Stanford



Jeremy Goldbogen

Professor of Oceans and, by courtesy, of Biology

Bio

BIO

Jeremy Goldbogen is a comparative physiologist studying the integrative biology of marine organisms, with a particular focus on the feeding biomechanics, energetics, and foraging ecology of baleen whales.

Goldbogen received his B.S. in Zoology from the University of Texas at Austin, where he began his research career studying the biomechanics of locomotion in hummingbirds and Antarctic pteropods. He earned his M.S. in Marine Biology from Scripps Institution of Oceanography and his Ph.D. in Zoology from the University of British Columbia, where his dissertation on the mechanics and energetics of rorqual lunge feeding earned him the Governor General's Gold Medal—UBC's most outstanding PhD award. Following postdoctoral positions at Scripps and the Cascadia Research Collective, he joined Stanford's faculty in 2014.

His research program uses cutting-edge bio-logging technology—animal-attached sensors including accelerometers, video cameras, and echosounders—to study the behavior and physiology of whales in their natural environment. His lab has made groundbreaking discoveries about whale feeding mechanics, cardiovascular function, and the ecological consequences of body size in cetaceans. Notable achievements include the first recordings of a blue whale's heart rate and insights into why whales are big but not bigger.

ACADEMIC APPOINTMENTS

- Professor, Oceans
- Professor (By courtesy), Biology
- Member, Bio-X

HONORS AND AWARDS

- Terman Fellowship, Stanford University (2017-2020)
- Young Investigator Award, Office of Naval Research (2016-2020)
- Hoagland Award for Teaching Innovation, Vice Provost for Undergraduate Education, Humanities and Sciences Dean's Office, Stanford University (2015)

PROFESSIONAL EDUCATION

- BSc, University of Texas at Austin , Zoology (2002)
- MSc, Scripps Institution of Oceanography, University of California - San Diego , Marine Biology (2005)
- PhD, University of British Columbia , Zoology (2010)

LINKS

- Stanford Whale Lab: https://whales.stanford.edu/
- High-tech tools to study whales in the wild (Video): https://youtu.be/ndv25YwRtgc?si=CGCTwV2qRonmzF8w
- First recording of a blue whale's heart rate (Video): https://youtu.be/hxL4XkHVSxg?si=AEsmNge43Uf75Aft
- 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/stories/2022/02/four-questions-jeremy-goldbogen

Teaching

COURSES

2026-27

- Topics in Comparative and Environmental Physiology: OCEANS 234H (Spr)
- Whales and Whale Ecosystems: OCEANS 135H, OCEANS 235H (Spr)

2025-26

- Environmental Change and Marine Biodiversity: OCEANS 125H, OCEANS 225H (Spr)
- Whales and Whale Ecosystems: OCEANS 135H, OCEANS 235H (Spr)

2024-25

- Bio-logging and Bio-telemetry: OCEANS 14H (Spr)
- Environmental Change and Marine Biodiversity: OCEANS 125H, OCEANS 225H (Spr)
- Topics in Comparative and Environmental Physiology: OCEANS 234H (Spr)

2023-24

- Bio-logging and Bio-telemetry: OCEANS 14H (Spr)
- Environmental Change and Marine Biodiversity: OCEANS 125H, OCEANS 225H (Spr)
- Get to Know Your Oceans: OCEANS 300A (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Sabrina Daley, Amanda Vanegas Ledesma

Postdoctoral Faculty Sponsor

Ashley Blawas, Elsie Cecilia Carrillo

Doctoral Dissertation Advisor (AC)

Jack Barkowski, Hannah Clayton

Master's Program Advisor

Nivitha Mavuluri

Doctoral (Program)

Jack Barkowski

Publications

PUBLICATIONS

- **High-precision localized feeding by blue whales.** *Current biology : CB*

Ryan, J. P., Vanegas Ledesma, A. I., Oestreich, W. K., Benoit-Bird, K. J., Goldbogen, J. A., Calambokidis, J., Fahlbusch, J. A.
2026

