

Annabel Payne

Education

2021 – 2026	ETH Zürich, Zürich, Switzerland Ph.D in Physical and Tracer Oceanography Thesis Title "They do it all! Nuclear Waste Radionuclides Trace Transport, Mixing, Carbon Storage, and Freshwater Sources in the Canadian Arctic Ocean" Supervisors: Prof. Dr. Núria Casacuberta-Arola & Dr. Marcus Christl
2019 - 2021	Christian-Albrechts-Universität zu Kiel, Kiel, Germany M.Sc in Marine Geoscience, Thesis Grade 1.0 Supervisors: Prof. Dr. Martin Frank & Dr. Sascha Flögel
2018 - 2019	Macquarie University, Sydney, Australia B.Phil in Geoscience
2015 - 2018	Macquarie University, Sydney, Australia B.Sc in Geology and Geophysics

Employment

August 2026	Hosted at NASA Jet Propulsion Lab, Pasadena, USA <i>SNSF.Mobility Postdoctoral Fellow</i> Modelling anthropogenic ¹²⁹ I and ²³⁶ U releases in the ECCO-Darwin Ocean Model framework to constrain anthropogenic carbon uptake in the Arctic Ocean. Model intercomparison of ECCO, the Transit Time Distribution and eMLR derived anthropogenic carbon estimates.
February 2026 – June 2026	ETH Zürich, Zürich, Switzerland <i>Postdoc</i> Training and supervising incoming PhD, lab management and measurements. Finalising publications from PhD thesis.
March 2025 – March 2026	Carbon Direct <i>Scientific Project Reviewer (Contractor)</i> Reviewing carbon reduction and removals projects in the marine environment. Assessing proposed methodologies, CO ₂ removal potential, efficiency and durability.
Nov. 2019 – Aug. 2021	GEOMAR Helmholtz Centre for Ocean Research Kiel <i>Graduate Research Assistant</i> Duties: Preparation and analysis of P in deep-sea corals using LA-ICP-MS. Preparation of sediment and seawater samples for separation of Hf isotopes and ion-exchange chromatography columns. Picking foraminifera, cleaning and analysis using MC-ICPMS.
Jan 2018 – June 2019	Macquarie University, Australia <i>Student Research Assistant</i> Project: "The influence of sediment composition on paleocirculation proxies over glacial – interglacial timescales" Preparation of sediment samples for separation of Nd and Sr isotopes by acid digestion and ion exchange chromatography columns. Analysis using TIMS and MC-ICPMS.
Jan 2018 – June 2018	Commonwealth Scientific and Industrial Research Organisation (CSIRO) <i>Intern</i> "Palaeomagnetic investigation of a suite of intrusive rocks near Mimili, South Australia" Measure remnant magnetisation and anisotropy of magnetic susceptibility. Successfully delineated possible ancient geomagnetic poles and the tectonic and thermal history of the region.

Publications

2026	Payne, A. , Raimondi, L., Wefing, A.M., Vockenhuber, C., Pérez-Tribouillier, H., Williams, W., Zimmermann, S. and Casacuberta, N., Nuclear waste radionuclides unveil three decades of anthropogenic carbon in the Canada Basin of the Arctic Ocean. <i>Nature Communications</i> https://doi.org/10.1038/s41467-026-71115-6
2025	Wefing, A-M., Payne, A. , Scheiwiller, M., Vockenhuber C., Christl, M., Tanhua, T., Casacuberta, N., Changes in Atlantic Water circulation in the central Arctic Ocean between 2011 and 2021 inferred from tracer observations <i>Ocean Science</i> https://doi.org/10.5194/os-21-3311-2025

2024 **Payne, A.**, Wefing, A.-M., Christl, M., Vockenhuber, C., Williams, W., Smith, J.N., Casacuberta, N.
Circulation Timescales and Pathways of Atlantic Water in the Canada Basin: Insights from Transient Tracers ¹²⁹I and ²³⁶U.
JGR: Oceans
<https://doi.org/10.1029/2023JC020813>
Selected as journal highlight and recognised as a top viewed article.

2021 Abbott, A.N., Löhr, S.C., **Payne, A.**, Kumar, H., Du, J.,
Widespread lithogenic control of marine authigenic neodymium isotope records? Implications for paleoceanographic reconstructions
Geochimica et Cosmochimica Acta
<https://doi.org/10.1016/j.gca.2021.11.021>

In Prep.

