

MARIE J. ZAHN

Curriculum Vitae

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CURRENT APPOINTMENT

Postdoctoral Scholar

Applied Physics Laboratory, Polar Science Center, University of Washington
NASA Jet Propulsion Laboratory, California Institute of Technology

Seattle, WA
Pasadena, CA
2024 – present

Research Associate

Climate Change Institute, University of Maine

Orono, ME
2024 – present

RESEARCH INTERESTS

Polar ecology, glacier ecology, marine mammal bioacoustics, physical oceanography at glacier-ocean boundary, numerical ocean modeling, effects of environmental change on high-latitude ecology

EDUCATION

University of Washington (UW)

Ph.D. in Aquatic and Fishery Sciences and Data Science

Seattle, WA
2019 – 2023

- Thesis title: *Quantifying features of Arctic odontocete echolocation and marine habitat variation in West Greenland*
- Faculty adviser: Dr. Kristin Laidre

Columbia University

B.A. in Environmental Biology and Pre-Medical

New York, NY
2012 – 2016

- Thesis title: *“Everything we do, it’s cedar:” First Nation and ecosystem-based foresters’ relationships and practices with western redcedar*
- Faculty advisers: Drs. Nancy Turner and Matthew Palmer

SELECTED PROFESSIONAL EXPERIENCE

NOAA Hawaiian Islands Cetacean and Ecosystem Survey (HICEAS)

Acoustician

Hawaiian Islands
Nov. – Dec. 2023

- Acoustician on large-scale ecosystem survey led by NOAA Pacific Islands and Southwest Fisheries Science Center to assess the abundance and habitat of whale, dolphin, and seabird populations across the Hawaiian Islands with special interest in protected species.
- Conducted passive acoustic monitoring aboard NOAA Ship *Reuben Lasker* using towed hydrophone arrays and drifting recorders to detect and track animals in coordination with visual observers.

East Greenland Polar Bear Aerial Survey

Polar Bear Observer and Data Manager

East Greenland
Apr. – May 2023

- Visually identified polar bears and other marine mammals from Twin Otter aircraft in remote inshore and offshore locations of East Greenland.
- Direct assistant to project lead, Dr. Kristin Laidre, and data manager for all survey data. Ensured an organized workflow for data entry and quality control. Conducted exploratory analyses in the field to visualize results and inform survey decisions.

Applied Physics Laboratory, UW*Marine Mammal Observer and Field Assistant on Research Cruise*

Nome, AK

Sep. 2022

- Led marine mammal component (PI: Dr. Kate Stafford) for 10-day research cruise (Chief Scientist: Dr. Rebecca Woodgate) aboard R/V *Norseman II* in the Bering Strait and southern Chukchi Sea as part of the Bering Strait project funded by NSF-AON (Arctic Observing Network).
- Assisted in recovery and deployment of three seafloor-mounted ocean moorings carrying physical and biogeochemical oceanographic and whale acoustic instrumentation. Supported CTD rosette deployments along transects to measure water properties and collect water for future analysis.
- Conducted marine mammal surveys during transits, identifying cetaceans and pinnipeds in the area, and serviced mooring acoustic recorders.

Applied Physics Laboratory, UW*Research Assistant*

Seattle, WA

Jun. – Sep. 2021

- Under the direction of Drs. Kate Stafford and Ana Širović, identified matching blue and fin whale calls between synchronous recordings on Sonobuoys and a High-frequency Acoustic Recording Package (HARP; Scripps Institution of Oceanography) in Antarctica to estimate HARP detection ranges.
- Wrote custom R scripts to identify potential call matches and analyzed raw WAV files in Raven.

University of Victoria*Field Research Assistant*

Vancouver Island, BC

Aug. 2019

- Recorded echolocation and vocalizations of Southern and Northern Resident killer whales using a 21-hydrophone array (Reson TC-4013-5) on 22' rigid haul inflatable boat (RHIB) in collaboration with Max Planck Institute and Fisheries and Oceans Canada.

