal Movement Sensing Workshop, Hobart, Tasmania, March 2011

Invited departmental seminars:

Moss Landing Marine Lab, Moss Landing, CA, December 2020  
University of California Berkeley, Department of Integrative Biology, November 2020  
Duke University Marine Lab, Beaufort, NC, October 2020  
Department of Zoology, University of British Columbia, Vancouver, BC, February 2017  
Scripps Institution of Oceanography, University of California - San Diego, CA, November 2016  
University of California, Santa Barbara, CA, November 2016  
Moss Landing Marine Laboratories, Moss Landing, CA, September 2016  
University of Wyoming, Laramie, WY, March 2016  
University of California, Berkeley, CA, November 2015 and November 2017  
Oregon Institute of Marine Biology, University of Oregon, Charleston, OR, October 2015  
Monterey Bay Aquarium Research Institute, Moss Landing, CA, June 2014  
University of St Andrews, Fife, Scotland, U.K., January 2014  
University of British Columbia, Vancouver, BC, December 2012 (Interview for Asst. Professor)  
Stanford University, Hopkins Marine Station, Monterey, CA, November 2012 (Interview for Asst. Professor)  
University of Washington, Tacoma, WA, November 2012  
Dalhousie University, March 2011 (Interview for Asst. Professor and Industrial Research Chair)  
University of California, Davis, The SeaDoc Society, Orcas Island, January 2011  
San Diego State University, September 2010  
University of California, Riverside, March 2010  
Hollings Marine Laboratory, NOAA, Charleston, SC, June 2009

University of California, Santa Cruz, CA, March 2009 (Interview for Asst. Professor)  
Fisheries Centre, University of British Columbia, Vancouver BC, February 2009  
Bamfield Marine Sciences Centre, Bamfield, BC, July 2008  
Western Washington University, Bellingham, WA, October 2008  
Brown University, Providence, RI, December 2007  
University of California, Berkeley, CA, 2007

## G. Teaching

- BIO 14. Biologging and Biotelemetry, Palo Alto Campus, Lectures + Lab. Winter 2016 (6 students). Spring 2018 (6 students). This course was developed with funds that I acquired through the Hoagland Award for Teaching Innovation, Stanford University, VPUE, H&S Dean's Office.
- OCEANS 125. Environmental Change and Marine Biodiversity of Monterey Bay. Spring 2023 (24 students + waitlist).
- BIOHOPK 179H/279H. Physiological Ecology of Marine Megafauna, Hopkins Marine Station Campus, Lectures + Lab. Spring 2015 (7 students), Spring 2017 (6 students).
- BIOHOPK 234H. Topics in Comparative and Environmental Physiology. Graduate level seminar. Spring 2017 (3 graduate students). Spring 2018 (7 graduate students). Spring 2019 (12).
- BIO 3. Frontiers in Marine Biology, Palo Alto Campus, One lecture per quarter. Fall 2014, Fall 2015, Fall 2016, Fall 2017, Fall 2018, Fall 2019.
- BIOHOPK 173H/273H. Marine Conservation Biology. Hopkins Marine Station Campus, Two lectures and one hands-on lab exercise. Spring 2014.
- BIOHOPK 323H. Stanford at Sea. Hopkins Marine Station Campus, 1 lecture. Spring 2017. Spring 2019.
- BIO 3N. Views of a Changing Sea: Literature and Science. One field trip. Spring 2017.
- BIOHOPK 84. Physiology (Foundations course). Spring 2018.
- BIOHOPK 175. Marine Science and Conservation in a Changing World. Spring 2019.
- BIOHOPK 183H. Introduction to Ecology (Spring 2019 cancelled due to pandemic)

## H. Outreach and broader impact of research program (Selected, 2014-2022)

### Exhibits:

Our lab's research was featured in an exhibit at the American Museum of Natural History (2018).