- **Kinematics of Gray Whale (Eschrichtius robustus) Foraging on Infaunal Ghost Shrimp (Neotrypnea californiensis).** *The Journal of experimental biology*
  Clayton, H. M., Cade, D. E., Fahlbusch, J. A., Kendall-Bar, J., Calambokidis, J., Pyenson, N., Goldbogen, J. A.
  2026
- **Sprint-like cardiac dynamics support repeated acrobatic lunges in foraging rorqual whales.** *Proceedings of the National Academy of Sciences of the United States of America*
  Blawas, A. M., Fahlbusch, J., Barkowski, J., Cade, D. E., Calambokidis, J., Friedlaender, A. S., Southall, B., Ponganis, P. J., Goldbogen, J. A.
  2026; 123 (31): e2613082123
- **Mesothermic fishes face high fuel demands and overheating risk in warming oceans.** *Science (New York, N.Y.)*
  Payne, N. L., Snelling, E. P., Peralta-Maraver, I., Cade, D. E., Chapple, T. K., McInturf, A. G., Watanabe, Y. Y., Sims, D. W., Queiroz, N., da Costa, I., Sousa, L. L., Goldbogen, J. A., Dolton, et al
  2026; 392 (6795): 301-305
- **Life in the slowest lane: Feeding allometry lowers metabolic rate scaling in the largest whales.** *Science advances*
  Blawas, A. M., Videsen, S. K., Cade, D. E., Calambokidis, J., Friedlaender, A. S., Johnston, D. W., Madsen, P. T., Goldbogen, J. A.
  2025; 11 (32): eadw2232
- **Submesoscale coupling of krill and whales revealed by aggregative Lagrangian coherent structures.** *Proceedings. Biological sciences*
  Fahlbusch, J. A., Cade, D. E., Hazen, E. L., Elliott, M. L., Saenz, B. T., Goldbogen, J. A., Jahncke, J.
  2024; 291 (2017): 20232461
- **Cheap gulp foraging of a giga-predator enables efficient exploitation of sparse prey.** *Science advances*
  Videsen, S. K., Simon, M., Christiansen, F., Friedlaender, A., Goldbogen, J., Malte, H., Segre, P., Wang, T., Johnson, M., Madsen, P. T.
  2023; 9 (25): eade3889
- **Minke whale feeding rate limitations suggest constraints on the minimum body size for engulfment filtration feeding.** *Nature ecology & evolution*
  Cade, D. E., Kahane-Rapport, S. R., Gough, W. T., Bierlich, K. C., Linsky, J. M., Calambokidis, J., Johnston, D. W., Goldbogen, J. A., Friedlaender, A. S.
  2023
- **How Whales Dive, Feast, and Fast: The Ecophysiological Drivers and Limits of Foraging in the Evolution of Cetaceans** *ANNUAL REVIEW OF ECOLOGY EVOLUTION AND SYSTEMATICS*
  Goldbogen, J. A., Pyenson, N. D., Madsen, P. T.
  2023; 54: 307-325
- **Oceanic giants dance to atmospheric rhythms: Ephemeral wind-driven resource tracking by blue whales.** *Ecology letters*
  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. L., Joseph, J. E., Margolina, T., Calambokidis, J., DeVogelaere, et al
  2022
- **Blue whales increase feeding rates at fine-scale ocean features.** *Proceedings. Biological sciences*
  Fahlbusch, J. A., Czapanskiy, M. F., Calambokidis, J., Cade, D. E., Abrahms, B., Hazen, E. L., Goldbogen, J. A.
  2022; 289 (1981): 20221180
- **Baleen whale prey consumption based on high-resolution foraging measurements.** *Nature*
  Savoca, M. S., Czapanskiy, M. F., Kahane-Rapport, S. R., Gough, W. T., Fahlbusch, J. A., Bierlich, K. C., Segre, P. S., Di Clemente, J., Penry, G. S., Wiley, D. N., Calambokidis, J., Nowacek, D. P., Johnston, et al
  2021; 599 (7883): 85-90
- **Animal-Borne Metrics Enable Acoustic Detection of Blue Whale Migration.** *Current biology : CB*
  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
- **Energetic and physical limitations on the breaching performance of large whales.** *eLife*

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, et al
2020; 9

- **Why whales are big but not bigger: Physiological drivers and ecological limits in the age of ocean giants.** *Science (New York, N.Y.)*
  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., Tonnesen, P., Gough, et al
  2019; 366 (6471): 1367–72