The Native Village of Eyak*Field Research Technician*

Cordova, AK

May – Jul. 2019

- Conducted research for mark-recapture program in remote field camp on the Copper River.
- Applied TBA-PIT tags on and collected biometrics and genetic samples of large adult Chinook salmon from fishwheels. Implanted esophageal radio tags and collected telemetry data from a fixed receiver. Constructed, deployed, and maintained aluminum fishwheels.
- Coordinated field camp operations, assisted helicopter sling loading, reported on field conditions, and determined points of access/egress.
- Trained in remote power systems and communication safety procedures, use of firearms as bear deterrent, and operation of powerboats (18-22') with outboard jet troubleshooting.

National Institute for Environmental Studies, Japan*Field Research Assistant*

Sarufutsu, Japan

Apr. 2019

- Deployed and maintained five Oregon RFID antennas in a remote region of Hokkaido to detect PIT tagged Sakhalin taimen. Troubleshot receiver issues, operated snowmobiles to field sites, and managed power supply to antennas.

US Antarctic Program, Long Term Ecological Research Project (LTER)*Field Science Leader*

Palmer Station,

Antarctica

Sep. 2018 – Feb. 2019

- Managed Dr. Oscar Schofield's lab (Rutgers University), studying primary productivity within the Palmer LTER program and long-term ecological changes of the West Antarctic Peninsula.
- Responsible for project oversight including lab and instrument setup and maintenance, supervision of research technicians, monthly reporting, outreach activities participation, and collection of samples and data using autonomous underwater vehicles (gliders), optical instruments, active acoustics, marine mammal surveys, and ring and metro net tows from small research vessels (34' RHIBs).
- Managed sample processing and analysis using chlorophyll *a* measurements, ¹⁴C uptake, FRe fluorometry, an imaging flow cytobot, and krill biometrics.

US Antarctic Program, LTER Project
Field Science Leader

Palmer Station,
Antarctica
Oct. 2017 – Mar. 2018

- Managed lab for Chief Scientist Dr. Hugh Ducklow (Lamont-Doherty Earth Observatory of Columbia University) at Palmer Station, collecting data for the microbial biogeochemistry component of the LTER Antarctic program.
- Deployed instrumentation from small research vessels (34' RHIBs and zodiacs), measured bacterial abundance using flow cytometry (BD Accuri C6) and bacterial production via ³H-leucine radioactive isotope analysis, filtered water samples, and ran equilibrator inlet mass spectrometer.

Prince William Sound Science Center
Biological Technician

Cordova, AK
Jul. – Sep. 2017

- Studied the interactions and impacts between hatchery and wild salmon in Prince William Sound, aboard M/V Auklet (58') under Drs. Pete Rand and Kristen Gorman.
- Conducted stream surveys, collected samples of otolith and DNA from spawned-out salmon carcasses, and documented all specimen measurements.

US Antarctic Program, LTER Project
Field Research Assistant on Antarctic Oceanographic Cruise

Antarctica
Dec. 2016 – Feb. 2017

- Conducted research for the microbial biogeochemistry component of the Antarctic LTER program aboard R/V *Laurence M. Gould* and under Chief Scientist Dr. Hugh Ducklow.

PUBLICATIONS

11. Laidre, K. L., T. Marques, B. Cohen, R. Guldborg, E. Regehr, **M. J. Zahn**, J. Aars, J. Ware, H. Stern, F. Ugarte. Estimating the abundance of the East Greenland polar bear (*Ursus maritimus*) subpopulation. *In prep.*
10. Laidre, K. L., **M. J. Zahn**, M. Simon, M. Ladegaard, K. Stafford, E. Phillips, T. Moon, H. L. Stern, B. Cohen. (2024). Narwhal (*Monodon monoceros*) associations with Greenland summer meltwater release. *Ecosphere* e70024. <https://doi.org/10.1002/ecs2.70024>.
9. **Zahn, M. J.**, K. L. Laidre, M. Simon, K. M. Stafford, M. Wood, J. K. Willis, E. M. Phillips, I. Fenty. (2024). Consistent seasonal hydrography from moorings at Northwest Greenland glacier fronts. *Journal of Geophysical Research: Oceans*, 129, e2024JC021046. <https://doi.org/10.1029/2024JC021046>.
8. **Zahn, M. J.**, M. Ladegaard, M. Simon, K. M. Stafford, T. Sakai, K. L. Laidre. (2024). Accurate species classification of Arctic toothed whale echolocation clicks using one-third octave ratios. *Journal of the Acoustical Society of America* 155(4): 2359–2370. <https://doi.org/10.1121/10.0025460>.
7. Laidre, K. L., J. Ware, **M. J. Zahn**, P. Hegelund, J. Aars. (2024). First recorded ice entrapment of a beluga whale (*Delphinapterus leucas*) in East Greenland. *Polar Research* 43. <https://doi.org/10.33265/polar.v43.9844>.
6. **Zahn, M. J.** (2023). Quantifying features of Arctic odontocete echolocation and marine habitat variation in West Greenland. Ph.D. Dissertation. University of Washington, Seattle, WA.
5. **Zahn, M. J.**, J. Martin, E. Enns. (2022). “Paddle with the Tide”: Nuu-Chah-Nulth and western redcedar coevolution. In: Wall J (ed) *The Cultural Value of Trees: Folk Value and Biocultural Conservation (1st ed.)*. Routledge Earthscan, pp 88-102. <https://doi.org/10.4324/9780429320897>

