

RESEARCH INTERESTS

CURRICULUM VITAE - THOMAS JOSHUA WILLIAMS

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RESEARCH INTERESTS

Benthic ecology, Climate change, Data science, Polar blue carbon, Trait-function relationships

PROFESSIONAL APPOINTMENTS

Postdoctoral Research Fellow. Marine Ecology

Research

SEA-Quester [Grant # EU 101136480]

[2025-Present]

Environmental & Marine Biology | Åbo Akademi University (ÅAU)

Appointed PDRA / PI: Anna Törnroos-Remes

- Investigating biodiversity-ecosystem function relationships in Arctic soft-sediment and littoral communities, focusing on how species abundance structure and functional traits drive carbon cycling across environmental gradients in emerging Arctic-Baltic ecosystems.
- Developing novel analytical frameworks that integrate intraspecific trait variation with community-scale functional capacity assessments to better predict blue carbon production, export and sequestration.

Benthic-Offshore Wind Interactions Evaluation (BOWIE) [Grant # NE/X008991/1]

[2024-2025]

School of Ocean & Earth Science | University of Southampton

Appointed PDRA / PI: Prof Martin Solan

- Experimentally investigated the effects of offshore wind (sound, vibration, electromagnetism) on benthic biodiversity and ecosystem functioning using globally unique experimental infrastructure.
- Conducted geospatial analyses on the interaction between multiple ocean-uses (inc. shipping, fishing, MPAs, telecom cables, offshore wind) and benthic ecosystem functioning across the UK Exclusive Economic Zone.
- Presented findings of project at the Annual Impact Meeting, attendees included representatives of academia, industry, policy & regulation, consultancy, and NGOs.

Implications of intraspecific trait variability across different environmental conditions for projections of marine ecosystem future [Grant # NE/T001577/1]

[2024]

School of Ocean & Earth Science | University of Southampton

Appointed PDRA / PI: Prof. Jasmin A. Godbold

- Produced a trait-based model for predicting ecosystem functioning that incorporates intra-specific variation in functional effect and response traits.

Teaching

Global Challenges in Biology (Y3 UG/ PGT module)

[2024]

School of Ocean & Earth Science | University of Southampton

Guest lecturer / Course Coordinators: Prof. Jasmin A. Godbold, Dr. Kelvin Peh

- Lectured on “Organism responses to high pCO₂ & low pH” and “Considering multiple stressors” to third-year undergraduate and taught postgraduate students.

PROFESSIONAL APPOINTMENTS

PhD. Arctic Marine Ecology Research Training

Laser-ablated inductively coupled plasma-triple-quadrupole-mass spectrometry (LA-ICP-QQQ-MS) [2022]

School of Ocean & Earth Science Plasma Mass Spectrometer Laboratory | University of Southampton

Postgraduate researcher | Supervisors: Prof. Gavin Foster, Dr. Chris Standish, Prof. J. Andy Milton

- Conducted high-resolution elemental analysis on multiple runs of deep-water coral samples.
- Developed a script in R Markdown to automate blank and standard correction of trace element signals, resulting in increased efficiency and accuracy.
- Created a second script in R Markdown to automate trace element signal rasterization and ratio analysis, streamlining data analysis and enabling rapid generation of results.

3D reconstruction of deep-water coral skeletal architecture

[2021]

X-ray Histology facility | University Hospital Southampton

Postgraduate researcher | Supervisors: Dr. Orestis Katsamenis, Dr. Philip Basford

- Prepared coral specimens and selected regions of interest for high-resolution micro-focus computer tomography (μ -CT), utilizing expert knowledge of sample preparation techniques to ensure optimal results.
- Developed proficiency in Linux OS and SSH to efficiently manage, process, and image large data files produced from μ -CT scans using high-performance supercomputer clusters (IRIDIS).
- Analysed μ -CT scans to produce detailed reconstructions of coral skeletal microarchitecture for two ecologically important coral species, providing valuable insights into their growth and morphology.

Induction and training on experimentally induced invertebrate larval reproduction

[Cancelled due to
COVID 19]

White Sea Biological Station "Kartesh" (WSBS) | Zoological Institute of Russian Academy of Sciences

Visiting postgraduate researcher | Supervisor: Dr. Liudmila Fliachinskaya (WSBS)

Co-Curricular Research Experience

Building and Enabling UK-Greenland Research Capacity to Address Effects of Anthropogenic Stressors on Benthic Ecosystems

[2023]

University of Southampton | Greenland Institute of Natural Resources

Postgraduate researcher | PI: Prof. Martin Solan (University of Southampton)

- Assisted with the project proposal and timeline of activities to submit to the NERC Arctic Office.
- Travelled to Nuuk, Greenland to investigate effects of marine contamination on benthic biodiversity in fjordic systems.
- Lead author on paper.

