

## Achievements

Community oriented open source developer

Maintains multiple open source repositories including community engagement, discussion and implementation (e.g. for a [general implementation of vertical coordinate transformation in xgcm](#))

Expert for CMIP6 data analysis in the cloud

Implemented automated retraction (via [Github Actions](#)) and upload of Analysis-Ready Cloud-Optimized Zarr stores (via [Conda-Forge recipes](#)) based on the ESGF API. Developed a [python package](#) to crowdsource fixes for common inconsistencies in the published CMIP6 data and facilitate Multi-Model-Analysis bases on ESGF metadata.

Promotion and Education for Pangeo Software

Regularly presents and teaches Pangeo software tools, and serves as open source software advisor for undergraduate and graduate students.

Advisor for Open Source Best Practices

Implemented automatic deployment of community sourced [Standard Operating Procedures](#) for Ocean Glider observations which are endorsed by the Global Ocean Observing System.

## Appointments

2021- | University of Hawaii | HI

Affiliate Graduate Faculty

2020- | Columbia University, Lamont-Doherty Earth Observatory | NY

Associate Research Scientist, Supervisor: Prof. Ryan Abernathey

2017- 2020 | Princeton University, Department of Geosciences | NJ

Postdoctoral Research Associate, Advisor: Prof. Laure Resplandy

2010-2017 | Columbia University, Dept. of Earth & Environmental Sciences | NY

Graduate Research Associate, Advisor: Prof. Arnold L. Gordon

2009-2010 | GEOMAR, Department of theory and modeling | Kiel | GER

Research assistant: Climate model data visualization, Advisor: Prof. Arne Biastoch

## Education

May 2017 - Ph.D. | Columbia University | NY | USA

Physical Oceanography, Advisor: Prof. Arnold L. Gordon

Feb 2015 - M.Phil. | Columbia University | NY | USA

Physical Oceanography, Advisor: Prof. Arnold L. Gordon

May 2012 - M.A. | Columbia University | NY | USA

Physical Oceanography, Advisor: Prof. Arnold L. Gordon

Aug 2010 - B.Sc. | Christians-Albrechts University/GEOMAR | Kiel | GER

Physics of the earth system: Oceanography-Meteorology-Geophysics, Advisor: Prof. Arne Biastoch

## Publications

Submitted/Under Review

**Busecke J. J. M.**, L. Resplandy, S. Ditkovsky, and J. G. John (under review): Diverging fates of the Pacific Ocean oxygen minimum zone and its core in a warming world, **AGU Advances**

Published/In Press

Loose, N., R. Abernathy, I. Grooms, **J. Busecke**, A. Guillaumin, E. Yankovsky, G. Marques, J. Steinberg, A.S. Ross, S. Bachmann, L. Zanna, P. Martin (2022). GCM-Filters: A Python Package for Diffusion-based Spatial Filtering of Gridded Data. **Journal of Open Source Software**

Nummelin, A., J. J. M. **Busecke**, T. W. N. Haine and R. P. Abernathy (2020): Diagnosing the Scale- and Space-Dependent Horizontal Eddy Diffusivity at the Global Surface Ocean, **Journal of Physical Oceanography**

**Busecke**, J. J. M., and R. P. Abernathy (2020): CMIP6 without the interpolation: Grid-native analysis with Pangeo in the cloud, **2020 EarthCube Annual Meeting**, doi: 10.1002/essoar.10504241.1

Bingham, F. M., J. J. M. **Busecke**, and A. L. Gordon (2019): Variability of the South Pacific Subtropical Surface Salinity Maximum, **JGR: Oceans**, doi: 10.1029/2018JC014598

**Busecke**, J. J. M., L. Resplandy, and J. P. Dunne (2019): The Equatorial Undercurrent and the Oxygen Minimum Zone in the Pacific. **Geophysical Research Letters**, doi:10.1029/2019GL082692.

**Busecke**, J. J. M., and R. P. Abernathy (2019): Ocean mesoscale mixing linked to climate variability. **Science Advances**, doi:10.1126/sciadv.aav5014.