4. **Zahn, M. J.**, S. Rankin, J. L. K. McCullough, J. C. Koblitz, F. Archer, M. H. Rasmussen, K. L. Laidre. (2021). Acoustic differentiation and classification of wild belugas and narwhals using echolocation clicks. *Scientific Reports* 11:22141. <https://doi.org/10.1038/s41598-021-01441-w>
3. **Zahn, M. J.**, K. L. Laidre, P. Stolz, M. H. Rasmussen, J. C. Koblitz. (2021). Vertical sonar beam width and scanning behavior of wild belugas (*Delphinapterus leucas*) in West Greenland. *PLoS ONE* 16(9): e0257054. <https://doi.org/10.1371/journal.pone.0257054>
2. **Zahn, M. J.**, M. I. Palmer, N. J. Turner. (2018). “Everything we do, it’s cedar”: First Nation and ecologically-based forester land management philosophies in coastal British Columbia. *Journal of Ethnobiology* 38(3): 314-332. <https://doi.org/10.2993/0278-0771-38.2.314>
1. **Zahn, M. J.** (2015). First Nation and ecosystem-based foresters’ relationships and practices with western redcedar (*Thuja plicata*) in coastal British Columbia. Senior Honors Undergraduate Thesis, Department of Ecology, Evolution, and Environmental Biology, Columbia University, NYC.

PUBLIC DATASETS

3. **Zahn, M. J.**, M. Ladegaard, M. Simon, K. M. Stafford, T. Sakai, K. L. Laidre (2023). Catalogue of Arctic toothed whale click spectra and spectrograms from SoundTrap recordings (1.0.0). Zenodo. <https://doi.org/10.5281/zenodo.10076260>
2. **Zahn M. J.**, K. L. Laidre, M. Simon, I. Fenty (2023). OMG Narwhals oceanographic data from moorings, 2018-2020. Ver. 1. NASA Physical Oceanography Distributed Active Archive Center (PO.DAAC), CA, USA. <https://doi.org/10.5067/OMGNW-MOOR1>
1. **Zahn M. J.**, K. L. Laidre, M. Simon, I. Fenty (2023). OMG Narwhals Shipboard Conductivity, Temperature, and Depth (CTD) profiles, 2018-2020. Ver. 1. NASA Physical Oceanography Distributed Active Archive Center (PO.DAAC), CA, USA. <https://doi.org/10.5067/OMGNW-SHIP1>

PRESENTATIONS

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| 2024 | Special Seminar for University of Maine Climate Change Institute Lecture Series. Orono, ME, USA. “Listening to the Arctic: Linking glaciology, oceanography, and marine mammal ecology.” |
| 2024 | Invited speaker for Sitka WhaleFest Science Symposium organized by the Sitka Sound Science Center. Sitka, AK, USA. “Tracking the Tusk: Using Sound to Study Narwhal Movements.” |
| 2024 | Invited speaker for seminar at the Alaska Student Chapter for the Society for Marine Mammalogy. Virtual. “Beluga and narwhal sounds and seascapes.” |
| 2024 | Oral presentation at the Ocean Sciences Meeting. New Orleans, LA, USA. “Seasonal hydrography and unique plume signatures from moorings at Northwest Greenland glacier fronts.” |
| 2023 | Oral presentation at Arctic Science Summit Week Science Symposium. Vienna, Austria. “Acoustic classification of belugas and narwhals using echolocation clicks with implications for passive acoustic monitoring.” |
| 2023 | Seminar of PhD research as visiting scientist at NASA’s Jet Propulsion Laboratory. Pasadena, CA, USA. “OMG Narwhals: Moored observations fill key knowledge gaps in ocean variability and ecosystem processes in northwest Greenland.” |
| 2022 | Invited speaker for seminar at the International Arctic Research Center, University of Alaska Fairbanks. Fairbanks, AK, USA. “Monitoring Arctic toothed whales and their coastal marine habitats in West Greenland.” |
| 2021 | Oral presentation at the 181 st Meeting of the Acoustical Society of America. Seattle, WA, USA. “Acoustic differentiation and classification of wild belugas and narwhals using echolocation clicks.” |

