

CONTACT INFORMATION	Jacob O. Wenegrat Assistant Professor Department of Atmospheric and Oceanic Science University of Maryland, College Park, MD	<a href="mailto:wenegrat@umd.edu">wenegrat@umd.edu</a> <a href="http://wenegrat.github.io">http://wenegrat.github.io</a>
RESEARCH INTERESTS	<b>Geophysical fluid dynamics, atmosphere and ocean dynamics, submesoscale processes, boundary-layer processes</b>	
EDUCATION	<b>Ph.D.</b> , Oceanography School of Oceanography University of Washington, Seattle, WA.	2015
	<b>M.S.</b> , Applied Mathematics Department of Applied Mathematics University of Washington, Seattle, WA.	2014
	<b>M.S.</b> , Oceanography Department of Oceanography University of Washington, Seattle, WA.	2013
	<b>B.S.</b> , Symbolic Systems Stanford University, Stanford, CA.	2006
APPOINTMENTS	<b>Assistant Professor</b> , University of Maryland, College Park Department of Atmospheric and Oceanic Science	2020 - present
	<b>Postdoctoral Fellow</b> , Stanford University Department of Earth System Science • Supervisor: <a href="#">Leif Thomas</a>	2016 - 2019
	<b>Visiting Scholar</b> , Kavli Institute for Theoretical Physics, UCSB Program on Planetary Boundary Layers in Atmospheres, Oceans, and Ice on Earth and Moons.	May 2018
	<b>Graduate Research Assistant</b> , University of Washington School of Oceanography • Advisor: <a href="#">Michael J. McPhaden</a>	2010 - 2015
	<b>Consultant</b> , Accenture Technology Labs R&D consultant focused on data center energy forecasting.	2007 - 2009
REFEREED PUBLICATIONS	<p>[1] <b>Wenegrat, J.O.</b>, L.N. Thomas, M.A. Sundermeyer, J.R. Taylor, E.A. D'Asaro, J. Klymak, R.K. Shearman, and C.M. Lee, <i>under review</i>: Enhanced mixing across the gyre boundary at the Gulf Stream front.</p> <p>[2] Johnson, L., C.M. Lee, E.A. D'Asaro, <b>J.O. Wenegrat</b>, and L.N. Thomas, <i>under review</i>: A stratifying submesoscale front, Part 2: Dynamics. <i>J. Phys. Oceanogr.</i></p>	

- [3] **Wenegrat, J.O.**, and R.S. Arthur, 2018c: Response of the atmospheric boundary layer to submesoscale sea surface temperature fronts. *Geophys. Res. Lett.* 45, 24, 13505-13512. doi:10.1029/2018GL081034
- [4] **Wenegrat, J.O.**, J. Callies, and L.N. Thomas, 2018b: Submesoscale baroclinic instability in the bottom boundary layer. *J. Phys. Oceanogr.* 48, 11, 2571-2592. doi:10.1175/JPO-D-17-0264.1
- [5] **Wenegrat, J.O.**, L.N. Thomas, J. Gula, and J.C. McWilliams, 2018a: Effects of the submesoscale on the potential vorticity budget of ocean mode waters. *J. Phys. Oceanogr.* 48, 9, 2141-2165. doi:10.1175/JPO-D-17-0219.1
- [6] **Wenegrat, J.O.**, and L.N. Thomas, 2017: Ekman transport in balanced currents with curvature. *J. Phys. Oceanogr.*, 47, 5, 1189-1203. doi:10.1175/JPO-D-16-0239.1
- [7] **Wenegrat, J.O.**, and M.J. McPhaden, 2016a: A simple analytical model of the diurnal Ekman layer. *J. Phys. Oceanogr.*, 46, 9, 2877-2894. doi:10.1175/JPO-D-16-0031.1
- [8] **Wenegrat, J.O.**, and M.J. McPhaden, 2016b: Wind, waves, and fronts: Frictional effects in a generalized Ekman model. *J. Phys. Oceanogr.*, 46, 2, 371-394. doi:10.1175/JPO-D-15-0162.1
- [9] **Wenegrat, J.O.**, and M.J. McPhaden 2015: Dynamics of the surface layer diurnal cycle in the equatorial Atlantic Ocean (0°, 23°W). *J. Geophys. Res. Oceans*, 120, 563-581. doi:10.1002/2014JC010504
- [10] **Wenegrat, J.O.**, M.J. McPhaden, and R.-C. Lien, 2014: Wind stress and near-surface shear in the equatorial Atlantic Ocean. *Geophys. Res. Lett.*, 141, 1226-1231. doi:10.1002/2013GL059149

MANUSCRIPTS IN PREPARATION

**Wenegrat, J.O.**, and L.N. Thomas: Forced symmetric instability in the ocean bottom boundary layer.

OTHER PUBLICATIONS

**Wenegrat, J.O.**, 2015: Ocean Boundary Layer Dynamics and Air-Sea Interaction. Ph.D. Thesis, University of Washington, Seattle, WA, <http://hdl.handle.net/1773/35286>

Benedek, Z., J.W.J. Liang, and **J.O. Wenegrat**, 2014: System for providing strategies to reduce the carbon output and operating costs of a workplace. U.S. Patent 8812971.

