

# SELENE FREGOSI

Cooperative Institute for Marine Resources Studies  
Oregon State University and NOAA Pacific Marine Environmental Lab  
Hatfield Marine Science Center, Newport, OR, USA

selene.fregosi@gmail.com

sfregosi.github.io

## EDUCATION

<b>Oregon State University</b> PhD Wildlife Science <i>Applications of slow-moving autonomous platforms for passive acoustic monitoring and density estimation of marine mammals</i>	Corvallis, OR June 2020
MSc Wildlife Science <i>Development and evaluation of an animal-borne active acoustic tag to conduct minimally invasive behavioral response studies on marine mammals</i>	June 2015
<b>University of San Diego</b> BA Marine Science – Biology Concentration, <i>magna cum laude</i>	San Diego, CA May 2009

## PROFESSIONAL POSITIONS

<b>Cooperative Institute of Marine Resource Studies</b> <b>Oregon State University and NOAA Pacific Marine Environmental Laboratory</b> Post-doctoral Researcher <i>Supervisor: Dr. David Mellinger</i>	Newport, OR June 2020-present
<b>Southall Environmental Associates, Inc.</b> Associate Scientist <i>Supervisor: Dr. Brandon Southall</i>	Aptos, CA 2011-present
<b>Cooperative Institute of Marine Resource Studies</b> <b>Oregon State University and NOAA Pacific Marine Environmental Laboratory</b> <b>and Department of Fisheries and Wildlife</b> Graduate Research Fellow/Assistant (PhD) <i>Supervisors: Drs. Holger Klinck and David K. Mellinger</i>	Newport, OR October 2014 – June 2020
Graduate Research Fellow/Assistant (MSc) <i>Supervisors: Drs. Holger Klinck and Markus Horning</i>	Newport, OR April 2013 – June 2015
Research Assistant <i>Supervisor: Dr. Holger Klinck</i>	Newport, OR November 2012 – April 2013
<b>Duckworth Lab, University of Arizona</b> Wildlife Biologist/Lead <i>Supervisor: Dr. Renee Duckworth</i>	Missoula, MT May – Oct 2012; May – Aug 2011
<b>Pinniped Cognition and Sensory Systems Lab, University of California, Santa Cruz</b> Research assistant <i>Supervisor: Dr. Colleen Reichmuth</i>	Santa Cruz, CA Nov 2011 – Apr 2012; Oct 2010 – Mar 2011

## GLIDER PILOTING AND SHIP TIME

Total piloting time to date: 13 months; total ship time to date: 15 weeks

**Cooperative Institute of Marine Resource Studies**  
**Oregon State University and NOAA Pacific Marine Environmental Laboratory**  
**and Department of Fisheries and Wildlife**

*AUV piloting*: Mar 2014, SG158 – Oregon; Oct 2014, SG607 – Oregon; Apr 2015, SG607 & Q003 – Washington; May 2015, SG607 & SG608 – Oregon; Jun-Jul 2015, SG608 – Gulf of Mexico; Dec 2015 – Jan 2016, SG158, Q001 & Q002 – Southern California; Jul-Aug 2016, SG607 & Q003 – Southern California; May 2017, SG607 & SG639 – Oregon; Jun-Jul 2017, SG607 – Gulf of Mexico; May-Jun 2018, SG639 – Gulf of Mexico; Feb-Mar 2020 – Southern California.

*Ship time*: 20-23 December 2015 and 4-6 January 2016, U.S. Navy RSC-4, Point Loma, CA – Glider and float deployment and recovery; 18 July – 3 August 2016, *M/V Horizon* San Diego, CA, *M/V Vibrio*, Two Harbors, CA - Glider, float, moored hydrophone, and buoy deployment, daily repositioning, and recovery; day trips 2013-2018, Newport, OR – glider deployments

#### **Southall Environmental Associates, Inc.**

*Ship time*: 2-3 weeks/yr 2012-2017, *M/V Truth*, Santa Barbara, CA, *M/V Magician*, San Pedro, CA, *R/V Ziphid* and *Musculus* (RHIBs) – tagging, focal follow, photo id, passive/active acoustics

