

# Ketil Koop-Jakobsen, PhD

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## Curriculum Vitae

Ketil Koop-Jakobsen, PhD

Citizenship: Denmark

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### KEY RESEARCH INTERESTS :

- Wetlands biogeochemistry and nutrient cycling
- Plant-soil-microbe interactions
- Chemical gradients in soils and sediments

### KEY RESEARCH METHODS AND TECHNOLOGY :

- Optode imaging of O<sub>2</sub> pH and CO<sub>2</sub> in rhizospheres, soil and sediments
- Microprofiling of O<sub>2</sub>, pH, CO<sub>2</sub>, H<sub>2</sub>S, N<sub>2</sub>O and redox in soil and sediments
- <sup>15</sup>N tracing and Isotope pairing for nitrogen research in soil and sediments

### WORK EXPERIENCE :

- 2022- Assistant Scientist, Marine Biological Laboratory, Woods Hole, Massachusetts, USA
- Research: Rhizosphere processes, nutrient turnover and GHG release
- 2020-2022 Postdoc Alfred Wegener Institute – Wadden Sea Station, Sylt, Germany.
- Research: Carbon Sequestration in salt marshes and sea grasses
- 2018-2020 Scientific Employee, Data Publisher – PANGAEA - University of Bremen, Germany
- Project management: Data-Projects on “Mesopelagic production” and “persistent identifiers in scientific data”
- 2012-2018 Scientific Employee, MARUM – Center for Marine Environmental Sciences, University of Bremen, Germany
- Project management: Projects improving international collaboration and interoperability among environmental research infrastructures (2012-2018). Projects: COOPEUS and AtlantOS
  - Research: Optode imaging of rhizosphere processes (2015-2018)
- 2010–2012 Post doc, Max Planck Institute for Marine Microbiology, Bremen, Germany
- Sensor development: Multifiber oxygen optode system
  - Research: Oxygen dynamics in salt marsh rhizospheres

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## EDUCATION:

- 2008 PhD, Biology, Boston University Marine Program. Research conducted at Marine Biological Laboratory, Woods Hole, Massachusetts, USA
- Research: Nitrogen cycling in salt marshes.
- 2003 Master's, Chemistry and Environmental biology, Roskilde University, Denmark
- Research: Ammonium adsorption dynamics in sediments

## PUBLICATIONS:

- 2022 Granse, D., Titschack, J., Ainouche, M., Jensen, K., and Koop-Jakobsen, K. (2022). Subsurface aeration of tidal wetland soils: Root-system structure and aerenchyma connectivity in *Spartina* (Poaceae). *Science of The Total Environment*, 802, 149771. [10.1016/j.scitotenv.2021.149771](https://doi.org/10.1016/j.scitotenv.2021.149771)
- 2021 **Koop-Jakobsen, Ketil**, Robert Meier, Peter Mueller “Plant-mediated rhizosphere oxygenation in the native invasive salt marsh grass *Elymus athericus*” *Frontiers in Plant Science*. doi: [10.3389/fpls.2021.669751](https://doi.org/10.3389/fpls.2021.669751)
- 2020 Keshta A, **Koop-Jakobsen K**, Titschack J, Mueller P, Jensen K, Baldwin A, Nolte S (2020). Ungrazed saltmarsh has well connected soil pores, higher soil porosity, and less dense sediment compared with grazed saltmarsh: A CT scanning study. *Estuarine Coastal Shelf Science*, Vol 145: 106987. DOI: [10.1016/j.ecss.2020.106987](https://doi.org/10.1016/j.ecss.2020.106987)
- 2019 **Koop-Jakobsen, Ketil** and Gutbrod, Martin (2019) Shallow salt marsh tidal ponds – an environment with extreme oxygen dynamics. *Frontiers in Environmental Science*. <https://doi.org/10.3389/fenvs.2019.00137>
- 2018 **Koop-Jakobsen, Ketil**, Peter Mueller, Robert Meier, Gregor Liebsch and Kai Jensen. Plant-sediment interactions in salt marshes – An optode imaging study of O<sub>2</sub>, pH and CO<sub>2</sub> gradients in the rhizosphere. *Frontiers in Plant Science*. DOI: [10.3389/fpls.2018.00541](https://doi.org/10.3389/fpls.2018.00541)
- 2018 Lenzewski, Nikola, Peter Mueller, Robert Meier, Gregor Liebsch, Kai Jensen, **Ketil Koop-Jakobsen** (2018). Dynamics of Oxygen and Carbon dioxide in rhizospheres of *Lobelia dortmanna* - A planar optode study of belowground gas exchange between plants and sediment. *New Phytologist* 218: 131–141 DOI: [10.1111/nph.14973](https://doi.org/10.1111/nph.14973)
- 2017 **Koop-Jakobsen, Ketil**, Jan P. Fischer and Frank Wenzhöfer (2017). *Survey of sediment oxygenation in rhizospheres of the saltmarsh grass -*