- **Extreme bradycardia and tachycardia in the world's largest animal** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  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; 116 (50): 25329–32

- **Memory and resource tracking drive blue whale migrations** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Abrahms, B., Hazen, E. L., Aikens, E. O., Savoca, M. S., Goldbogen, J. A., Bograd, S. J., Jacox, M. G., Irvine, L. M., Palacios, D. M., Mate, B. R.
  2019; 116 (12): 5582–87

- **Predator-informed looming stimulus experiments reveal how large filter feeding whales capture highly maneuverable forage fish.** *Proceedings of the National Academy of Sciences of the United States of America*
  Cade, D. E., Carey, N. n., Domenici, P. n., Potvin, J. n., Goldbogen, J. A.
  2019

- **Physiological constraints on marine mammal body size** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Goldbogen, J. A.
  2018; 115 (16): 3995–97

- **Context-dependent lateralized feeding strategies in blue whales** *CURRENT BIOLOGY*
  Friedlaender, A. S., Herbert-Read, J. E., Hazen, E. L., Cade, D. E., Calambokidis, J., Southall, B. L., Stimpert, A. K., Goldbogen, J. A.
  2017; 27 (22): R1206–R1208

- **A hydrodynamically active flipper-stroke in humpback whales** *CURRENT BIOLOGY*
  Segre, P. S., Seakamela, S., Meyer, M. A., Findlay, K. P., Goldbogen, J. A.
  2017; 27 (13): R636–R637

- **Independent evolution of baleen whale gigantism linked to Plio-Pleistocene ocean dynamics.** *Proceedings. Biological sciences*
  Slater, G. J., Goldbogen, J. A., Pyenson, N. D.
  2017; 284 (1855)

- **How Baleen Whales Feed: The Biomechanics of Engulfment and Filtration.** *Annual review of marine science*
  Goldbogen, J. A., Cade, D. E., Calambokidis, J., Friedlaender, A. S., Potvin, J., Segre, P. S., Werth, A. J.
  2017; 9: 367-386

- **Kinematic Diversity in Rorqual Whale Feeding Mechanisms** *CURRENT BIOLOGY*
  Cade, D. E., Friedlaender, A. S., Calambokidis, J., Goldbogen, J. A.
  2016; 26 (19): 2617-2624

- **Blue whales (Balaenoptera musculus) optimize foraging efficiency by balancing oxygen use and energy gain as a function of prey density.** *Science advances*
  Hazen, E. L., Friedlaender, A. S., Goldbogen, J. A.
  2015; 1 (9)

- **Stretchy nerves are an essential component of the extreme feeding mechanism of rorqual whales** *CURRENT BIOLOGY*
  Vogl, A. W., Lillie, M. A., Piscitelli, M. A., Goldbogen, J. A., Pyenson, N. D., Shadwick, R. E.
  2015; 25 (9): R360-R361

- **Increases in foraging performance of humpback whales in multi-predator feeding aggregations with California sea lions.** *Philosophical transactions of the Royal Society of London. Series B, Biological sciences*

Krylova, A., Blawas, A. M., Fahlbusch, J. A., Calambokidis, J., Clayton, H., Friedlaender, A. S., Stimpert, A. K., Goldbogen, J. A., Cade, D. E.
2026; 381 (1961)