## **PUBLICATIONS**

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\*indicates undergraduate mentee

7. **Fregosi, S**, Harris, DV, Matsumoto, H, Mellinger, DK, Barlow, J, Baumann-Pickering, S, & Klinck, H. (In Press). Detections of whale vocalizations by simultaneously deployed bottom-moored and deep-water mobile autonomous hydrophones. *Frontiers in Marine Science*.
6. **Fregosi, S**, Harris, DV, Matsumoto, H, Mellinger, DK, Negretti\*, C, Moretti, DJ, Martin, SW, Matsuyama, B, Dugan, P, Klinck, H. (2020). Comparable detections of fin whale 20 Hz calls by mobile and stationary autonomous recorders. *Journal of the Acoustical Society of America*, 147(2):961-977
5. Southall, BL, DeRuiter, S, Friedlaender, AS, Stimpert, AK, Goldbogen, J, Hazen, E, Casey, C, **Fregosi, S**, Cade, D, Allen, A, Harris, C, Falcone, E, Schorr, G, Moretti, DJ, Gailey, G, Guan, S, Calambokidis, J. (2019). Behavioral responses of individual blue whales (*Balaenoptera musculus*) to mid-frequency military sonar. *Journal of Experimental Biology*, 222(5): jeb190637. doi:10.1242/jeb.190637
4. Niekirk, SL, **Fregosi, S**, Mellinger, DK, & Klinck, H. (2016). A complex baleen whale call recorded in the Marianas Trench Marine National Monument. *Journal of the Acoustical Society of America*, 140(3): EL1-6. DOI: 10.1121/1.4962377.
3. **Fregosi, S**, Klinck, H, Horning, M, Mellinger, DK, Costa, DP, Mann, DA, Sexton, K, Hückstädt, L & Southall, BL. (2016). An animal-borne active acoustic tag for minimally invasive behavioral response studies on marine mammals. *Animal Biotelemetry*, 4:9. DOI: 10.1186/s40317-016-0101-z.
2. Klinck, H, **Fregosi, S**, Matsumoto, H, Turpin, A, Mellinger, DK, Erofeev, A, Barth, JA, Shearman, RK, Jafarmadar, K, & Stelzer, R. (2016). Mobile autonomous platforms for passive-acoustic monitoring of high-frequency cetaceans, In A. Friebe and F. Haug (Eds.), *Robotic Sailing 2015*, Springer International Publishing, pp. 29–37. DOI: 10.1007/978-3-319-23335-2\_3
1. Matsumoto, H, Haxel, J, Turpin, A, **Fregosi, S**, Klinck, H, Klinck, K, Baumann-Pickering, S, Erofeev, A, Barth, JA, Dziak, RP, & Jones, C. (2015). Simultaneous operation of mobile acoustic recording systems off the Washington Coast for cetacean studies: System noise level evaluations, *Oceans 2015 MTS/IEEE*, 19-22 October, 2015, Washington, D.C.

#### *In Revision or Review*

- Harris, DV, **Fregosi, S**, Klinck, H, Mellinger, DK, Thomas, L. (In Revision). Assessing the effect of ocean glider movement on distance sampling assumptions. *Remote Sensing in Ecology and Conservation*.
- Barlow, J, Fregosi, S, Thomas, L, Harris, D, Griffiths, ET. (In Review). Acoustic detection range and population density of Cuvier's beaked whales estimated from near-surface hydrophones. *Journal of the Acoustical Society of America*.

