Andrea Muñoz Ledo Farré

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EDUCATION

Amherst College, Amherst, MA — May, 2022
Bachelor of Arts | Biology/Environmental Studies double major
Magna cum laude | GPA: 3.98/4.0

EXPERIENCE

Resource Ecology and Ecosystem Modeling Program, AFSC, NOAA | *Research Scientist* — September 2022–Present

Laboratory

- Conduct stomach content analysis for a variety of Alaskan groundfishes, performing around 3,000 scans annually
  - Perform taxonomic identification of digested prey items to the lowest possible taxonomic level
  - Data contributes to NOAA's ground fish trophic interactions database
- Upkeep crucial laboratory procedures, such as monthly formalin neutralization and disposal, proper sample storage, and inventory organization and maintenance

Field

- Collaborate with RACE group through participation on Summer Bottom Trawl Groundfish Surveys in the Gulf of of Alaska and Aleutian Islands
  - Gather environmental, population, distribution, and biological data on marine organisms collected during each haul by sorting and sexing organisms, collecting otoliths from fish, and conducting stomach scans at-sea
  - Conduct 5-6 hauls per day and 12 stomach scans per haul
  - Assist in calibrating instruments for environmental data collection (such as temperature, pressure, and depth meters and probes)
  - Collaborate with a team of 10 scientists and fishermen

Modeling and Data Analysis

- Spearheaded an independent research project under the guidance of Dr. Kirstin Holsman to investigate potential seasonal diet patterns in Bering Sea Walleye Pollock data collected by NOAA Observers on commercial fishing vessels between 1985 and 2008.
- Applied a bioenergetics model developed by Dr. Kirstin Holsman to observer pollock data to obtain "relative foraging rate" (RFR, or foraging success)
- Developed generalized additive models (GAMs) to investigate seasonal and monthly variations in RFR
- Currently writing a scientific paper detailing process and findings in hope of creating an internal NOAA tech memo or publishing work

Sierra Field Crew, UC Davis / US Forest Service, Southern Sierra Nevada | *Assistant Crew Lead* — June–September 2022

- Collected data for Dr. Hugh Safford's laboratory to support Sierra Nevada -wide studies investigating the effect of fires on giant sequoia groves and post-fire recovery to improve our understanding and expand the application of prescribed fire for management and ecological applications
- Assisted in locating and visiting 10 remote field sites (giant sequoia groves), each containing 5-10 plots, often in areas burned by wildfire or prescribed fire
- Assisted in the identification of plant species and carrying out measurements of forest stand structure, including characterizing vegetation, tree density, basal area, canopy cover, etc., as well as measurements of landscape condition (grove location, health, and condition of the overstory, seedlings and saplings, covers (forbs, grasses, litter, burnt vegetation, burnt wood etc.), and fuels)
- Camped in the field for 8-day stretches and hiked 5+ miles to the plots with heavy packs and and gear through off-trail, rough, steep terrain and areas burned by wildfire
- Used Microsoft Excel/Access for data entry and QAQC

Department of Environmental Studies, Amherst College, Amherst | *Honors Thesis Student* — May 2021–May 2022

Principal Investigator: Dr. Rebecca Hewitt

- Investigate nitrogen availability as a constraint to growth of white spruce trees at the arctic treeline in Alaska
- Investigate the implications of arctic treeline migration on carbon cycling and how these changes could mitigate or exacerbate climate warming
- Determine the effect of nitrogen availability on root traits and ectomycorrhizal colonization of white spruce trees
  - Verified ID of 84 white spruce fine root samples
  - Processed and analyzed the samples using WinRhizo in order to calculate root traits and measured colonization using point-intersect method

Book & Plow Farm, Amherst College, Amherst | *Farmer.* — March 2022–May 2022

- Assisted in seeding, potting, and planting around 20 varieties of flowers and vegetables
  - Included prepping and planting around 400 potatoes and 1000 onions
- Weekly 3 hour shifts
- Helped upkeep greenhouse
- Tested soil for nutrient concentrations at the beginning of the season
- Co-led workshops on the benefits of farming techniques utilized such as no-till, using cover crops, crop rotation, and organic/ regenerative approaches