2026 **Payne, A.**, Rickli, J., Wefing, A.-M., Pérez-Tribouillier, H., Jensen, L., Woodgate, R., Williams, W., Zimmermann, S., Casacuberta, N.
Tracking Arctic Freshwater with Natural Isotopes and Nuclear Waste Signatures in the Beaufort Gyre

Grants

2026-2028 *ARCTOS: Anthropogenic Radionuclide Tracers in Arctic Ocean Simulations (Assimilating ²³⁶U and ¹²⁹I with ECCO-Darwin to Unravel Arctic Halocline Changes & Carbon Cycle Dynamics)*
Swiss National Science Foundation, Postdoc.Mobility, 135,000 CHF
Project Number P500-2_239456

2022 *A multi-tracer investigation of ocean circulation and ventilation in the Canada Basin*
Swiss Polar Institute,
Polar Access Grant, 7,690 CHF
Grant number PAF-2022-003

Acheivements & Awards

2022 Recognition for contribution to the local community “Greening the Kieler Foerde”, Landhauptstadt, Kiel, Germany.

2021 Invited to exhibit at Kiel Waterkant Festival, “Greening the Kieler Foerde”.

2021 Accepted to the competitive startup programme “MakerBooster”, Kiel, Germany for “Greening the Kieler Foerde”.

2020 DAAD Study Scholarship - Master Studies for All Academic Disciplines (€861 per month for ten months, relocation and study allowance, payment of insurance premiums).

2019 Selected for CAPSTAN 2019 (Australian Postgraduate Marine Research Training Program).

2019 Macquarie University Research Training Program Scholarship (Stipend) (AU\$8000).

2018 2018 Faculty of Arts highest achiever award for AHMG101 – Greek Heroes and Heroines.

2018 Telemachus Ancient History Mentor Program Greek Heroes and Heroines Prize for best essay.

2017 Macquarie University Summer Research Scholarship (AU\$3000).

2016 Selected for the IODP / ANZIC Masterclass (1 student from each university in Australia & New Zealand)

Field Experience

Sept. 2025 – Oct. 2025	ETH Zurich onboard the CCGS Louis St. Laurent (35 days) <i>CTD watch</i> Four weeks in the Canada Basin of the Arctic Ocean. Sampling for transient gas tracers CFC-12 and SF6, 129I and 236U. Water sampling, ice coring, deployment of, and sampling Bongo nets.
Sept. 2024	ETH Zurich onboard the Norseman II (12 days) <i>CTD watch</i> Ten days in Bering Strait, assisting with mooring deployment and water sampling for Hf and Nd.
Sept. 2022 – Oct. 2022	ETH Zurich onboard the CCGS Louis St. Laurent (29 days) <i>CTD watch</i> Four weeks in the Canada Basin of the Arctic Ocean. Water sampling, ice coring, deployment of, and sampling Bongo nets.
April 2019 – May 2019	Macquarie University on board RV Investigator (11 days) <i>CAPSTAN training cruise</i> Logging deployment and recovery of equipment, sediment sampling from Kastern cores, porewater sampling from multicores in a nitrogen glove bag, CTD sampling, bongo nets.
Sept 2018 – Oct 2018	Macquarie University on board RV Investigator (28 days) <i>Student Research Assistant</i> Logging deployment and recovery of equipment, sediment sampling from Kastern cores, porewater sampling from multicores in a nitrogen glove bag, CTD sampling.
June 2017 – July 2018	Macquarie University on board Akademik Sergey Vavilov (7 days) <i>Student Research Assistant</i>