## PEER-REVIEWED REPORTS

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7. Mellinger, DK & **Fregosi, S.** (2019). Assessment of ocean ambient sound levels in the northern Gulf of Mexico, May – June 2018. Preliminary Report. Prepared for the Bureau of Ocean Energy Management (BOEM), United States Department of the Interior under Contract No. M17PC00001, Task Order M17PD00011, issued to HDR Inc., Vienna, VA, USA. Prepared by Oregon State University, Newport, OR, USA. February 2019.
6. Klinck, H, Nieukirk, SL, **Fregosi, S.**, Klinck, K, Mellinger, DK, Lastuka, S, Shilling, GB, & Luby, JC. (2016). *Cetacean Studies on the Kona Coast in March 2010: Passive Acoustic Monitoring of Marine Mammals Using Gliders – Results from an Engineering Test*. Final Report. Prepared for Commander, U.S. Pacific Fleet, Environmental Readiness Division, Pearl Harbor, HI. Submitted to Naval Facilities Engineering Command (NAVFAC) Pacific, Pearl Harbor, HI under Contract No. N62470-10-D-3011, Task Order KB25, issued to HDR Inc., Honolulu, HI. Prepared by Oregon State University, Newport, OR, and the Applied Physics Laboratory of the University of Washington, Seattle, WA. April 2016. 36 pages.
5. Klinck, H, Nieukirk, SL, **Fregosi, S.**, Klinck, K, Mellinger, DK, Lastuka, S, Shilling, GB, & Luby, JC. (2016). *Cetacean Studies in the Gulf of Alaska Temporary Maritime Activities Area in July-August 2015: Passive Acoustic Monitoring of Marine Mammals Using Gliders*. Final Report. Prepared for Commander, U.S. Pacific Fleet, Environmental Readiness Division, Pearl Harbor, HI. Submitted to Naval Facilities Engineering Command (NAVFAC) Pacific, Pearl Harbor, HI under Contract No. N62470-10-D-3011, Task Order KB25, issued to HDR Inc., Honolulu, HI. Prepared by Oregon State University, Newport, OR, and the Applied Physics Laboratory of the University of Washington, Seattle, WA. March 2016. 44 pages.
4. Klinck, H, Nieukirk, SL, **Fregosi, S.**, Klinck, K, Mellinger, DK, Lastuka, S, Shilling, GB, & Luby, JC. (2016). *Cetacean Studies on the Mariana Islands Range Complex in March-April 2015: Passive Acoustic Monitoring of Marine Mammals Using Gliders*. Final Report. Prepared for Commander, U.S. Pacific Fleet, Environmental Readiness Division, Pearl Harbor, HI. Submitted to Naval Facilities Engineering Command (NAVFAC) Pacific, Pearl Harbor, HI under Contract No. N62470-10-D-3011, Task Order KB25, issued to HDR Inc., Honolulu, HI. Prepared by Oregon State University, Newport, OR, and the Applied Physics Laboratory of the University of Washington, Seattle, WA. March 2016. 52 pages.
3. Klinck, H, Nieukirk, SL, **Fregosi, S.**, Klinck, K, Mellinger, DK, Lastuka, S, Shilling, GB, & Luby, JC. (2015). *Cetacean Studies on the Quinault Range Site in June 2012: Passive Acoustic Monitoring of Marine Mammals Using Gliders – Results from an Engineering Test*. Final Report. Prepared for Commander, U.S. Pacific Fleet, Environmental Readiness Division, Pearl Harbor, HI. Submitted to Naval Facilities Engineering Command (NAVFAC) Pacific, Pearl Harbor, HI under Contract No. N62470-10-D-3011, Task Order KB25, issued to HDR Inc., Honolulu, HI. Prepared by Oregon State University, Newport, OR, and the Applied Physics Laboratory of the University of Washington, Seattle, WA. November 2015. 33 pages.
2. Klinck, H, Nieukirk, SL, **Fregosi, S.**, Klinck, K, Mellinger, DK, Lastuka, S, Shilling, GB, & Luby, JC. (2015). *Cetacean Studies in the Hawaii Range Complex in December 2014–January 2015: Passive Acoustic Monitoring of Marine Mammals Using Gliders*. Final Report. Prepared for Commander, U.S. Pacific Fleet, Environmental Readiness Division, Pearl Harbor, HI. Submitted to Naval Facilities Engineering Command (NAVFAC) Pacific, Pearl Harbor, HI under Contract No. N62470-10-D-3011, Task Order KB23, issued to HDR Inc., Honolulu, HI. Prepared by Oregon State University, Newport, OR, and the Applied Physics Laboratory of the University of Washington, Seattle, WA. October 2015. 58 pages.
1. Klinck, H, Nieukirk, SL, **Fregosi, S.**, Klinck, K, Mellinger, DK, Lastuka, S, Shilling, GB, & Luby, JC. (2015). *Cetacean Studies on the Mariana Islands Range Complex in September-November 2014: Passive Acoustic Monitoring of Marine Mammals Using Gliders*. Final Report. Prepared for Commander, U.S. Pacific Fleet, Environmental Readiness Division, Pearl Harbor, HI. Submitted to Naval Facilities Engineering Command (NAVFAC) Pacific, Pearl Harbor, HI under Contract