- **Energetic benefits of resting behaviour in humpback whale mother-calf pairs revealed by biologging and UAS-photogrammetry.** *Conservation physiology*
  Hollers, A., Gough, W. T., van Aswegen, M., Szabo, A., Evans, L., Currie, J. J., Blawas, A. M., Fahlman, A., Goldbogen, J. A., Bejder, L.
  2026; 14 (1): coag041
- **Meet me in the middle: potential collaborative benthic hunting in humpback whales (Megaptera novaeangliae)** *BEHAVIORAL ECOLOGY AND SOCIOBIOLOGY*
  Wiley, D. N., Cade, D. E., Friedlaender, A. S., Goldbogen, J., Kendall-Bar, J., Parks, S. E., Thompson, M. A., Weinrich, M., Silva, T. L.
  2026; 80 (7)
- **Constraints on lunge feeding: krill can clog the baleen of filter-feeding whales.** *The Journal of experimental biology*
  Ackermann, I. A., Cade, D. E., Goldbogen, J. A., Denny, M. W.
  2026; 229 (13)
- **Baleen hormone analyses reveal stress and reproductive life-history of the critically endangered Rice's whale (Balaenoptera ricei).** *PloS one*
  Evey, R. G., Savoca, M. S., Ososky, J., McGowen, M. R., Goldbogen, J. A., Cherney, M., Case, A., Hunt, K. E.
  2026; 21 (5): e0347749
- **Delta Wing-Shaped Upper Jaw as a Control Surface to Stabilize Rorqual Whales During Lunge-Feeding** *MARINE MAMMAL SCIENCE*
  Fish, F. E., Sebo, S. P., Gough, W. T., Segre, P. S., Immekus, R., Potvin, J., Moored, K. W., Goldbogen, J. A.
  2026; 42 (2)
- **The key to bubble-net feeding: how humpback whale morphology functionally differs from other baleen whales.** *The Journal of experimental biology*
  Nemeth, C., Gough, W. T., Segre, P. S., Fish, F. E., Szabo, A., Fassmann, W. N., Thomson, S. L., van Aswegen, M., Burrows, J. A., Chenoweth, E. M., di Clemente, J., Friedlaender, A. S., Goldbogen, et al
  2025; 228 (16)
- **A workflow of open-source tools for drone-based photogrammetry of marine megafauna.** *PeerJ*
  Bierlich, K. C., Hewitt, J., Bird, C. N., Johnston, D. W., Dale, J., Pirotta, E., Schick, R. S., Stewart, J. D., New, L., Chimienti, E., Goldbogen, J. A., Friedlaender, A. S., Cantor, et al
  2025; 13: e19768
- **Functional models from limited data: A parametric and multimodal approach to anatomy and 3D kinematics of feeding in basking sharks (Cetorhinus maximus).** *Anatomical record (Hoboken, N.J. : 2007)*
  Li, T., Schindler, M., Paskin, M., Surapaneni, V. A., Scott, E., Hauert, S., Payne, N., Cade, D. E., Goldbogen, J. A., Mollen, F. H., Baum, D., Hanna, S., Dean, et al
  2025
- **How deep is their lunch: Inshore South African Bryde's whales shift attack mode at different depths** *MARINE ECOLOGY PROGRESS SERIES*
  Di Clemente, J., Segre, P., Garagouni, M., Wisniewska, D. M., Kahane-Rapport, S., Gough, W. T., Wahlberg, M., Goldbogen, J. A., Penry, G. S., Nabe-Nielsen, J., Briefer, E. F.
  2025; 761: 115-128
- **Audible changes in marine trophic ecology: Baleen whale song tracks foraging conditions in the eastern North Pacific.** *PloS one*
  Ryan, J. P., Oestreich, W. K., Benoit-Bird, K. J., Waluk, C. M., Rueda, C. A., Cline, D. E., Zhang, Y., Cheeseman, T., Calambokidis, J., Fahlbusch, J. A., Barkowski, J., Fleming, A. H., Turner Tomaszewicz, et al
  2025; 20 (2): e0318624
- **How do feeding biomechanics, extreme predator-prey size ratios and the rare enemy effect determine energetics and ecology at the largest scale?** *The Journal of experimental biology*
  Goldbogen, J. A., Cade, D. E.
  2025; 228 (Suppl_1)
- **Organic ligands in whale excrement support iron availability and reduce copper toxicity to the surface ocean** *COMMUNICATIONS EARTH & ENVIRONMENT*

Monreal, P. J., Savoca, M. S., Babcock-Adams, L., Moore, L. E., Ruacho, A., Hull, D., Pallin, L. J., Nichols, R. C., Calambokidis, J., Resing, J. A., Friedlaender, A. S., Goldbogen, J., Bundy, et al
2025; 6 (1)

