

## CURRICULUM VITAE

### JESSICA A. LUEDERS-DUMONT, PH.D.

Department of Integrative Biology, University of California-Berkeley, Berkeley, CA, USA & Smithsonian Tropical Research Institute, Panama City, Panama | talkstodiatoms@gmail.com | sites.google.com/view/otolithnitrogen

#### EXPERTISE:

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Isotope geochemistry, biological oceanography, food webs, historical ecology, paleoecology, otolith chemistry, biomineralization

#### EDUCATION

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- 2019                    **Princeton University**, PhD in Geosciences.  
*Nitrogen isotopes of otolith-bound organic matter: a new tool for trophic reconstruction using modern and fossil otoliths.*  
Advisors: Drs. Bess Ward and Daniel Sigman
- 2014                    **Princeton University**, M.Sc. in Geosciences.
- 2009                    **Colby College**, B.A. in Biology. Minor in Studio Art; Minor in Science, Technology, and Society

#### CURRENT POSITION

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- 2022-present        **Postdoctoral Research Associate**  
Dept. of Integrative Biology, University of California-Berkeley, CA, USA  
Supervisor: *Dr. Seth Finnegan*  
*Trophic determinants of extinction risk in marine metazoans*
- 2022-present        **Visiting Postdoctoral Researcher**  
Geosciences Department, Princeton University, Princeton, NJ, USA  
Supervisors: *Drs. Bess Ward and Daniel Sigman*
- 2019-present        **Smithsonian Institution MarineGEO Postdoctoral Fellow**  
Smithsonian Tropical Research Institute, Panama City, Panama  
Supervisor: *Dr. Aaron O'Dea*

#### OTHER PROFESSIONAL EXPERIENCE

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- 2019-2022            **Postdoctoral Research Fellow**  
Supervisors: *Drs. Bess Ward and Daniel Sigman*  
Geosciences Department, Princeton University, Princeton, NJ, USA  
*Laboratory support and proxy development for vertebrate paleontology*
- 2019                    **Postdoctoral Research Associate**  
Supervisors: *Drs. Bess Ward and Daniel Sigman*  
Geosciences Department, Princeton University, Princeton, NJ, USA  
*Atlantic cod historical ecology from archaeological and archival otoliths*

- 2012 *At-Sea Monitor*, commercial groundfish fleet, Northeast Fisheries Observer Program, National Oceanic and Atmospheric Administration (NOAA), Gloucester, MA, USA
- 2011 *Biological Technician*, using otolith microstructure and stable isotopes to assess juvenile salmon food web response to natural iron fertilization in the Gulf of Alaska, Prince William Sound Science Center, Cordova, AK, USA
- 2011 *Fisheries Policy Intern*, various projects relating to fisheries catch shares policy in the USA and land-based recirculating aquaculture systems, Food & Water Watch, Washington, D.C., USA
- 2011 *Contractor*, harmful algal bloom monitoring program, Department of Marine Resources, State of Maine, Augusta, ME, USA
- 2010 *Watershed Monitoring Intern*, water quality and phytoplankton biodiversity, Marine Environmental Research Institute, Blue Hill, ME, USA
- 2009-2010 *Research Technician*, assisted with multiple projects relating to river biogeochemistry, salmonid food webs, and river floodplain ecology and habitat restoration, Baxter Lab, Stream Ecology Center, Idaho State University, Pocatello, ID, USA
- January 2009 *Intern*, using GIS to evaluate community-supported forestry potential in Addison County, Vermont Family Forests, Bristol, VT, USA
- 2008-2009 *Research Assistant*, Colby College, Biology Dept., Waterville, ME, USA
- Summer 2008 *Conservation Intern*, floodplain habitat restoration, endangered reptile and amphibian monitoring, Southern Lake Champlain Valley Program, The Nature Conservancy, VT, USA
- January 2008 *Research Assistant*, American lobster (*Homarus americanus*) vulnerability to shell disease, New England Aquarium, Boston, MA, USA
- January 2008 *Intern*, Sustainable Fisheries Initiative, Conservation Department, New England Aquarium, Boston, MA, USA
- Summer 2007 *Research Assistant*, marine benthic ecology, effects of closed areas on the trophic ecology of juvenile cod, Gulf of Maine Research Institute, Portland, ME, USA
- 2005-2006 *Research Assistant*, assisted research on multiple projects relating to biocontrol of invasive watermilfoil, salt marsh biogeochemistry, and marine diatom response to nutrient addition experiments, Middlebury College, Biology Dept., Middlebury, VT, USA