Workshop on Functional Roles of Benthic Ecosystem Engineers

[2023]

Université Bretagne Loire

Postgraduate researcher | Workshop lead: Dr. Martin Marzloff (Ifremer-DYNECO-LEBCO)

- Produced a skeleton draft of a position paper on how major benthic ecosystem engineers contribute to multiple dimensions of seafloor habitats.
- Commenced data collection for an additional paper aimed at evaluating how habitat forming species shape biodiversity-ecosystem functioning relationships.

EuroMarine Foresight Workshop on Functional Traits in Marine Benthic Ecology

[2022]

EuroMarine Full Member Organisations

Postgraduate researcher | Workshop lead: Dr. Trystan Sanders (University of Southampton)

- Conducted a comprehensive literature review with scientific colleagues on trait-function relationships in marine benthic ecology.
- Collaborated on a scientific paper aimed at evaluating the status of the functional trait approach in benthic ecosystem functioning.

PROFESSIONAL APPOINTMENTS

Scientific Partnership on the Consequences of Climate Change in Arctic Coastal Ecosystems [2021-2022]

University of Southampton | Zoological Institute of Russian Academy of Sciences

Postgraduate researcher | PIs: Professor Martin Solan, Dr. Alexey Sukhotin

- Championed the co-ordination a series of scientific workshops on White Sea Benthic Datasets.
- Led discussions with APECS to co-develop a scientific conference aimed at Early Career Researchers.

Communication of Climate Change impacts in the Arctic

[2021-2022]

Association of Polar Early Career Scientists (APECS)

Project member | Project leads: Alexis Geels, Geetha P.N.

- Co-produced video shorts and social media posts about Arctic climate change and the local, regional and global threats that it would induce.
- Advocated for a presentation during the Arctic Science Summit Week 2022.

Science & Diplomacy

[2021-2022]

Association of Polar Early Career Scientists (APECS)

Project member | Project leads: Nicholas Parlato, Chloe Scott

- Led discussions on facilitating better integration of APECS and country-specific collaborative groups, including UK Polar Network.
- Advocated for presenting a talk or poster on the importance of scientific diplomacy in developing the next generation of ECRs at the UArctic Congress 2022 .

Amundsen research expedition – ROV Coral Seep Habitats / ArcticNet

[2021]

CCGS Amundsen | University of Southampton & Université Laval

Visiting postgraduate researcher and project lead | Principal Scientist: Dr. Maxime Geoffroy (MUN)

- Coordinated and lead two separate projects that involved running mesocosm incubations on intact samples of the seafloor and the collection of deep-water corals during the ROV dives.
- Presented the preliminary findings of the mesocosm incubations to the scientific team and crew.

Biodiversity and ecosystem functioning in the Arctic benthos: FCDO UK-Russia Science Workshop [2020]

St. Petersburg | Zoological Institute of Russian Academy of Sciences & UK Science and Innovation Network

Visiting postgraduate researcher | Co-ordinators: Tatiana Iakovleva, Prof. Nikita Chernetsov

- Presented a talk on assessing the impacts of climate change on benthic biodiversity.
- Established a proposal with scientific colleagues to carry out experimental work at the White Sea Biological Station for a PhD data chapter.
- Collaborated on a scientific paper that explores the responses of White Sea benthic biodiversity to model climate change scenarios.

Changing Arctic Ocean Seafloor (ChAOS) research expedition – [JR18006](#)

[2019]

RRS James Clark Ross | University of Southampton

Scientific officer | Principal Scientific Officer: David Barnes (British Antarctic Survey)

- Selected to join the multidisciplinary team of like-minded polar scientists investigating physical, chemical and biological components across a gradient of sea-ice.
- Collaborated in the sampling of and husbandry of macroinvertebrate benthic communities for future climate change experiments.

Internships

Geospatial mapping of impacts from offshore wind turbines on benthic community and heritage assets [2023]

School of Engineering | University of Southampton

Postgraduate researcher | Project manager: Dr. Hugo Putuhena

- Advised on the effects of offshore wind on the benthos to the project consortium.
- Computationally explored the effects of marine infrastructure on benthic biodiversity and ecosystem functioning within the UK EEZ.