- Spartina anglica*. Science of The Total Environment 589: 191-199.  
DOI: [10.1016/j.scitotenv.2017.02.147](https://doi.org/10.1016/j.scitotenv.2017.02.147)
- 2015 **Koop-Jakobsen, Ketil**, and Frank Wenzhöfer (2015). *The Dynamics of Plant-mediated Sediment Oxygenation in Spartina anglica Rhizospheres - a Planar Optode Study*. Estuaries and Coasts. Vol 38, Iss 3, pp 951-963.  
DOI: [10.1007/s12237-014-9861-y](https://doi.org/10.1007/s12237-014-9861-y)
- 2014 Hofmann, Laurie C, Kai Bischof, Cecilia Baggini, Andrew Johnson, **Ketil Koop-Jakobsen** and Mirta Teichberg (2014). *CO<sub>2</sub> and inorganic nutrient enrichment affect the performance of a calcifying green alga and its noncalcifying epiphyte*. Oecologia 177:1157–1169  
DOI: [10.1007/s00442-015-3242-5](https://doi.org/10.1007/s00442-015-3242-5)
- 2012 Fischer, Jan P., **Ketil Koop-Jakobsen** (2012) – *The multi fiber optode (MuFO): A novel system for simultaneous analysis of multiple fiber optic oxygen sensors* - Sensors and Actuators B: Chemical, Volume 168, 20 June 2012, pp 354-359  
DOI: [10.1016/j.snb.2012.04.034](https://doi.org/10.1016/j.snb.2012.04.034)
- 2010 **Koop-Jakobsen, K** and A.E. Giblin (2010) – *The effect of increased nitrate loading on nitrate reduction via denitrification and DNRA in salt marsh sediments* - Limnology and Oceanography vol.55(2), pp789-802  
DOI: [10.4319/lo.2009.55.2.0789](https://doi.org/10.4319/lo.2009.55.2.0789)
- 2009 **Koop-Jakobsen, K.** and A.E. Giblin, 2009 “*Anammox in tidal marsh sediments: The role of salinity, nitrogen loading and marsh vegetation*”, Estuaries and Coasts. Vol. 32, No.2, p238-245  
DOI: [10.1007/s12237-008-9131-y](https://doi.org/10.1007/s12237-008-9131-y)
- 2009 **Koop-Jakobsen, K** and A.E. Giblin (2009) – *A new approach to measuring denitrification in the rhizosphere of vegetated marsh sediments* – Limnology and Oceanography methods, vol 7, pp626-637  
DOI: [10.4319/lom.2009.7.626](https://doi.org/10.4319/lom.2009.7.626)
- 2009 D.C. Drake, Bruce J. Peterson, Kari A. Galván, Linda A. Deegan, John W. Fleeger, Carl T. Friedrichs, John Hobbie, Charles Hopkinson, J. Michael Johnson, **Koop-Jakobsen, K.**, Lynsey E. Lemay, Erin E. Miller, Christian Picard, R. Scott Warren. "Salt marsh ecosystem responses to nutrient enrichment: A paired <sup>15</sup>N tracer study". Ecology Vol.90, No.9. pp2535-2546  
DOI: [10.1890/08-1051.1](https://doi.org/10.1890/08-1051.1)
- 2002 **Koop-Jakobsen, K.** and A.E. Giblin, “Tidal flushing of ammonium from intertidal salt marsh sediments: The relative importance of adsorbed ammonium”, Biological Bulletin, 203, p. 258-259  
DOI: [10.2307/1543429](https://doi.org/10.2307/1543429)

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## OTHER PUBLICATIONS (Non Peer-reviewed)

- 2017 **Koop-Jakobsen, Ketil** and Martin Gutbrod. *O<sub>2</sub>, pH and CO<sub>2</sub> Dynamics in Salt Marsh Tidal Ponds* - Technical report on novel O<sub>2</sub>, pH and CO<sub>2</sub> needle optode profiling. DOI: [10.13140/RG.2.2.33109.32483](https://doi.org/10.13140/RG.2.2.33109.32483)
- 2014 **Koop-Jakobsen, Ketil**, Lindsay Powers, Robert Huber, Christoph Waldmann, and Henry W. Loescher “*COOPEUS – Building the framework for information exchange between the US and EU Environmental Research Infrastructures*”, 2014 [iLEAPS Newsletter P31-33](#).