**PEER-REVIEWED PUBLICATIONS** (undergraduate student authors underlined)

7. Reis-Santos, P., B.M. Gillanders, A.M. Sturrock, C. Izzo, D. S. Oxman, J.A. Lueders-Dumont, K. Hüßy et al. Reading the biomineralized book of life: expanding otolith biogeochemical research and applications for fisheries and ecosystem-based management." *Reviews in Fish Biology and Fisheries* (2022): 1-39.

6. O’Dea, A, S. G. A. Flantua, M. Leray, **J. A. Lueders-Dumont**, M. C. Titcomb. 2022. *In press*. Pleistocene sea level changes and crocodile population histories on the Isthmus of Panama: A comment on Avila-Cervantes et al. (2020). *Ecology*.
5. **Lueders-Dumont, J.A.**, Fornden, A.G., E.R. Kast, J.A. Mohan, B.D. Walther, D.M. Sigman, B.B. Ward. Controls on the nitrogen isotopic composition of fish otolith organic matter: Lessons from a controlled diet switch experiment. *Geochimica et Cosmochimica Acta* (2022). 316, 69-86.
4. **Lueders-Dumont, J.A.**, D.M. Sigman, B.J. Johnson, O.P. Jensen, B.B. Ward. Comparison of the isotopic composition of fish otolith-bound organic N with host tissue. *Canadian Journal of Fisheries & Aquatic Sciences* (2020), 77(2), 264-275.
3. Aldunate, M., C. Henríquez-Castillo, Q. Ji, **J.A. Lueders-Dumont**, B.B. Ward, P. von Dassow, O. Uloa. Nitrogen assimilation in picocyanobacteria inhabiting the anoxic marine zones of the eastern tropical North and South Pacific. *Limnology and Oceanography* (2019), 65(2), 437-453.
2. **Lueders-Dumont, J.A.**, X.T. Wang, O.P. Jensen, D.M. Sigman, B.B. Ward. Nitrogen isotopic analysis of carbonate-bound organic matter in modern and fossil fish otoliths. *Geochimica et Cosmochimica Acta* (2018), 224, 200–222.
1. Van Oostende, N., S.E. Fawcett, D. Marconi, **J.A. Lueders-Dumont**, A.J.M. Sabadel, E.M.S. Woodward, B.F. Jönsson, D.M. Sigman, B.B. Ward. Variation of summer phytoplankton community composition and its relationship to nitrate and regenerated nitrogen assimilation across the North Atlantic Ocean. *Deep Sea Research Part I: Oceanographic Research Papers* (2017), 121, 79-94.

**AWARDS****(total \$211,300)**

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| 2020 | <i>Instrumentation grant, Smithsonian Institution</i> ; led proposal co-written with colleagues in the O’Dea and Sharpe labs at the Smithsonian Tropical Research Institute to purchase a dual-range Mettler-Toledo micro-balance. Total: \$9,000                |
| 2019 | <i>Smithsonian Institution Marine Global Earth Observatory (MarineGEO) Postdoctoral Fellowship</i> ; wrote proposal for postdoctoral stipend (\$50,400) plus research funding (\$15,000). Total: \$130,800   |
| 2018 | <i>Ecological Dissertations in the Aquatic Sciences (Eco-DAS)</i> ; selected for NSF-funded training program for early career scientists, University of Hawaii, Manoa, HI, USA (funded for travel, room & board for week-long conference)                        |
| 2015 | <i>Leifur Eiriksson Foundation Fellowship</i> ; wrote proposal for collaborative research at the Marine Research Institute, Reykjavik, Iceland, including proposal for sampling otolith archives, Marine Research Institute, Reykjavik, Iceland. Total: \$25,000 |
| 2013 | <i>Proposal granting access to otolith archives</i> ; wrote successful proposal to the U.S. National Marine Fisheries Service, Fishery Biology Program for sampling of otolith archives, NOAA, Woods Hole, MA, USA   |
| 2014 | <i>Equipment Fund Award, Princeton University</i> ; led proposal co-written with D. Sigman, J. Higgins, A. Maloof to purchase ESI NewWave Micromill. Total: \$45,000   |