No. N62470-10-D-3011, Task Order KB25, issued to HDR Inc., Honolulu, HI. Prepared by Oregon State University, Newport, OR, and the Applied Physics Laboratory of the University of Washington, Seattle, WA. August 2015. 50 pages

## SELECTED CONFERENCE PRESENTATIONS

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- Fregosi, S**, Harris, D, Mellinger DK, Barlow, J, Thomas, L, Klinck, H. (2018). Detection probability of Cuvier's beaked whale clicks from a glider and a deep-water float. 174<sup>th</sup> Meeting of the Acoustical Society of America, Victoria, BC, Canada, 4-10 Nov 2018. (*Invited speaker*)
- Fregosi, S**, Klinck, H., Matsumoto, H, Turpin, A, Martin, SW, Matsuyama, BM, Helble, TA, Henderson, EE, Moretti, DJ, Morrissey, RP, and Mellinger, DK. (2016). Simultaneous recordings of marine mammal calls by a glider, float, and cabled hydrophone array. 172<sup>nd</sup> meeting of the Acoustical Society of America, Honolulu, HI, USA 28 Nov – 3 Dec 2016. (Oral presentation)
- Fregosi, S**, Klinck, H, Horning, M, Mellinger, DK, Costa, DP, Mann, DA, Sexton, K, Hückstädt, L & Southall, BL. (2015). Turn down for what: Animal-borne controlled exposure as an innovative tool for dive manipulation in free-ranging marine mammals. 21<sup>st</sup> Biennial Conference on the Biology of Marine Mammals, San Francisco, CA, USA, 12-18 December 2015. (Oral presentation)
- Fregosi, S**, Klinck, H, Matsumoto, H, Turpin, A, Mellinger, DK, & Baumann-Pickering, S. (2015). Field comparison of PAM capabilities between a commercially available glider, a float, and a bottom-moored system. The 7<sup>th</sup> International Detection, Classification, Localization, and Density Estimation Workshop, La Jolla, CA, USA, 13-16 July 2015. (Oral presentation)
- Fregosi, S**, Klinck, H, Horning, M, Mellinger, DK, Costa, DP, Mann, DA, Sexton, K, Hückstädt, L & Southall, BL. (2014). Integration of an active acoustic playback system with an animal-borne sensor suite for behavioral response studies. 5<sup>th</sup> International Bio-logging Science Symposium, Strasbourg, France, 22 - 27 September 2014. (Poster presentation)
- Fregosi, S**, Klinck, H, Horning, M, Mellinger, DK, Costa, DP, Mann, DA, Sexton, K, & Hückstädt, L. (2013). Use of an animal-borne active acoustic tag to conduct minimally-invasive behavioral response studies. 166<sup>th</sup> Meeting of the Acoustical Society of America, San Francisco, USA, 2-6 December 2013. (Oral presentation)
- Fregosi, S**, Klinck, H, Mellinger, DK, Bogue, NM, & Luby, JC. (2013). Acoustic observations of mid-frequency cetaceans in the eastern North Pacific using a glide. Sixth International Workshop on Detection, Classification, Localization, and Density Estimation of Marine Mammals using Passive Acoustics, 12-15 June 2013, St. Andrews, Scotland. (Poster presentation)

## FELLOWSHIPS AND GRANTS

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Total funding to date: \$460k

2019	Autonomous Underwater Vehicle Passive Acoustic Monitoring of Beaked Whales in the Southern California Area, NAVFAC HDR Contract (\$260k)
2018	Oregon Lottery Graduate Scholarship, OSU (\$2000)
2017	Mamie L. Markham Research Award, HMSC (\$8000)
2014	National Defense Science and Engineering Graduate Fellowship, American Society for Engineering Education & Office of Naval Research, 3 years (\$142k) Dr. Nancy Foster Scholarship, NOAA, declined
2013	Provost Distinguished Graduate Fellowship, OSU (\$36k) Markham First Year Award, Hatfield Marine Science Center (HMSC) (\$6000) Laurel's Block Grant Tuition Scholarship, OSU (\$6800)