- 2021 **Oral presentation** at the at the School of Aquatic and Fishery Sciences Graduate Student Symposium, UW. Seattle, WA, USA. “Acoustic differentiation and classification of wild belugas and narwhals using echolocation clicks.”
- 2021 **Oral presentation** at NASA’s Oceans Melting Greenland (OMG) Science Team Meeting. Online. “Subannual hydrographic variability in three Northwest Greenland fjords.”
- 2021 **Oral presentation** at the Northwest Student Chapter for the Society of Marine Mammalogy spring meeting. Online. “Acoustic differentiation and classification of wild belugas and narwhals using echolocation clicks.”
- 2020 **Oral presentation** at the 179th meeting of the Acoustical Society of America. Online. “Vertical sonar beam width and scanning behavior of wild belugas in West Greenland.”
- 2019 **Oral presentation** at the School of Aquatic and Fishery Sciences Graduate Student Symposium, UW. Seattle, WA, USA. “Differentiating belugas and narwhals using acoustic signatures.”
- 2016 **Oral presentation** at Wood at Work Conference. New York, NY, USA. “People of the cedar: First Nation and ecosystem-based foresters’ relationships and practices with western redcedar.”
- 2016 **Poster presentation** at Columbia University’s Office of Undergraduate Admission’s Science Research Symposia. New York, NY, USA. “‘Everything we do, it’s cedar’: First Nation and ecosystem-based foresters’ relationships and practices with western redcedar.”
- 2016 **Oral presentation** at the 39th Annual Conference of the Society of Ethnobiology. Tucson, AZ, USA. “‘Everything we do, it’s cedar’: First Nation and ecosystem-based foresters’ relationships and practices with western redcedar.”

TEACHING AND MENTORING EXPERIENCE

- 2024 **Science Mentor** of PhD student through the Society for Women in Marine Science.
- 2024 **Invited Guest Lecturer** for Mission Vista High School AP Biology class. Oceanside, CA. “Marine Biology from Pole to Pole.”
- 2024 **Invited Guest Lecturer** for UW Oceanography Ocean Pollution course (OCEAN 409). Seattle, WA. “Narwhals and Noise: Arctic Soundscapes in a Changing Climate.”
- 2022 – 23 **Science mentor** for Evergreen high school student’s STEM capstone project on beluga and narwhal acoustics.
- 2021 **Teaching Assistant** for UW’s School of Aquatic and Fishery Sciences Marine Biology course (BIOL/FISH/OCEAN 250). Seattle, WA.
- 2021 **Invited Guest Lecturer** for FISH 464, Arctic Marine Vertebrate Ecology class at UW’s School of Aquatic and Fishery Sciences. Seattle, WA. “Mysticetes of the Arctic.”
- 2021 **Teaching Assistant** for UW’s School of Aquatic and Fishery Sciences Arctic Marine Vertebrate Ecology course (FISH 464). Seattle, WA.
- 2020 **Invited Guest Lecturer** for Arctic Environmental Change class at Seattle University. Seattle, WA. “Arctic marine mammals and underwater soundscapes in a changing ocean.”