- 2012 *G. Wallace Ruckert Fellowship*, Princeton University, first year PhD fellowship awarded based on potential for success in academic research; tuition support and graduate stipend
- 2009 *Linda K. Cotter Internship Award*, wrote proposal granting stipend and research funds to support GIS research, Colby College, Waterville, ME and Vermont Family Forests, Bristol, VT. Total: \$1,500
- 2009 *Democratic Citizenship Award for Civic Engagement*, Goldfarb Center for Public Affairs and Civic Engagement, Colby College, Waterville, ME USA
- 2007 *American Maritime History Prize for Best History Paper*, G.W. Blunt White Library, Mystic Seaport, Mystic, CT USA

### **SELECTED PRESENTATIONS**

*(\*invited speaker)*

- \*Lueders-Dumont, J.A.** Reconstructing ecological baselines in fish assemblages using nitrogen isotopes in otoliths. *International Council for the Exploration of the Sea - Working Group on the History of Fish and Fisheries (WGHIST)*. Jun 8, 2022. Chioggia, Italy (Zoom).
- Lueders-Dumont, J.A.** Ecological baselines from nitrogen isotopes in fish otolith-bound organic matter: calibration and first applications. *Climate and pre-industrial human impacts on marine ecosystems: crossing disciplinary boundaries*. First meeting of the PAGES Q-MARE working group. January 17, 2022. Vienna, Austria (Zoom).
- Lueders-Dumont, J.A.** D.M. Sigman, B.J. Johnson, O.P. Jensen, B.B. Ward. 2021. The N isotopic relationship between fish tissue and otoliths: controls and variation. *American Fisheries Society*. November 08, 2021. Baltimore, MD, USA.
- \*Lueders-Dumont, J.A.** 2021. An ear to the past: reconstructing past food web structure using nitrogen isotopes in fossil otoliths. *World Fisheries Congress*. October 09, 2021. Adelaide, Australia.
- \*Lueders-Dumont, J.A.** 2021. Developing otolith-bound  $\delta^{15}\text{N}$  as a paleo archive of trophic level. *Max Planck Inst. for Geochemistry*, weekly seminar series. October 09, 2020. Avery Point, CT, USA.
- \*Lueders-Dumont, J.A.** 2020. Development of otolith-bound nitrogen isotopes as a new tool for reconstructing past marine food web structure. *University of Connecticut Marine Sciences Seminar*. October 09, 2020. Avery Point, CT, USA.
- \*Lueders-Dumont, J.A.** 2020. Taking the pulse of Holocene coral reefs: Ecosystem health metrics using N isotopes in fish otoliths and coral skeletons. *Smithsonian MarineGEO Seminar Series*. June 09, 2020. Washington, DC, USA.
- Lueders-Dumont, J.A.,** D.M. Sigman, B.B. Ward, X.T. Wang, K. Griswold, C.H. Lin, B. de Gracia, A. O’Dea. 2020. Trophic reconstruction using fossil otolith-bound nitrogen isotopes: first data from Holocene reefs. *Conservation Paleobiology Symposium*. Feb 3, 2020. University of Bologna, Bologna, Italy.