- **Whale recovery and the emerging human-wildlife conflict over Antarctic krill.** *Nature communications*
  Savoca, M. S., Kumar, M., Sylvester, Z., Czapanskiy, M. F., Meyer, B., Goldbogen, J. A., Brooks, C. M.
  2024; 15 (1): 7708
- **Whale baleen to monitor per- and polyfluoroalkyl substances (PFAS) in marine environments.** *Environmental science & technology letters*
  Savoca, M. S., Robuck, A. R., Cashman, M. A., Cantwell, M. G., Agvent, L. C., Wiley, D. N., Rice, R., Todd, S., Hunter, N. E., Robbins, J., Goldbogen, J. A., Lohmann, R.
  2024; 11 (8): 862-870
- **Behavioral response of megafauna to boat collision measured via animal-borne camera and IMU** *FRONTIERS IN MARINE SCIENCE*
  Chapple, T. K., Cade, D. E., Goldbogen, J., Massett, N., Payne, N., Mcinturf, A. G.
  2024; 11
- **Whale Baleen To Monitor Per- and Polyfluoroalkyl Substances (PFAS) in Marine Environments** *ENVIRONMENTAL SCIENCE & TECHNOLOGY LETTERS*
  Savoca, M. S., Robuck, A. R., Cashman, M. A., Cantwell, M. G., Agvent, L. C., Wiley, D. N., Rice, R., Todd, S., Hunter, N. E., Robbins, J., Goldbogen, J. A., Lohmann, R.
  2024
- **Evidence of sociality and group foraging in Antarctic minke whales (Balaenoptera bonaerensis)** *BEHAVIORAL ECOLOGY AND SOCIOBIOLOGY*
  Allen, J. A., Cade, D. E., Casey, C. B., Weindorf, S., Johnston, D. W., Linsky, J. M. J., Goldbogen, J. A., Nowacek, D. P., Friedlaender, A. S.
  2024; 78 (5)
- **Baleen-Plastic Interactions Reveal High Risk to All Filter-Feeding Whales from Clogging, Ingestion, and Entanglement** *OCEANS-SWITZERLAND*
  Werth, A. J., Kahane-Rapport, S. R., Potvin, J., Goldbogen, J. A., Savoca, M. S.
  2024; 5 (1): 48-70
- **Energy densities of key prey species in the California Current Ecosystem** *FRONTIERS IN MARINE SCIENCE*
  Price, S. E., Savoca, M. S., Kumar, M., Czapanskiy, M. F., McDermott, D., Litvin, S. Y., Cade, D. E., Goldbogen, J. A.
  2024; 10
- **Spin-leap performance by cetaceans is influenced by moment of inertia.** *The Journal of experimental biology*
  Fish, F. E., Nicastro, A. J., Cardenas, K. L., Segre, P. S., Gough, W. T., Kahane-Rapport, S. R., St Leger, J., Goldbogen, J. A.
  2023
- **Behavioural responses of fin whales to military mid-frequency active sonar.** *Royal Society open science*
  Southall, B. L., Allen, A. N., Calambokidis, J., Casey, C., DeRuiter, S. L., Fregosi, S., Friedlaender, A. S., Goldbogen, J. A., Harris, C. M., Hazen, E. L., Popov, V., Stimpert, A. K.
  2023; 10 (12): 231775
- **Acoustic behavior of gray whales tagged with biologging devices on foraging grounds** *FRONTIERS IN MARINE SCIENCE*
  Clayton, H., Cade, D. E. E., Burnham, R., Calambokidis, J., Goldbogen, J.
  2023; 10
- **Formation of a fringe: a look inside baleen morphology using a multimodal visual approach.** *Journal of morphology*
  Vandenberg, M. L., Cohen, K. E., Rubin, R. D., Goldbogen, J. A., Summers, A. P., Misty Paig-Tran, E. W., Kahane-Rapport, S. R.
  2023
- **A three-dimensional, dynamic blue whale model for research and scientific communication** *MARINE MAMMAL SCIENCE*
  Segre, P. S. S., Martin, J., Irschick, D. J. J., Goldbogen, J. A. A.
  2023
- **Seasonal gain in body condition of foraging humpback whales along the Western Antarctic Peninsula** *FRONTIERS IN MARINE SCIENCE*
  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., Nichols, R., Shero, et al

2022; 9

- **Fast and Furious: Energetic Tradeoffs and Scaling of High-Speed Foraging in Rorqual Whales** *INTEGRATIVE ORGANISMAL BIOLOGY*
  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., Szabo, A., Bejder, L., Goldbogen, et al
  2022; 4 (1): obac038