Conferences & Seminars

June 2026	Swiss Ocean Day 2026 <i>Talk:</i> Nuclear waste radionuclides unveil three decades of anthropogenic carbon in the Canada Basin of the Arctic Ocean.
January 2026	Alaska Marine Science Symposium, Anchorage, Alaska <i>Talk:</i> Tracing Three Decades of Anthropogenic Carbon in the Canada Basin Using Nuclear Waste Products <i>Poster:</i> Tracing Freshwater Sources in the Canada Basin Using Natural and Nuclear Waste Isotopes
May 2025	ASOF (Arctic and Sub-Arctic Ocean Fluxes), Barcelona, Spain <i>Poster:</i> Nuclear Waste Reveals 30 Years of Circulation Changes & Anthropogenic Carbon Storage in the Canada Basin
December 2024	AGU (Attending only)
June 2024	1st Swiss Ocean Day <i>Poster:</i> Circulation timescales and pathways of Atlantic Waters in the Arctic Canada Basin using novel tracers Iodine-129 and Uranium-236
April 2024	Laboratory of Ion Beam Physics, ETH Zürich, Switzerland <i>Seminar:</i> 30 Years of Radionuclide Observations: Updates from the Canadian Arctic Ocean
April 2024	IBP PhD Congress, ETH Zürich, Switzerland <i>Poster:</i> Circulation timescales and pathways of Atlantic Waters in the Arctic Canada Basin using novel tracers Iodine-129 and Uranium-236
February 2024	<i>Poster:</i> Circulation timescales and pathways of Atlantic Waters in the Arctic Canada Basin using novel tracers Iodine-129 and Uranium-236 <i>Poster:</i> Hafnium-Neodymium Isotope Compositions to Trace Freshwater Inputs to the Beaufort Gyre
July 2023	Goldschmidt Conference, Lyon, France

	<i>Poster:</i> Tracing sediment provenance in the Early Cretaceous Southern Ocean
May 2023	ASOF (Arctic and Sub-Arctic Ocean Fluxes) Conference, Las Palmas, Gran Canaria <i>Talk:</i> Circulation timescales in the Canada Basin: Insights from transient tracers Iodine-129 and Uranium-236
April 2023	IBP PhD Congress, ETH Zürich, Switzerland <i>Poster:</i> A new compilation of anthropogenic radionuclides & transit time distributions in the Canada Basin
March 2023	The Changing Beaufort Gyre Workshop, Woods Hole Oceanographic Institute, MA, USA <i>Poster:</i> A new compilation of anthropogenic radionuclides & transit time distributions in the Canada Basin
November 2022	Laboratory of Ion Beam Physics, ETH Zürich, Switzerland <i>Seminar:</i> Everything but the kitchen sink: Anthro-, Cosmo- and Lithogenic radionuclides to trace water mass transport, mixing, and ventilation in the Canada Basin
April 2022	IBP PhD Congress, ETH Zürich, Switzerland <i>Poster:</i> A Multi-tracer investigation of ocean circulation and ventilation in the Canada Basin

Outreach & Teaching

2024 - 2025	IBP PhD Congress, ETH Zürich, Switzerland <i>Organising Committee</i>
Autumn 2024	Term Paper Supervisor Student: Julia Schneider
February 2024	Ocean Sciences Meeting, New Orleans, USA <i>Early Career Chair:</i> Transient Tracers in the Ocean: Understanding Physical Processes and Biogeochemical Rates
2022 - 2025	Co-supervising undergraduate and masters students interning in the group.
Apr. 2020 – Feb. 2022	“Habitable - Greening the Kieler Förde” <i>Co-Founder / Principal Investigator</i> Investigating the effects of colonization of artificial structures in the Baltic Responsible for execution of the project, team role assignment, obtaining funding, building a collaborative partnership with the Sydney Institute of Marine Science in Australia and local stakeholders. Locating experiment sites and obtaining permissions, experiment design, sampling, and reporting.
2019	Australian Society of Exploration Geophysicists (NSW) <i>Student President</i>
2018	Earth Sciences Student Symposium NSW <i>Organising Committee</i>
2016 - 2019	Demonstrator at Macquarie University open days

Other Employment

2015 - 2019	Rose Bay Dentistry, Sydney, Australia <i>Senior Dental Assistant</i>
2013 - 2015	Kissing Point Road Dental, Sydney, Australia <i>Dental Assistant</i>
2012	Stanstead Abbots Dental Care, Stanstead Abbots, United Kingdom <i>Dental Assistant</i>

Skills

Experienced in clean lab protocols and running column chromatography for seawater, sediments, and forams.

Running TIMS, MC-ICPMS and AMS.

Coding: MATLAB, Python, Git.

Proficient with Microsoft Office Suite, Adobe Illustrator, Photoshop and Lightroom.