- \*Lueders-Dumont, J.A.** 2019. Nitrogen isotopes of otolith-bound organic matter: a tool for trophic and biogeochemical reconstruction. Ecology and Evolutionary Biology Department, Cornell University, USA.
- Lueders-Dumont, J.A.,** X.T. Wang, O.P. Jensen, D.M. Sigman, B.B. Ward. 2018. Ecological and biochemical controls on nitrogen isotopic fractionation of otolith-bound organic matter. *Goldschmidt*. August 10, 2018. Boston, MA, USA.
- Lueders-Dumont, J.A.,** X.T. Wang, O.P. Jensen, D.M. Sigman, B.B. Ward. 2018. Natural abundance nitrogen isotopic composition of the organic matrix of fish otoliths across diverse taxa. *6th International Otolith Symposium*. Apr 17, 2018. National Museum of Marine Science and Technology, Keelung, Taiwan.
- Lueders-Dumont, J.A.** 2018. Ecological and biochemical controls on nitrogen isotopic fractionation of otolith-bound organic matter. *Northeast Geobiology Conference*. April 7, 2018. Woods Hole Oceanographic Institute, Falmouth, MA, USA.
- Lueders-Dumont, J.A.** 2017. Validation of the N isotopic record in otoliths. Environmental Geology & Geochemistry Seminar. Oct 28, 2017. Department of Geosciences, Princeton University, Princeton, NJ, USA.
- Lueders-Dumont, J.A.,** A. Forden, J.A. Mohan, B.D. Walther, D.M. Sigman, B.B. Ward. 2017. Diet-driven nitrogen isotopic change in the organic matrix of otoliths: micromill sampling in a diet switch experiment with Atlantic croaker. American Fisheries Society, Aug. 2017, Tampa Bay, FL, USA.
- Lueders-Dumont, J.A.,** D.M. Sigman, B.B. Ward. 2017. Variability in baseline  $\delta^{15}\text{N}$  propagates to zooplankton but not to otolith  $\delta^{15}\text{N}$  of a small pelagic fish on the U.S. Northeast Continental Shelf. 2017. *ASLO 2017 Aquatic Sciences*, March 2017, Honolulu, HI, USA.
- Lueders-Dumont, J.A.,** X.T. Wang, O.P. Jensen, D.M. Sigman, B.B. Ward. 2015. Unlocking the secret lives of fish using nitrogen isotopic analysis of otolith-bound organic matter. *American Fisheries Society*, August 2015, Portland, OR, USA.
- Lueders-Dumont, J.A.,** J.R. Bellmore, C.V. Baxter. 2010. Floodplain habitat heterogeneity and benthic invertebrate communities: a comparison of main channel and side channel habitats in the Methow River, WA. *Society for Freshwater Science*, June 2010, Santa Fe, NM, USA.

## SCIENTIFIC AND SCHOLARLY SERVICE

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- 2022 (upcoming) *Co-convener*, ICES theme session: Geohistorical records of climate and anthropogenic impacts on marine biota. International Council for Exploration of the Sea Annual Science Conference. September 2022. Dublin, Ireland
- 2022-2024 *Co-organizer and Early Career Network Representative*, PAGES working group, Disentangling climate and pre-industrial human impacts on marine ecosystems (Q-MARE working group), 2022-2024