Building and enabling UK-Russian research capacity to address climate change effects on Arctic marine ecosystems - [link](#) [2020-2021]

Public Policy Southampton | University of Southampton | Zoological Institute of Russian Academy of Sciences

Policy researcher | Project manager: Gareth Giles (Public Policy Southampton)

- Chaired multiple breakout discussion sessions (online) during the 3-day scientific workshop series in March 2020.
- Co-authored a policy brief titled “A changing Arctic: Merging scientific perspectives” aimed at British and Russian policymakers and stakeholders in scientific diplomacy and Arctic relations .
- Contributed to the completion of the end-of-project report submitted to the Foreign and Commonwealth Development Office.
- Produced an extensive scientific literature-and-policy analysis to investigate scientific diplomacy in the Arctic between Russia and the United Kingdom.

**MSci. Marine Biology (Integrated)
Research Training**

Laboratory based mesocosm experimentation

[2018-2019]

Biodiversity and Ecosystem Futures Facility | University of Southampton

Undergraduate student | Supervisor: Dr. Jasmin Godbold

- Conducted a medium-term (20 week) experiment exposing two functionally contrasting Arctic invertebrate species to two levels of ocean warming and acidification.
- Carried out the continuous monitoring of environmental variables, maintenance of CO₂ gas mixing system and animal husbandry.
- Quantified responses in burrowing behaviour, bioturbation, carbonate chemistry and contribution to nutrient cycling.

Flume-based laboratory experimentation

[2019]

National Oceanography Centre Southampton

Assistant researcher | Project manager: Professor Martin Solan (University of Southampton)

- Accomplished 12 multi-phase flume experiments on benthic mesocosms over a period of 4 weeks.
- Contributed to the data collection on experimentally simulated consecutive storms on coastal sediment integrity and biogeochemical cycling for nationally collaborate project BLUEcoast.

Co-Curricular Research Experience

Tropical reef conservation

[2016]

Marine Conservation Cambodia | ReachOut Volunteers

Volunteer

- Constructed artificial coral reef pods to aid in restoration of previously dynamite-damaged reefs around Koh Rong Island.
- Qualified as an Advanced PADI Open Water Diver

PUBLICATIONS AND MANUSCRIPTS UNDER PREPARATION

Putuhena, H., **Williams, T.J.**, Sturt, F., White, D., Solan, M., Godbold, J. A., Gourvenec S. (2025). Integrated geospatial datasets to inform marine spatial planning and impact assessment in waters surrounding the United Kingdom. *Scientific Data* **12**, 1845. <https://doi.org/10.1038/s41597-025-05950-5>

Williams, T.J., Garcia, C.R., Godbold, J.A., Archambault, P. Solan, M. (2025). Co-extinctions and co-compensatory species responses to climate change moderate ecosystem futures. *Global Change Biology*, **31**(10), e70539. <https://doi.org/10.1111/gcb.70539>

Williams, T.J., Standish, C., Archambault, P., Godbold, J.A., Solan, M., Katsamanis, O.L., Basford, P.J., Foster, G. (2024). Geochemical proxies for deep-sea temperature and nutrient content in cold-water bamboo corals. *Chemical Geology*, **654**, 122053. <https://doi.org/10.1016/j.chemgeo.2024.122053>

EDITORIAL, REVIEWING, AND PROFESSIONAL SERVICE

Williams, T.J., Reed, A.J., Peck, L., Godbold, J.A., Solan, M. (2024) Ocean warming and acidification adjust inter- and intra-specific variability in the functional trait expression of polar invertebrates. *Scientific Reports*, **14**, 14985. <https://doi.org/10.1038/s41598-024-65808-5>

Williams, T.J., Katsamenis, O.L., Basford, P.J., Solan, M., Foster, G., Godbold, J.A., Archambault, P. (2024). Three-dimensional reconstruction of high latitude bamboo coral via X-ray microfocus Computed Tomography. *Scientific Data*, **11**, 602. <https://doi.org/10.1038/s41597-024-03396-9>

Williams, T.J., Blockley, D., Cundy, A., Godbold, J.A., Howman, R.M., Solan, M. (2024). Dilute concentrations of maritime fuel can modify sediment reworking activity of high-latitude marine invertebrates. *Ecology and Evolution*, **14**(7), e11702. <https://doi.org/10.1002/ece3.11702>

Williams, T.J., Reed, A.J., Godbold, J.A., Peck, L.S., Hauton, C., Solan, M. (in review). Intra-specific variability in physiological responses to changing conditions moderate the acclimation capacity of high-latitude benthic invertebrates. *PLOS ONE*