Swart, N., **Busecke**, J., Langendijk, G., et al. (2018), Reflections on the CLIVAR Early Career Scientists Symposium 2016, **npj Climate and Atmospheric Science**, doi:10.1038/s41612-018-0015-y

**Busecke**, J., R. P. Abernathy, A. L. Gordon (2017), Lateral Eddy Mixing in the subtropical salinity maxima of the global ocean, **JPO**, doi: 10.1175/JPO-D-16-0215.1

Gordon, A. L., C. F. Giulivi, J. **Busecke**, and F. M. Bingham (2015), Differences among subtropical surface salinity patterns, **Oceanography**, doi:10.5670/oceanog.2015.02.

Gordon, A. L., B. A. Huber, and J. **Busecke** (2015), Bottom water export from the western Ross Sea, 2007 through 2010, **GRL**, doi:10.1002/2015GL064457.

Bingham, F. M., J. **Busecke**, A. L. Gordon, C. F. Giulivi, and Z. Li (2014), The North Atlantic subtropical surface salinity maximum as observed by Aquarius, **JGR: Oceans**, doi:10.1002/2014JC009825.

**Busecke**, J., A. L. Gordon, Z. Li, F. M. Bingham, and J. Font (2014), Subtropical surface layer salinity budget and the role of mesoscale turbulence, **JGR: Oceans** , doi:10.1002/2013JC009715.

#### Software

**xgcm** - A python package for the analysis of finite-volume ocean general circulation model output.

**xmovie** - Visualization library for easy creation of rich movies from xarray objects.

**cmip6\_preprocessing** - Enables easier computation across CMIP6 models in the cloud.

**cookiecutter-science-project** - A modular project template as guidance for beginner workflows.

**xarrayutils** - Collection of xarray based tools for working with geospatial data.

#### Awards

2016 - Outstanding Student Paper Award - AGU Fall Meeting, San Francisco

2016 - Invitation to the CLIVAR Early Career Science Symposium - Qingdao, China

2014 - NASA Earth and Space Science Fellowship

2014 - Outstanding Student Presentation Award - Ocean Science Meeting, Honolulu

2012 - United States Antarctic Service Medal

2010 - German meteorological society award for top 5 graduates of "Physics of the earth system"

## Teaching/Workshops

Ocean Hack Week (2021) **Introduction to xarray and cmip6\_preprocessing** Invited Tutorial

Columbia University (2019) **Research Computing in Earth Science: Working with output from general circulation models using xesmf and xgcm** - Interactive Guest Lecture

Princeton University (2019) **Junior Colloquium: Plotting maps in python** - Interactive Guest Lecture

Hun School, Princeton (2018) Invited Guest Lecture

Princeton University (2018) **Earth System Modelling, assessing mitigation strategies: Limits and strengths - A quick look at more complex models** - Guest Lecture and Lab

Columbia University (2013) **Earth Systems** - Teaching Assistant

Columbia University (2012) **Intro to Physical Oceanography** - Teaching Assistant

Columbia University (2012) **Earth Oceans and Atmospheres** - Teaching Assistant

## Selected Presentations

**LANL COSIM Climate and Ocean Group Webinar (invited)** | Virtual | “Going both far AND fast as a community - Climate Science with Pangeo” (oral)

**UCLA IDRE Open Science Symposium (invited)** | Virtual | “Open Science with Pangeo - From community to climate science in the cloud” (oral)

**Ocean Sciences Meeting 2022** | Virtual | “Oxygen Minimum Zones in the Tropical Pacific - Will they expand or shrink?” (poster)

**Ocean Sciences Meeting 2022 (invited)** | Virtual | “No Supercomputer, no problem! - Analyzing Petabyte scale climate data in your browser with Pangeo.” (oral)

**AMS Annual Meeting 22 (invited)** | Virtual | “CMIP6 in the cloud - Open, fast, and accessible climate science with Pangeo” (oral)

**OCB Science Meeting 2021 (invited together with V. Tamsitt)** | Virtual | “Ocean CDR storage permanence” (oral)

**Dask Distributed Summit 2021 (invited)** | Virtual | “Dask and the ocean death zones” - Lessons from a real life earth science workflow with a ‘fullish’ pangeo stack (oral)

**MLSE Conference Columbia 2020 (invited)** | Virtual | Open Source Tools for Big Data (Climate) Science (oral)

**EarthCube Annual Meeting 2020** | Virtual | CMIP6 without the interpolation: Grid-native analysis with Pangeo in the cloud (oral)