- 2020-2022 *Manuscript peer reviewer*, Methods in Ecology and Evolution, Paleobiology, Journal of Fish Biology, Functional Ecology, Proceedings of the Royal Society B, Canadian Journal of Fisheries and Aquatic Sciences, PlosOne
- 2021 *Pod Leader*, Unlearning Racism in Geoscience (URGE), Princeton University Department of Geosciences
- 2021 *Convener*, Symposium: Advances in life history and environmental reconstruction using biogenic structures. *American Fisheries Society*. Baltimore, MD, USA
- 2021 *Panelist*, Advances in Biomarkers. World Fisheries Congress, September 20-24, 2021, Adelaide, Australia (zoom)
- 2021-present *Participant*, Conservation Paleobiology working group of the Big Questions in Paleontology Initiative, an international effort to identify outstanding questions in the field of paleontology, hosted by the Paleosynthesis Center at FAU (zoom)
- 2021 *Moderator*, Conservation Paleobiology Network graduate student virtual events
- 2020-2021 *Moderator and organizer*, weekly international lab meeting and seminars, O'Dea Lab, Italy and Panama (Zoom)
- 2018-2021 *Mentor*, Princeton University Women in Geosciences
- 2020 *Co-convener*, Conservation Paleobiology Conference, U. of Bologna, Italy
- 2013-2018 *Exhibitor*, Great Phytoplankton Race, Young Women in Science Conference, Princeton Plasma Physics Laboratory
- 2015 *Curriculum development*, collaborated with high school educator DJ Kast (Los Angeles County, CA, USA) to design an otolith lab and lesson plan for high school biology students, NOAA Teacher-at-Sea Program
- 2014 *Volunteer advisor*, high school women's robotics team, underwater vehicle design
- 2012-2013 *Graduate student representative*, undergraduate Women in Science Colloquium
- 2010 *Volunteer*, Portneuf watershed science exhibitor, Baxter Lab, Pocatello, ID, USA
- 2008 *Fieldwork co-advisor*, LEAF program, VT Chapter of The Nature Conservancy
- 2004 *Exhibit interpreter*, Champlain Sea exhibit, The Ecology, Culture, History, Opportunity (ECHO) Center for Lake Champlain, Burlington, VT, USA

## TEACHING EXPERIENCE

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**Field Course Professor** (co-taught). December 27, 2019, to January 10, 2020. *Field Course: University of Wisconsin-Green Bay Tropical Marine Ecosystems*. Bocas del Toro Research Station, Smithsonian Tropical Research Institute, Bocas del Toro, Panama

**Assistant in Instruction**. Fall semester 2018. *GEO102 Climate: Past, Present, and Future*. Princeton University, Princeton, NJ, USA

Guest lecturer. March 2018. Nitrogen isotope fractionation of carbonate-bound organic matter in modern and fossil fish otoliths. *Mineralogy Lecture Series*. Earth & Planetary Sciences, Johns Hopkins University, Baltimore, MD, USA

Guest lecturer. April 2018. Higher Trophic Levels (Fisheries). *GEO 428 Biological Oceanography*. Princeton University, Princeton, NJ, USA

**Assistant in Instruction.** Spring semester 2016. *GEO202 Ocean, Atmosphere, and Climate*. Princeton University, Princeton, NJ, USA

Guest lecturer. April 2016. Global fisheries in the Anthropocene. *GEO202 Ocean, Atmosphere, and Climate*. Princeton University, Princeton, NJ, USA

Guest lecturer. April 2016. Oceanography and Fisheries of Iceland. *Departmental Field Course to Iceland Seminar*. Princeton University, Princeton, NJ, USA

**Field Course Professor** (co-taught). Spring 2014. Field trip. Princeton GEO 202 Ocean, Atmosphere, and Climate. University of Delaware, Lewes, Delaware, USA

**Instructor.** March 2011. Curriculum design followed by workshop training citizen scientists. *Using Motic Images 2.0 for phytoplankton monitoring and harmful algal blooms*, Maine Department of Marine Resources, Darling Marine Center. Walpole, Maine, USA

**LIST OF THESES SUPERVISED (primary mentor for 12 undergraduate theses & internships)**

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**Senior theses:** Chan, Keo. 2018 | Forden, Atleigh. 2016 | Myers, Sophia. 2016

**Junior theses:** Chan, Keo. 2016 | Myers, Sophia. 2015

**Summer research internships:** Kenya Ripley. 2022 | India Ingemi. 2022 | Titcomb, Max. 2020 | Wallace, Elizabeth. 2019 | Chan, Keo. 2017 | Leahy, Catharine. 2016 | Henry, Sheriel. 2015-2018 | Henry, Samuel. 2015-2017 | Forden, Atleigh. 2015