See also our collaboratively developed interactive lesson plan:

<https://www.amnh.org/learn-teach/curriculum-collections/giants-of-the-sea>

### Podcasts and Interviews:

Big Biology Podcast:

<https://www.bigbiology.org/episodes/2020/10/22/ep-50-big-blue-how-whales-evolved-to-become-ocean-titans-with-jeremy-goldbogen>

The scientific article "Goldbogen et al. (2019) *Science*" was featured in:  
on NPR's Science Friday:

<https://www.sciencefriday.com/segments/why-are-whales-so-big/>



Coverage of lab's research and publications in the media (selected):

The Stanford whale biologist discusses a pod of orcas taking down a blue whale – “arguably one of the most dramatic and intense predator-prey interactions on the planet.”:

<https://news.stanford.edu/2022/02/07/four-questions-jeremy-goldbogen/>

Our lab's research, in general, was featured by The New York Times:

<https://www.nytimes.com/2017/07/07/science/humpback-whale-video-camera.html>

Our lab's research, in general, was featured by Stanford News:

<https://news.stanford.edu/2020/07/15/studying-whales-high-tech-tools/>

The scientific article “Oestreich et al. (2020) *Current Biology*” was featured in:

NPR's All Things Considered, Smithsonian Magazine, Popular Science,

<https://news.stanford.edu/2020/10/01/pattern-whale-songs-predicts-migration/>

The scientific article “Flammang et al. (2020) *Journal of Experimental Biology*” was featured in:

CBC Radio, New Scientist, and NY Times:

<https://www.nytimes.com/2020/10/29/science/remoras-suckerfish-whales.html>

The scientific article “Goldbogen et al. (2019) *PNAS*” was featured in:

The Atlantic, Reuters, NY Times, and Stanford News (Video viewed over 146,797 times):

<https://news.stanford.edu/2019/11/25/first-ever-recording-blue-whales-heart-rate/>

The scientific article “Cade et al. (2020) *PNAS*” was featured in:

Forbes and NPR's All Things Considered:

<https://www.npr.org/2019/12/27/791918061/why-an-agile-anchovy-isnt-able-to-escape-a-ponderous-whale>

The scientific article “Slater, Goldbogen, Goldbogen (2017)” was featured by: NPR Science Friday, NY Times, BBC, Nature, Science, PBS, The Week, Wired, The Guardian, The Atlantic, CBC Quirks & Quarks, LA Times, Washington Post, Der Spiegel, Smithsonian, Scientific American, and NPR Morning Edition:

<https://www.npr.org/sections/thetwo-way/2017/05/23/529505847/how-the-biggest-animal-on-earth-got-so-big>

The scientific article and research in “Cade, Friedlaender, Calambokidis, Goldbogen (2016)” was featured by PBS:

<https://youtu.be/-1AmyfR4OHA>

...also covered by Stanford News:

<http://news.stanford.edu/2016/09/22/unique-feeding-habits-whales-come-light/>

...and featured on the BBC Big Blue Live on prime-time TV (also featured on PBS prime time):

<http://www.bbc.co.uk/programmes/p0314qqh>

... also featured prominently on the BBC ONE website as an education module to accompany the Big Blue Live TV program:

<http://www.bbc.co.uk/programmes/articles/34VDFMDrV7tWFqsCNCNgz0M/how-do-blue-whales-get-so-big>

Our research from “Natural and Virtual Realms: An Integrative Approach Towards Understanding Natural and Anthropogenic Drivers of Animal Behavior and Energetics in Marine Ecosystems” was featured by BBC Earth (viewed over 600k times):

<https://youtu.be/kJv0eYQp1lo>

Local public Lectures and other outreach efforts:

Whale Soirée, Greater Farallones National Marine Sanctuary, Sausalito, CA

Plenary lecture at the 50<sup>th</sup> Anniversary of the American Cetacean Society, Monterey, CA

Pacific Grove Natural History Museum, Pacific Grove, CA

Whale Fest, Fisherman's Wharf, Monterey, CA

Seymour Discovery Center, University of California Santa Cruz, CA

Friends of Hopkins, Hopkins Marine Station, Pacific Grove, CA