- **Intra-seasonal variation in feeding rates and diel foraging behaviour in a seasonally fasting mammal, the humpback whale.** *Royal Society open science*
  Nichols, R. C., Cade, D. E., Kahane-Rapport, S., Goldbogen, J., Stimpert, A., Nowacek, D., Read, A. J., Johnston, D. W., Friedlaender, A.
  2022; 9 (7): 211674

- **An accelerometer-derived ballistocardiogram method for detecting heartrates in free-ranging marine mammals.** *The Journal of experimental biology*
  Czapanskiy, M. F., Ponganis, P. J., Fahlbusch, J. A., Schmitt, T. L., Goldbogen, J. A.
  2022

- **High-speed chases along the seafloor put Bryde's whales at risk of entanglement** *CONSERVATION SCIENCE AND PRACTICE*
  Segre, P. S., di Clemente, J., Kahane-Rapport, S. R., Gough, W. T., Meyer, M. A., Lombard, A. T., Goldbogen, J. A., Penry, G. S.
  2022

- **The limits of convergence in the collective behavior of competing marine taxa.** *Ecology and evolution*
  Burford, B. P., Williams, R. R., Demetras, N. J., Carey, N., Goldbogen, J., Gilly, W. F., Harding, J., Denny, M. W.
  2022; 12 (3): e8747

- **Scaling of maneuvering performance in baleen whales: larger whales outperform expectations.** *The Journal of experimental biology*
  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, et al
  2022; 225 (5)

- **Acoustic signature reveals blue whales tune life-history transitions to oceanographic conditions** *FUNCTIONAL ECOLOGY*
  Oestreich, W. K., Abrahms, B., McKenna, M. F., Goldbogen, J. A., Crowder, L. B., Ryan, J. P.
  2022

- **Evidence for Size-Selective Predation by Antarctic Humpback Whales** *FRONTIERS IN MARINE SCIENCE*
  Cade, D. E., Kahane-Rapport, S. R., Wallis, B., Goldbogen, J. A., Friedlaender, A. S.
  2022; 9

- **Advancing the Interpretation of Shallow Water Marine Soundscapes** *FRONTIERS IN MARINE SCIENCE*
  McKenna, M. F., Baumann-Pickering, S., Kok, A. C. M., Oestreich, W. K., Adams, J. D., Barkowski, J., Fristrup, K. M., Goldbogen, J. A., Joseph, J., Kim, E. B., Kugler, A., Lammers, M. O., Margolina, et al
  2021; 08

- **Tools for integrating inertial sensor data with video bio-loggers, including estimation of animal orientation, motion, and position** *ANIMAL BIOTELEMETRY*
  Cade, D. E., Gough, W. T., Czapanskiy, M. F., Fahlbusch, J. A., Kahane-Rapport, S. R., Linsky, J. M. J., Nichols, R. C., Oestreich, W. K., Wisniewska, D. M., Friedlaender, A. S., Goldbogen, J. A.
  2021; 9 (1)

- **Sympatry and resource partitioning between the largest krill consumers around the Antarctic Peninsula** *MARINE ECOLOGY PROGRESS SERIES*
  Friedlaender, A. S., Joyce, T., Johnston, D. W., Read, A. J., Nowacek, D. P., Goldbogen, J. A., Gales, N., Durban, J. W.
  2021; 669: 1-16

- **Too big to study? The biologging approach to understanding the behavioural energetics of ocean giants.** *The Journal of experimental biology*
  Watanabe, Y. Y., Goldbogen, J. A.
  2021; 224 (13)

- **Scaling of oscillatory kinematics and Froude efficiency in baleen whales.** *The Journal of experimental biology*
  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., Segre, P., Stanworth, A., Weir, et al

2021

- **Modelling short-term energetic costs of sonar disturbance to cetaceans using high-resolution foraging data** *JOURNAL OF APPLIED ECOLOGY*
  Czapanskiy, M. F., Savoca, M. S., Gough, W. T., Segre, P. S., Wisniewska, D. M., Cade, D. E., Goldbogen, J. A.
  2021
- **Biomechanically distinct filter-feeding behaviors distinguish sei whales as a functional intermediate and ecologically flexible species** *JOURNAL OF EXPERIMENTAL BIOLOGY*
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