## AWARDS AND HONORS

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2019	Briggs Scholarship in Biogeography, OSU (\$1000)
2018	Bob Moch Memorial Endowment Service Award, Hatfield Student Organization Robert Anthony Graduate Scholarship in Population Ecology, OSU (\$2000) Graduate Student Travel Award, OSU (\$1000) Student Travel Subsidy, Acoustical Society of America (\$200)
2018	GoMRI Scholar, Gulf of Mexico Research Initiative
2017	Thomas G. Scott Grant Scholarship, outstanding PhD student, OSU (\$2000) Lylian Brucefield Reynolds Scholarship Fund Award, HMSC (\$1000) Hatfield Student Organization Travel Award, HMSC (\$400)
2016	Chairman's Leadership Award, OSU Department of Fisheries and Wildlife Student Travel Subsidy, Acoustical Society of America (\$175) Mastin Student Travel Award, OSU, Dec 2016 (\$1000) Hatfield Student Organization Travel Award, HMSC, OSU, Dec 2015 (\$250)
2015	Student Travel Support, DCLDE Workshop (\$1200)
2014	Student Travel Support, 5 <sup>th</sup> Biologging Science Symposium (\$1400) Mastin Student Travel Award, OSU (\$2000) Hatfield Student Organization Travel Award, HMSC, OSU (\$250)
2013	Student Travel Award, DCLDE Workshop (\$1200) Student Travel Award, Acoustical Society of America (\$120)
Pre-2012	Trustee Scholarship, USD (\$48,000) Valedictorian, St. Patrick- St. Vincent High School

## SELECTED PUBLIC TALKS

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- Fregosi, S.** (2018). The How and Why of Using Underwater Gliders to Listen for Whales, Oregon Chapter of the American Cetacean Society, Newport Public Library, Newport, OR, USA 10 February 2018.
- Fregosi, S.**, Nelson, D, & Diogou, N. (2015). #SciComm: The Social Media – Science Connection. Monday Tech Talk, HMSC, Newport, OR, USA 2 February 2015.
- Fregosi, S** & Diogou, N. (2014). Do you speak whale? Oregon Chapter of the American Cetacean Society, Newport Public Library, Newport, OR, USA 13 December 2014.
- Fregosi, S.** (2014). An animal-borne active acoustic tag: A new paradigm for conducting behavioral response studies? Fisheries and Wildlife Graduate Student Association, OSU, Corvallis, OR, USA, 9 January 2014. ***Award for Best Presentation.***
- Reichmuth, C, Southall, BL, Casey, C, & **Fregosi, S.** (2012). Bioacoustics of northern elephant seals. Año Nuevo State Park Docent Seminar, Año Nuevo, CA, USA, January 2012.

## MEDIA COVERAGE

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- Acoustical Society of America (ASA). "Bioacousticians test passive acoustic monitoring to capture sounds of marine life." ScienceDaily. ScienceDaily, 1 December 2016.  
[www.sciencedaily.com/releases/2016/12/161201094452.htm](http://www.sciencedaily.com/releases/2016/12/161201094452.htm)
- Oregon State University. "New, complex call recorded in Mariana Trench believed to be from baleen whale. News and Research Communication, Oregon State University 14 December 2016. <http://oregonstate.edu/ua/ncs/archives/2016/dec/new-complex-call-recorded-mariana-trench-believed-be-baleen-whale>