Williams, T.J., Putuhena, H., Gouvenic, S., Godbold, J.A., Strut, F., White, D., Solan, M. (in prep). Acceleration in, and composition of, anthropogenic ocean use reveal habitat dependent transitions in benthic ecosystem integrity

Williams, T.J., Burgess, J., Clayton, K., Mazik, K., White, P., Ziegenfus, T., Hauton, C., Solan, M., Godbold, J.A. (in prep). Noise from offshore wind farms modifies the metabolic activity and functional trait expression of benthic invertebrates

Williams, T. J., Burgess, J., Jones, A., Mazik, K., White, P., Godbold, J. A., Hauton, C., Solan, M. (in prep). Inter-specific behavioural and physiological changes in benthic invertebrates to offshore wind substrate-borne vibration

Williams, T. J., Burgess, J., Mazik, K., White, P., Solan, M., Godbold, J. A. (in prep). The performance of benthic communities under offshore wind-related stressors diverges under a near-future climate

Williams, T.J., Blais, G., Solan, M., Archambault, P. (in prep). Deep-water benthic invertebrate activity and biogeochemical functioning in the Eastern Canadian Arctic

Solan, M., **Williams, T.J.**, Godbold, J. A., Törnroos-Remes, A., Villnäs, A., Gogina, M., Marzloff, M., Boye, A., Grall, J. (in prep). Habitat forming species across multiple marine habitats shape benthic community capacity to mediate ecosystem functioning

Sanders, T., Solan, M., Garcia, C.R., **Williams T.J.**, Armitage, P., Godbold, J. A., Bremner, J., Cooper, K., Gogina., M., Marzloff, M., Mouillot, D., Törnroos-Remes, A., Villnäs, A. (in prep). What traits matter for seafloor ecosystem functioning?

Aristov, D.A., Garcia, C.R., Naumov, A.D., Savchenki, O.N., Sukhotin, A. A., **Williams, T.J.**, Zanodov, A.Y., Solan, M. (in prep). Scale dependency of biodiversity-ecosystem function relations modify the ecological consequences of species loss

Solan, M., Garcia, C.R., **Williams, T.J.**, Sukhotin, A.A., Shunatova, N., Naumov, A.D. (in prep). Scientific cooperation catalyses ecological insight in a changing Arctic: a review and perspectives from a bilateral UK-Russia marine science collaboration

EDITORIAL, REVIEWING, AND PROFESSIONAL SERVICE

Peer Review

Earth and Planetary Science Letters (Elsevier) | 2025

Journal of Experimental Marine Biology and Ecology (Elsevier) | 2024

SCHOLARSHIPS AND RESEARCH FUNDING

Full Sponsor (Interdisciplinary Southampton Partnership for Investigators Researching the Environment) PhD studentship | grant number NE/S007210/1 [2019-2027] | National Environmental Research Council (UK) & Université Laval (Canada)

NXCT Free Beamtime Access Scheme Award | grant number EP/T02593X/1 [2020-2025] | Engineering and Physical Science Research Council (UK)

United Kingdom – Greenland Arctic Research Bursaries Scheme 2023-24 | UK Arctic Office

United Kingdom – Greenland Arctic Research Bursaries Scheme 2024-25 | UK Arctic Office

TECHNICAL EXPERIENCE

Computational and analytical

- Proficient user of **R Markdown, Git and HTML5**
- Collection, analysis and presentation of qualitative data using **R** (*tidyverse, raster, wordcloud, ggforce* packages), **VOSviewer, NVivo, AntConc, Excel** and **PowerPoint**
- Organisation, analysis and presentation of **Bayesian** and **mixed-effects** statistics using **R** (*gam, nlme, mgve, stats, vegan* packages)
- Practiced user of scientific and graphical software including **ImageJ, CO2calc, Panoply, Affinity Designer, Dragonfly**

Laboratory skills

- Experimental design and execution across **individual-to-community scales** for benthic marine systems
- Multi-factorial **long-term climate manipulation** (temperature, salinity, pCO₂, O₂) with **high replication** in controlled **mesocosm systems**
- **Vibration and electromagnetic field** (EMF) experimental manipulation capability for offshore renewable energy impact assessment
- **Acoustic disturbance** experiments on benthic invertebrates
- Trained in fluorescent sediment profile imagining (**f-SPI**), closed-chamber **respirometry**, total alkalinity titration analysis
- Experience with Scanning Electron Microscopy, Digital Microscopy and Laser Ablation Inductively Coupled Plasma QQQ Mass Spectrometry (**LA-ICP-QQQ-MS**)