**PROFESSIONAL MEMBERSHIPS**

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American Fisheries Society (AFS) | American Geophysical Union (AGU) | Geological Society of America (GSA) | Association for the Sciences of Limnology and Oceanography (ASLO) | Conservation Paleobiology Network (CPN) | Past Global Changes (PAGES) | National Association of Geoscience Teachers (NAGT)

**FIELD EXPERIENCE**

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2022	Miocene marine sediments of the Panama Isthmus, Colon Province, Panama
2021	<i>R/V Veliger</i> , 5 days, Neogene marine sediment sampling, Bocas del Toro, Panama
2020	<i>R/V Anibal</i> , 2 days, coral reef coring on Pearl Islands, Gulf of Panama
2016	<i>R/V Gordon Gunter</i> , 13 days, NOAA Ecosystem Monitoring (EcoMon), U.S. N.E. Continental Shelf, seawater nitrate, phytoplankton, zooplankton sampling
2015	<i>R/V Henry Bigelow</i> , 14 days, NOAA EcoMon program, U.S. N.E. Continental Shelf, seawater nitrate, phytoplankton, zooplankton sampling
2014	<i>R/V Endeavor</i> , 27 days, North Atlantic, tracer incubation experiments, nutrient sampling, phytoplankton preservation for flow cytometry

- 2013 *R/V Endeavor*, 25 days, North Atlantic, tracer incubation experiments, nutrient sampling, phytoplankton preservation for flow cytometry
- 2012 *R/V Atlantic Explorer*, 6 days, Bermuda Atlantic Time Series (BATS); tracer incubation experiments, oceanographic sampling
- 2012 Northeast multispecies sector fishery (commercial groundfish fleet), multiple 1-10 day trips, Gulf of Maine, Georges Bank; biological monitoring and sampling of commercial fisheries catch and bycatch
- 2011 *R/V New Wave*, multiple 1-2 day trips, Copper River Delta, Gulf of Alaska, Prince William Sound, AK; ocean chemistry, phytoplankton, zooplankton, juvenile fish
- 2011 *R/V Bjarni Sæmundsson*, 1 day, benthic fish species sampling, bottom trawl survey vessel for the Marine Science Institute, Reykjavik, Iceland
- 2010 *R/V Pinniped II*, weekly day trips, Blue Hill Bay, Gulf of Maine, deploying invasive species collectors, sampling phytoplankton biodiversity, analyzing nutrients, monitoring for harmful algal bloom taxa
- 2009-2010 Weekly field sampling trips, Methow River, WA; Salmon River, ID, Boise River North Fork, ID; whole-stream nutrient uptake experiments, electrofishing, benthic invertebrate sampling
- 2007, 2008 Weekly sampling and monitoring surveys of aquatic plants and insects in multiple lakes, VT, USA; aquatic weevil as biocontrol on invasive Eurasian watermilfoil
- 2007 Salt marsh sampling, sediment coring, diatom slide colonization experiments; Plum Island Ecosystems Long Term Ecological Research site (PIE-LTER)

**OTHER ACADEMIC AND PROFESSIONAL TRAINING** *(non-degree-granting)*

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- 2021 *Participant*, Earth Educator Rendezvous, Annual conference for the **National Association of Geosciences Teachers** (Zoom)
- 2018 *Participant*, Ecological Dissertations in the Aquatic Sciences (Eco-DAS), NSF-funded training program for early career scientists, **University of Hawaii**, Manoa, HI, USA
- 2013 Fisheries Science & Management graduate seminar, Stock Assessment Crash Course, Department of Marine and Coastal Studies, **Rutgers University**, New Brunswick, NJ, USA
- 2013 McGraw Center, Certificate in Assistant Instruction training, **Princeton University**, Princeton, NJ, USA
- 2011 Marine Academic Research in Iceland (MARICE) program, **University of Iceland**, Reykjavik, Iceland
- 2008 Comparative Ecology and Conservation, semester program, **School for International Training**, Quito, Ecuador
- 2007 Williams-Mystic, Interdisciplinary Maritime Studies Program, **Williams College and Mystic Seaport**, Mystic, CT, USA