## TEACHING/MENTORING EXPERIENCE

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Instructor, FW302 Biology and Conservation of Marine Mammals, OSU, Spring 2020  
Instructor, FW317 Mammalogy, OSU, Fall 2019  
Guest Lecturer, FEW-875 Bioacoustics, University of Wisconsin, Madison Fall 2019  
Guest lecturer, BI373-Biology and Conservation of Marine Mammals, OSU Summer 2013-2017  
Teaching Assistant, ENVI210 Intro to Earth Systems, University of San Diego, Fall 2007 – 2008  
January 2016 – 2019: Research mentor, OSU FW Undergraduate Mentorship Program  
Christina Negretti, September 2017 – June 2019  
Derek Garcia, September 2017 – June 2019  
Chris Lundeberg, September 2016 – June 2017  
Laura McCourt, September 2016 – June 2017  
Liz Marquez, January – June 2016  
January 2017 – June 2017: Research mentor, FW401, Ciera Edison  
June-August 2013: Intern Supervisor, OSU/NOAA CIMRS, Carlissa Salant

## DIVERSITY, EQUITY, AND INCLUSION

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I am committed to promoting and enhancing diversity, equity, and inclusion (DEI) in the sciences.  
White Allyship DEI Training (NOAA, Summer 2020)  
Unconscious Bias DEI Training (NOAA, Summer 2020)  
Practical Ways to be an Ally DEI Training (NOAA, Summer 2020)  
Girls in Engineering and Marine Science, instructor (Oregon Coast STEM Hub, 2016 – 2018)  
Designing our World, training and engineering role-model (Oregon Coast STEM Hub, 2016 – 2017)

## SERVICE AND OUTREACH

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Hatfield Student Organization, Treasurer (2017 – 2018)  
Hatfield Student Organization, Community Outreach Coordinator (2014 – 2017)  
Fisheries and Wildlife Graduate Student Organization, Communication's Officer (2014 – 2017)  
Careers in Science Investigation, instructor (2017, 2018, 2020)  
Wild About Wildlife Summer Camp, OSU, planning committee (2017 – 2018)  
Discovering the Scientists Within, instructor (2017 – 2018)  
Hatfield Marine Science Center, Marine Science Day, scientist volunteer (2013 – 2017)  
Oregon Coast Renewable Energy Challenge, judge (2016 – 2017)  
Girls in Engineering and Marine Science, mentor (2016)  
SeaGlide Educator Workshop, instructor (2015 – 2016)  
Winter Wonderings (science camp), instructor (2014)  
Newport Science Fair, mentor (2013)

## SPECIAL COURSES

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11-24 Aug 2017: PhD Summer Course in Acoustic Communication, SNAK, University of Southern Denmark, Odense, DK: Advanced theoretical and practical course covering topics of terrestrial and marine animal acoustic communication.  
31 Oct/7 Nov 2016: Designing Our World Training, Newport, OR.  
Kick-off workshop for NSF program to engage young girls in engineering and science.  
23-27 June 2014: Seaglider Pilot Training, Kongsberg UTI, Lynnwood, WA.  
Intensive hands-on training course for piloting Kongsberg Seagliders.  
16-20 June 2014: SeaBASS (BioAcoustics Summer School), National Conference Center  
One-week foundational graduate course on marine animal biology and acoustics.  
January-March 2013: Introduction to Animal Bioacoustics, OSU

Graduate special topics course covering range of bioacoustics topics including sound recording and analysis, source-medium receiver theory, animal behavior and acoustic communication  
12-24 August 2012: Methods in Marine Bioacoustics, Duke University Marine Laboratory  
Two-week course on basics of active and passive marine bioacoustics methodology including theory and hands on equipment and software training

## **SKILLS/CERTIFICATIONS**

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Experienced MATLAB and R programmer  
Acoustic analysis of low and high-frequency data, using various software and automated detection (Osprey, Ishmael, Raven, Triton, Pamguard, Adobe Audition)  
Spatial analyses in ArcGIS and Matlab  
Pilot for underwater AUV's including Seaglider and APEX float  
American Boating Certification; experience with small boat driving, maintenance, and towing (including open ocean research activities)  
Physiological sample collection for avian and pinniped species including blood collection  
Captive marine mammal husbandry, behavioral observation, and health assessment

## **PROFESSIONAL MEMBERSHIP**

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Acoustical Society of America, Animal Bioacoustics Technical Committee  
Society of Marine Mammalogy (including Northwest Student Chapter)  
Marine Technology Society

## **JOURNAL REVIEWER**

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Scientific Reports  
Marine Ecology Progress Series  
Animal Biotelemetry