**GEO/AOS/PEI Climate Seminar 2020 (invited)** | Princeton, NJ | When details matter to the earth system - From ocean eddies to the Equatorial Undercurrent (oral)

**Ocean Sciences Meeting 2020** | San Diego, CA | How important is the Equatorial Undercurrent for biogeochemistry and global climate predictions? (oral)

**GFDL Lab Review 2019 (invited)** | Princeton, NJ | The Equatorial Undercurrent and the Oxygen Minimum Zone in the Pacific (poster)

**OCB Summer Workshop 2019** | Woods Hole, MA | The equatorial undercurrent and the Oxygen Minimum Zone in the Pacific (poster)

**WHOI PO Seminar 2019 (invited)** | Woods Hole | A fourth dimension to ocean mixing: Mesoscale mixing related to large scale climate variability (oral)

**AGU Fall Meeting 2018** | Washington DC | The importance of the equatorial current system for variability in the oxygen minimum zones (oral)

**OCB Summer Workshop 2018** | Woods Hole | How important are forced changes in the equatorial current system for the extent of tropical oxygen minimum zones? (poster)

**Ocean Deoxygenation Conference 2018** | Kiel, Germany | *How important is the equatorial current system for the extent of the tropical oxygen minimum zones?* (poster)

**Ocean Sciences Meeting** | Portland, OR | 2018 | *Interannual Variability of Ocean Mesoscale Mixing Correlated with ENSO* (oral)

**AGU Fall Meeting** | San Francisco | 2016 | *Time variable eddy mixing in the global Sea Surface Salinity maxima* (received OSPA award)

**CLIVAR Open Science Conference** | Qingdao, China | 2016 | *Time variable eddy mixing in the surface salinity maxima of the global ocean* (poster)

**Ocean Science Meeting** | Honolulu | 2014 | *Evidence for the origin of the subsurface salinity maximum in the subtropical North Atlantic* (received OSPA award)

#### Mentoring

**Andrew Fagerheim** | 2022 | LDEO Summer Internship Co-mentor

**Dianne Deauna** | 2022 - | PhD committee at the University of Hawaii | PhD committee member

**Abigale Baskind** | 2021-2022 | Technical Advisor on Senior Thesis at Princeton University

**Dianne Deauna** | 2021 | SlparCS Summer Internship | Co-Project Mentor

**Paban Kumar Bhuyan** | 2019 - | Indian Institute of Technology | Informal career advisor

**Grace Kortum** | 2019 | Princeton University | Informal mentor Junior Thesis

**Keeley Walsh** | 2018 | Princeton University | Informal mentor for Senior Thesis

**Abigale Wyatt** | 2018 - 2020 | Princeton University | Technical and Scientific Advice for Ph.D. thesis

**Anwar Hossein** | 2017 - | Brooklyn Boulders Foundation | Mentor for students of underserved communities in NYC

#### Service

2020 - **Session Organizer/ Co-convener:** OSM20 PS011 - Vertical Transport: Pathways from the Surface to the Interior

2018 - **Session Organizer/ Co-convener:** AGU18 OS51B: Temporal Variability in Oceanic Mesoscale Activity, from Seasonal to Multidecadal Records I/II

**Journal Reviewer:** Nature, Geophysical Research Letters, Deep-Sea Research Part II, Global Biogeochemical Cycles, Journal of Oceanography, Journal of Geophysical Research: Oceans

**Proposal Reviewer:** National Science Foundation

**Panelist:** NASA ROSES Proposal Review (2016, 2018, 2019)

#### Fieldwork

**Research cruise** - B/O SARMIENTO DE GAMBOA - Mar/Apr 2013 Subtropical North Atlantic Assistance with sampling strategy | Underway sampling | Data viz/management

**Research cruise** - R/V KNORR - Sep/Oct 2012 Subtropical North Atlantic  
CTD/LADCP | Underway sampling | Data viz/management

**Research cruise** - R/V NATHANIEL B. PALMER - Jan/Feb 2011 Ross Sea, Antarctica  
CTD/LADCP

**Research cruise** - R/V METEOR - Jan/Feb 2009 Eastern subtropical North Atlantic  
CTD