AWARDS AND HONORS

- 2024 UW School of Aquatic and Fishery Sciences Faculty Merit Award for the PhD Program
- 2023 American Geophysical Union Ocean Sciences 2024 Early Career Travel Grant
- 2023 School of Aquatic and Fishery Sciences Finishing Fellowship, University of Washington
- 2023 International Arctic Science Committee (IASC) Arctic Science Summit Week 2023 Travel Award
- 2023 School of Aquatic and Fishery Sciences Winter Quarter Fisheries Interdisciplinary Network of Students Award, University of Washington
- 2022 UW College of the Environment Student Travel Fund Award for virtual conference attendance
- 2022 The Cooperative Institute for Climate, Ocean, and Ecosystem Studies (CICOES) Graduate Student Research Fellowship
- 2022 Animal Bioacoustics Technical Committee Best Student Paper Award for oral presentation at 181st Meeting of the Acoustical Society of America
- 2021 National Science Foundation Graduate Research Fellowship Program Honorable Mention

2021 Fisheries Interdisciplinary Network of Students Research Communication Award
 2019 College of the Environment Top-Off Award, University of Washington
 2019 School of Aquatic and Fishery Sciences Fellowship, University of Washington
 2013 – 16 Dean’s List Honors Student, Columbia College, Columbia University

COMMUNITY ENGAGEMENT AND SERVICE

Aug. 2024 – Present **Participant** in Interagency Arctic Research Policy Committee (IARPC) Collaborations Mentorship Program

Apr. 2024 – Present **Member** of the Society for Women in Marine Science.

Oct. 2024 **Participant** in Mentoring Physical Oceanography Women to Increase Retention (MPOWIR) virtual conference.

Sep. 2021 – Jun. 2023 **Open house committee lead** for the UW’s Students Explore Aquatic Sciences (SEAS) outreach program that seeks to increase access to science for underserved K-12 students in the Seattle area. Led the planning and execution of our annual open house event that is open to the public with booths and activities featuring research happening at the UW. Also led the search committee and interviews to hire an Open House Coordinator who controlled planning operations close to and on the day of the event.

Jun. 2021 – Jun. 2023 **Board member** for SEAS outreach program.

2021 – 2022 **Community networking committee member** for UW’s SEAS program.

2020 – 2022 **Graduate student mentor** for SAFS’ Fisheries Interdisciplinary Network of Students (FINS) peer-mentorship program.

Nov. 2021 **Session Chair** for the Analysis and Classification of Animal Bioacoustics Signals lecture session. 181st Meeting of the Acoustical Society of America. Seattle, WA.

Dec. 2020 – Jun. 2021 **Volunteer climber in the Climb for Clean Air Program.** Summited Mt. Rainier in June. While training, fundraised \$4,250 for the American Lung Association to support initiatives for clean air and lung disease, including COVID-19.

Fall 2020, 2021 FINS autumn **graduate student retreat coordinator.** Seattle, WA.

Jan. – May 2021 UW’s SEAS annual **open house organizer.**

Mar. 2021 National Ocean Sciences Regional Bowl/Orca Bowl **Volunteer** (online).

Dec. 2020 **Session Chair** for the Parameters and Features of Animal Bioacoustic Signals panel. Acoustical Society of America Virtual Conference (online).

Feb. 2020 **Visiting Educator** for Pacific Science Center’s Climate Change/Curiosity Expo “Narwhal Mysteries” activity open to the public. Seattle, WA.

Feb. 2020 National Ocean Sciences Regional Bowl/Orca Bowl **Volunteer.** Seattle, WA.

Sep. 2018 **Invited speaker** to primary school students and faculty at The Prairie School: “Alaska to Antarctica: Science near the Poles.” Racine, WI.

Jan. 2017, Nov. 2018 **Organized hand-written letter exchanges** between US primary school students and scientists in Antarctica.

Jan. 2018, Jan. 2019 **Invited speaker** for video teleconferences with US middle and high school students to explain science conducted on Palmer Station, Antarctica.

Dec. 2017 – Feb. 2018, Dec. 2017 – Feb. 2019 **Volunteer** that guided Antarctic tourists throughout the field site to explain the science conducted on Palmer Station in Antarctica.

TECHNICAL SKILLS

Field Skills Wilderness First Responder (NOLS Wilderness Medicine, 2017; recert 2019, 2021, 2024); adult, child, infant CPR and AED (2024); Valid US Driver’s and Motorcycle License; PADI Advanced Open Water Diver; Bear and firearm safety (Remington 870 Tactical 12 ga); Proficient in use of power tools and operation of small boats.

Software and Programming Skills Python, Unix shell, AWS cloud computing, R statistical programming, Github, MATLAB, QGIS, PAMGuard Passive Acoustics Software, Raven Acoustics Software, Adobe Illustrator