Miscellaneous

- Supervised multiple undergraduates (BSc. And MSci) undertaking labwork in the *Biodiversity and Ecosystem Futures Facility*
- Administrative experience includes the organisation and chairing of focus groups and workshops
- Advanced Open Water PADI scuba diver to 30m depth, with over 30 hours logged in temperate and tropical waters
- ENG 1 certified seafarer

EDUCATION

PhD. Marine Ecology

[2019-2023]

University of Southampton | Southampton, United Kingdom

Université Laval | Quebec City, Quebec, Canada

Thesis: Ecological consequences of climatic forcing in the Arctic marine benthos

MSci. Marine Biology (Integrated)

[2015-2019]

University of Southampton | Southampton, United Kingdom

University of Bergen | Bergen, Norway (ERASMUS)

MSc. Thesis: Impacts of climate change on benthic organism behaviour and ecosystem functioning

3rd Year Dissertation: Impact and cause of rising coastal water temperatures on the aquaculture of *Salmo salar* (Atlantic Salmon) in Norway

ACADEMIC CONFERENCE & WORKSHOP PRESENTATIONS

Williams, T.J. (2024). Cumulative expansion of "Ocean-Use" predicts seafloor functioning across the UKEEZ – Presentation at the EcoWind Annual Impact Meeting [Southampton, UK]

Williams, T.J. (2024). Cumulative expansion of offshore wind infrastructure across the UKEEZ: A retrospective view from the seafloor – Presentation at the Aura Conference 2024 [Hull, UK]

Williams, T.J. (2022). Disparities in behavioural trait expression between and within species confound benthic ecosystem functioning under a near-future climate scenario – Presentation at the "6th Nereis Park Conference - Bioturbation in past and present: from terrestrial to marine ecosystems" [Logonna-Daoulas, France]

Williams, T.J. (2021). Deep-water benthic invertebrate activity in the Eastern Canadian Arctic – Presentation of preliminary findings from the 2021 Amundsen expedition at the "Wessex Congress 2021" conference [online]

Williams, T.J. (2021). Bibliometric knowledge networks: where is the science at the moment? What collaborations are there at present? – Presentation of findings from scientific literature-and-policy analysis at the "FCDO UK-RU Scientific Workshop: Development of collaborative research ideas"; 17-19th March 2021 [online]

Williams, T.J., Reed, A.J., Peck, L., Godbold, J.A., Solan, M. (2020). Species responses to climate change modify benthic biogeochemical cycling – Presentation at the "Arctic Change 2020" conference; 7-10th December 2020 [online - [link](#)]

Williams, T.J., Reed, A.J., Godbold, J.A. (2020). Impacts of climate change on polar benthic species behaviour and ecosystem functioning – Presentation at the "A Changing Arctic 2020" conference [Tromsø, Norway]*

Williams, T.J. (2020). Assessing the impact of climate change on Arctic benthic biodiversity. Presentation at the "Biodiversity and ecosystem functioning in the Arctic benthos: FCDO UK-Russia Science Workshop" [St. Petersburg, Russia]

*Postponed indefinitely due to COVID-19

LIST OF INVITED TALKS

- Geochemical proxies for deep-sea temperature and nutrient content in cold-water bamboo corals | G3 Seminar Series – UoS | 20 Feb, 2024
- High-resolution computed tomography reconstructions of deep-water bamboo coral: Applicability in understand calcification strategies | µVIS- Correlative Imaging Forum - UoS | 26 May, 2022
- Collaborations Matter: UK-Russia Collaboration Series | UK Polar Network – APECS Russia | 28 October, 2021

ORGANISATION AFFILIATIONS

Interagency Arctic Research Policy Committee Collaborations [2022-]
International/Early Career member [Academic]

Learned Society of Wales [2022-]
Early Career Research Network

Association of Polar Early Career Scientists [2021-]
Project group alumni | 2021-2022 President: Marta Moreno Ibáñez

The Marine Biological Association | Plymouth, United Kingdom [2019-]
Professional membership

UK Polar Network [2019-]
Active member | 2024-2025 Co-Presidents: Lucy Stephenson, Louise Mercer

EXTRA-CURRICULAR ACTIVITIES AND OTHER ACHIEVEMENTS

British Ecological Society

[2019-]

Annual membership

EXTRA-CURRICULAR ACTIVITIES AND OTHER ACHIEVEMENTS

World Aquatics Masters Championships Doha 2024 - Competition Athlete (GBR)

[2024]

Vice-President of the Southampton University Swimming Club

[2018-2019]

British Universities & Colleges Sport - Swimming Team Championships Finalist, Shield Division

[2018]