## FUNDING :

- 2021 Sea4Society: searching for solutions for Carbon-sequestration in coastal ecosystems. Deutschen Allianz Meeresforschung (DAM)/ Bundesministerium für Bildung und Forschung (BMBF) 710.000€ (PI)
- 2018 SUMMER: Sustainable management of mesopelagic resources. *European Commission H2020-programm*. 202.000€ (PI)
- 2014 (Co-PI) COOP+ *Cooperation of research Infrastructures to address global challenges in the environmental field. European Commission H2020-programm*. 195.000€. (Co-PI)
- 2007 Palmer McLeod Fellowship, Boston University. 1yrs tuition and stipend

## CONFERENCE CONTRIBUTIONS - TALKS AND POSTERS

**2021 CERF** (The Coastal and Estuarine Research Federation), Online, Oral Anchor talk, Presenter Koop-Jakobsen “Plant-mediated sediment oxygenation facilitate the spread of *Elymus athericus* in European marshes”

**2017 CERF** (The Coastal and Estuarine Research Federation), Providence, RI, USA, oral presentation, Ketil Koop-Jakobsen and Peter Mueller “Salt marsh rhizospheres - O<sub>2</sub>, pH and CO<sub>2</sub> gradients in time and space”

**2016 ECSA** (Estuarine and coastal sciences association), Bremen, Germany, oral pres., “*Planar optode studies of marsh rhizospheres*”

**2016 ASLO** (Ocean Sciences Meeting), New Orleans, LA, USA Poster Pres. Koop-Jakobsen “*Plant-mediated Sediment Oxygenation in Coastal Wetlands*”

**2015 EGU** (European Geosciences Union General Assembly), Vienna, Austria, Oral Pres. Koop-Jakobsen, C. Waldmann and R. Huber “COOPEUS – connecting research infrastructures in environmental sciences”

**2014 AGU** (American Geosciences Union General Assembly) San Francisco, Oral Pres., Koop-Jakobsen “The Dynamics of Sediment Oxygenation in Marsh Rhizospheres”

**2013 EGI** (EGI-Technical Forum) Oral Pres., Koop-Jakobsen “Strengthening the cooperation between EU and US in the field of environmental research infrastructures”

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**2013 EGU** Vienna, Poster Pres Koop-Jakobsen. “The Dynamics of sediment oxygenation in *Spartina anglica* Rhizospheres – a Planar Optode Study”

**2012 EGU** (*European Geosciences Union General Assembly*) Vienna, Oral Pres. Koop-Jakobsen -”A novel Multi-Fiber Optode sensor system (MuFO) for monitoring oxygen”

**2007 ERF** (*Estuarine Research Federation*, Providence RI, USA - Oral Presentation -. Koop-Jakobsen Title: “A New Approach To Measuring Denitrification in Vegetated Marsh Sediments”.

**2007 SIL** (30th Congress of the International Association of Theoretical and Applied Limnology) Title: “Nitrogen Retention in Salt Marsh Sediment - A Study of Anaerobic Ammonium Oxidation and Dissimilatory Nitrate Reduction to Ammonium”.

**2007 ASLO** (aquatic sciences meeting) Santa Fe, NM, USA - Oral presentation – Title: “Nitrogen Retention in Salt Marsh Sediment - A Study of Anaerobic Ammonium Oxidation”.

### WORKSHOP/COURSES/MEETINGS (ORGANIZATION OF...) :

**2019 Workshop** “The Old and New – working with existing and emerging PID types”. Organizer: **Ketil Koop-Jakobsen** and Tina Dohna. Oct 23<sup>rd</sup> Research Data Alliance (RDA) plenary meeting, Helsinki Finland (half day)

**2017 Workshop**, Organizer: **Ketil Koop-Jakobsen**, “GEOSS for Ocean data providers” PLOCAN, Gran Canarias, Spain, November 24<sup>th</sup> (full day)

**2017 Workshop**, Organizer: **Ketil Koop-Jakobsen**, “*AtlantOS workshop on transatlantic Ocean data harmonization*” Brussels, Belgium, June 7-8<sup>th</sup>

**2014 Splinter meeting** for the environmental research infrastructure community, Organizer: **Ketil Koop-Jakobsen**, “*Connecting research infrastructures through brokering services* - EGU Vienna, Austria, April 29<sup>th</sup>

**2013 Splinter meeting** for the environmental research infrastructure community, Co-Organizer: **Ketil Koop-Jakobsen**, “*Future harmonization of data sharing among Research Infrastructures*” EGU Vienna, Austria, April 11<sup>th</sup>

**2011 Workshop/Course**, Organizer: **Ketil Koop-Jakobsen**, “*Use of in situ sensor technology in marine research -A field course*”, AWI Sylt, Germany September 4-9<sup>th</sup>.