Department of Environmental Studies, Amherst College, Amherst | *Laboratory TA* — August–December 2021

Laboratory Instructor: Dr. Rebecca Hewitt

- Assisted 20 students in refining their writing skills; aided with statistical analysis of data and representation of results in figures
- First time this course was offered, which presented an opportunity to provided more support in the creation and presentation of field and laboratory experiments focused on important themes in environmental science including data collection and processing
  - Helped in designing/organizing/testing-out the experiments, and writing lab instruction manuals
- Held bi-weekly, hour-long office hours

Department of Environmental Studies, Amherst College, Amherst | *Laboratory Research Assistant* — January 2021–May 2022

Principal Investigator: Dr. Rebecca Hewitt

- Explored the role of plant-fungal interactions in carbon and nitrogen cycling, community assembly after disturbance, and landscape patterns of vegetation change, primarily in Arctic tundra and boreal ecosystems of Alaska and Siberia
- Created a database of literature on the effect of warming on below-ground processes, root traits, and mycorrhizal fungi in collaboration with researchers, postdoc students, and senior scientists worldwide
  - Contributed to the Fine-Root Ecology Database (FRED)

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- Co-authored a talk presented by Dr. Hewitt at the American Geophysical Union titled "Aboveground and below ground traits suggest nutrient limitation of growth at treeline in Alaska's Brooks Range"

Department of Biology, Amherst College, Amherst | *Laboratory TA* August–December 2019, 2020
Laboratory Instructor: Dr. Thea Kristensen
- Guided 15 students as they pursued mastery of skills related to course material, scientific writing, statistical analysis of data, and producing figures
- Worked closely with course instructor to refine the experiments and advise the students
- Assisted with field work and data collection and processing during Field and Laboratory experiments focused on important themes in ecology and evolutionary biology

Department of Biology, Amherst College, Amherst | *Laboratory Research Assistant* February 2019–November 2020
Principal Investigator: Dr. Alexandra Purdy
- Aided in research projects exploring gene regulation in *Vibrio* pathogens and symbionts that affects host and bacterial metabolism.
- Helped develop an online lab inventory of supplies and 1000 bacteria cultures stored in the -80 C freezer
- Transitioned to remote Bioinformatics work due to the COVID-19 pandemic
  - Utilized BLAST to identify potential proteins in the genome of *V. fischeri*

Department of Environmental Studies, Amherst College, Amherst | *Research Assistant* May–August 2020
Principal Investigator: Dr. Ashwin Ravikumar
- Conducted online/database research on the effectiveness on payments for ecosystem services (PES) programs
- Investigated the perspectives of Indigenous communities living in the Amazon on different approaches to conservation
  - The objective was to gain a better understanding of the true beneficiaries and stakeholders of PES programs

PUBLICATIONS

"Disrupting the minga: How Payments for Environmental Services have ignored Indigenous visions to replace reciprocity with employment and subsistence with commodification in the Ampiyacu-Apayacu watershed of Loreto, Peru" | *Co-Author* *Ecological Economics* March 2023
Principal Investigator: Dr. Ashwin Ravikumar

"Mycorrhizal fungi impact nutrient limitation of growth at treeline in Alaska's Brooks Range" Abstract accepted to *AGU* for Fall 2022 Meeting
First Author: Dr. Rebecca Hewitt

NATIONAL SOCIETIES, AWARDS & HONORS

The Phi Beta Kappa Society | *Member* June 2022–Present

Sigma Xi, The Scientific Honors Research Society, Amherst College Chapter | *Associate member* April 2022–Present

The Jan E. Dizard Price in Environmental Studies, Amherst College May 2022
- Awarded to a member(s) of the graduating class, who in the opinion of the Environmental Studies Department, exemplifies the field of environmental studies in academic work

The Sawyer Price, Amherst College May 2020
- Awarded to that second-semester sophomore who, in the opinion of the Biology Department, has shown the most promise as a student of Biology

LEADERSHIP

Food Justice Alliance, Amherst College, Amherst | *Co-Chair & Founder* August 2021–May 2022
- Created and established a student-run Food Recovery Program to help relieve food insecurity in Amherst (town) and reduce food waste at the College
- Attend/help lead weekly meetings where we discuss issues such as dining hall workers' rights, food security in the Amherst community, the environmental-consciousness of the College's food suppliers, and supporting the on-campus farm

OUTREACH & COMMUNITY ENGAGEMENT

Students Explore Aquatic Sciences (SEAS), University of Washington, Seattle | *Member* Fall 2022–Present
- Lead and co-lead classes free of charge to K-12 students, with a primary focus on middle school students
  - Topics include predator-prey interactions, food webs, impacts of urbanization and habitat change on aquatic ecosystems, and ecological investigations
  - Served as Spanish translator for several class sessions, ensuring accessibility for non-English speaking students
- More information on SEAS purpose and mission: **https://fish.uw.edu/students/student-organizations/students-explore-aquatic-sciences-seas/**

Lab Tours / Job Shadowing, Alaska Fisheries Science Center, NOAA, Seattle| *Organizer & Host* June 2023–Present
- Organize and coordinate laboratory tours for visiting students and guests, arranging campus access and ensuring smooth logistical operations
- Deliver presentations on lab's research and its significance to NOAA's mission
- Conduct hands-on stomach dissections for interested visitors and prepare the lab with displays of reference specimens
- Hosted and mentored a 12th-grade student for their senior project, managing all communications with the student, laboratory staff, and program managers
  - Provided a comprehensive shadowing experience, guiding the student through typical lab activities and addressing their questions

UW Aquatic Sciences Open House, University of Washington, Seattle | *Activity Booth Host, Translator* May 2023, May 2024
- Hosted a booth featuring three different interactive activities for children at day-long free annual event organized by SEAS and hosted by the School of Aquatic and Fishery Sciences at the UW, engaging with over 1,200 kids
- Co-developed two interactive activities:
  - Food chain assembly: guided kids in constructing their own food chains using existing prey and predators from the Puget Sound
  - Local Organism Facts and Figures poster: educated participants about local marine organisms through interactive learning

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- Reused and adapted an activity previously developed for GeekGirlCon (see additional details below) on fish diet analysis
- Translated activities for Spanish speaking kids and families
- Demonstrated strong science communication skills by tailoring all three activities to accommodate a diverse age range (3-15 years)
- Translated summaries of SAFS Essington Lab graduate students' projects into Spanish, ensuring accessibility for non-English speaking families

GeekGirlCon, Seattle | *Activity Booth Host* October 2023

- Hosted an interactive activity booth at two-day convention dedicated to celebrating and promoting involvement of underrepresented groups in STEM fields
- Developed and implemented an engaging educational activity that simulates laboratory work conducted at NOAA
  - Participants used a custom-designed simplified "key" to identify paper "prey" items (whole prey and fragments), simulating the process of stomach content analysis
  - Activity aimed at enhancing pattern recognition, critical thinking, collaboration, and cognitive development in children aged 5 to 14
- Successfully engaged with numerous children, parents, and educators, fostering interest and enthusiasm for scientific inquiry and marine biology

SKILLS

Lab: Taxonomic ID using dichotomous keys, fish stomach dissection, formalin neutralization, PCR genome sequencing, streaking, Western Blot, protein purification, soil incubations, and measuring mycorrhizal colonization of fine roots
Analysis/Research: R/R Studio, Microsoft Excel/Google Sheets/Microsoft Access, ITIS, Oracle, BLAST, and literature databases
Communication: Fluent in Spanish (reading, writing, speaking), Zoom/Google Meet, Slack, good scientific communication, writing, and presenting skills