**2010 Workshop/Course**, Organizer: **Ketil Koop-Jakobsen**, “*Sensor technology in marine research – A course in general use and data analysis*”, Max Planck Inst. Bremen, Germany August 23-27<sup>th</sup>.

## INVITED GUEST-SEMINARS, WEBINARS AND LECTURES

**2021** Title: “Carbon storage in Wadden Sea seagrasses and salt marshes”. Seminar series for Helmholtz Klimainitiative (HI-CAM), Online

**2021** Title: “Techniques for Spatiotemporal investigations of rhizosphere processes” - Seminar series for Hamburg University's research training group 'Biota-mediated Effects on Carbon Cycling in Estuaries'

**2021** Title: “Searching for solutions for Carbon sequestration in coastal ecosystems” HELCOM Workshop on Blue Carbon in the Baltic Sea region

**2021**Title: “Why do plant-sediment interactions in salt marshes affect ecosystem services?” 2nd Themeday NCK-Waddenacademie Webinar

**2019** Title: “New developments in the field of Persistent Identifiers” Joint webinar FREYA and OpenAIRE. webinar

**2019** Title: “The PID Graph and its Potential: Extending Persistent Identifiers for Research Data” Research data Canada – Webinar

**2018** Title: “*GEOSS Mirror & GEOSS VIEW - the AtlantOS story*” - 3rd GEO Data Providers workshop Data Providers, Rome, Italy, Workshop oral presentation

**2017** Title: “Sediment oxygenation and Nitrogen cycling in wetlands” Helmholtz-Zentrum Geesthacht - Centre for Materials and Coastal Research, Geesthacht, Germany – guest-lecture

**2016** Title: “Rhizosphere processes in vegetated salt marshes – A planar optode perspective” – Biocentrum Klein Flottbek – Hamburg University, Germany – guest-lecture

**2016** Title: “The research perspective of underwater ground vehicles - a sensor platform for flux measurements at the sediment-water interface”, Robex-Allianz – University of Kaiserslautern, Germany - Workshop oral presentation

**2015** Title: “Sediment oxygenation in intertidal *Spartina anglica*-dominated marshes” Coastal Ecology Workshop Westerhefer, Germany. Workshop oral presentation.

**2010** Title: “Nitrogen retention in marsh sediment” – Max Planck Institute for marine microbiology – Bremen, Germany - guest-lecture

## EDITORIAL ACTIVITIES (Non Peer-reviewed)

**2014** Invited guest editor on [iLEAPS newsletter 2014](#) – special issue – Environmental research infrastructures 12 articles 48pages

## REVIEWER ACTIVITIES:

Journal manuscript reviews: Journal of Environmental Quality - Plant and Soil - Marine Ecology Progress Series - Estuarine, Coastal and Shelf Science - Limnology and Oceanography, Limnology and Oceanography-methods – Biogeochemistry - Marine Biology - Estuaries and Coasts – Hydrobiologia - Journal of Experimental Marine Biology and Ecology, Applied and Environmental Microbiology – Frontiers in Plant Science – Frontiers in Marine Science – Journal of plant nutrition and soil - Journal of Marine Research

Proposal reviews: National Science Foundation

## **SUPERVISION**

- PhD student Peter Mueller, Group of applied plant ecology, Hamburg University. (Co-supervision)
- PhD student Nikola Lenzewski, Group of applied plant ecology, Hamburg University (Co-supervision)
- PhD student Dirk Granse, Group of applied plant ecology, Hamburg University (Co-supervision)

## **PUBLIC OUTREACH ACTIVITIES :**

- Science Slam - Norddeutschen Vertretung bei der Europäischen Union – Brussels, Belgium August 23rd 2017.
- Newspaper a public newspaper article about testing underwater robotics for seafloor investigations in fjords and estuaries. Roskilde Dagblad, Sep. 12th 2014, Denmark
- Interview article in International Innovations - Environment Dec 2012, p 12-1