Tung, T.S., and **J.O. Wenegrat**, 2013: System for providing strategies for increasing efficiency of data centers. U.S. Patent 8395621.

EXTERNAL FUNDING

Submesoscale instabilities in the bottom boundary layer and their control of buoyancy and potential vorticity fluxes. PIs: Thomas/**Wenegrat**. NSF, 9/2018-9/2020.

Impacts of deep submesoscale processes and internal waves on the North Atlantic ocean circulation. *Unfunded collaborator*. PI: Gula. ANR, *pending review*.

INVITED TALKS

From the surface to the abyss: Effects of the submesoscale on the large-scale circulation. *SOEST, University of Hawaii*, Honolulu, HI. 2019.

Submesoscale turbulence in the bottom boundary layer: A new frontier for oceanography. *AOSC, University of Maryland*, College Park, MD, 2019.

Air-sea interaction at the ocean submesoscale: Ekman transport and surface winds. *NASA Jet Propulsion Laboratory*, Pasadena, CA, 2019.

Into the deep: Submesoscale turbulence in the ocean bottom boundary layer. *Climate and Global Dynamics Seminar, NCAR*, Boulder, CO, 2018.

SELECTED  
PRESENTATIONS

- Submesoscale processes in the abyss: A new frontier for ocean dynamics. *Research School for Earth Sciences, Australian National University*, Canberra, AUS, 2018.
- From the submesoscale to the gyre scale: How small-scale fronts modify the properties of ocean gyres. *Mechanical Engineering Department Seminar, University of California, Santa Barbara*, Santa Barbara, CA, 2018.
- From the submesoscale to the gyre scale: How small-scale fronts modify ocean mode waters. *Oceanography Department Seminar, Dalhousie University*, Halifax NS, Canada, 2017.
- Mixed layer dynamics and the diurnal cycle in the equatorial Atlantic Ocean. *Equatorial Dynamics of the Atmosphere and Oceans, AGU Fall Meeting*, San Francisco, CA, 2014.
- Mixed layer dynamics and the diurnal cycle in the equatorial Atlantic Ocean. *Physics of Oceans and Atmospheres Seminar, Oregon State University*, Corvallis, OR, 2014.
- Symmetric instability in the ocean bottom boundary layer: A new pathway for energy dissipation? *California Geophysical Fluid Dynamic Symposium*, Pasadena, CA, 2019. Talk.
- Submesoscale turbulence in the ocean bottom boundary layer: Baroclinic, symmetric, and centrifugal instabilities. *22<sup>nd</sup> Conference on Atmospheric and Oceanic Fluid Dynamics*, Portland, ME, 2019. Talk.
- Submesoscale instabilities in the bottom boundary layer. *Workshop on BBL turbulence and the Ocean Overturning Circulation, MIT*, Boston, MA, 2018. Talk.
- Into the deep: Submesoscale turbulence in the bottom boundary layer. *SLS, MIT*, Boston, MA, 2018. Talk.
- Into the deep: Submesoscale turbulence in the bottom boundary layer. *PO Seminar, WHOI*, Woods Hole, MA, 2018. Talk.
- Submesoscale baroclinic instability in the bottom boundary layer. *Ocean Mixing Conference*, Gordon Research Conference, Andover, NH, 2018. Poster.
- PV dynamics in the turbulent boundary layer. *Program on Planetary Boundary Layers*, Kavli Institute for Theoretical Physics, Santa Barbara, CA, 2018. Talk.
- Submesoscale baroclinic instability in the bottom boundary layer. *Frontiers in Oceanic, Atmospheric, and Cryospheric Boundary Layers*, Kavli Institute for Theoretical Physics, Santa Barbara, CA, 2018. Poster.
- Submesoscale baroclinic instability in the bottom boundary layer: A mechanism for enhanced vertical buoyancy fluxes. *Ocean Sciences Meeting*, Portland, OR, 2018. Talk.
- From the submesoscale to the gyre scale: How small-scale fronts modify ocean mode waters. *Climate, Atmospheric Sciences, and Physical Oceanography Seminar, Scripps Institution of Oceanography*, San Diego, CA, 2018. Talk.
- Submesoscale symmetric instability and observed rapid horizontal dispersion across the Gulf Stream. *CLIVAR Ocean Carbon Hotspots Workshop*, Monterey, CA, 2017. Poster.
- Ekman transport in balanced currents with curvature. *21<sup>st</sup> Conference on Atmospheric and Oceanic Fluid Dynamics*, Portland, OR, 2017. Talk.
- Effects of the submesoscale on the potential vorticity budget of ocean mode waters. *21<sup>st</sup> Conference on Atmospheric and Oceanic Fluid Dynamics*, Portland, OR, 2017. Poster.

Submesoscale dynamics in the turbulent boundary layer. *Oceanography Department Seminar, Dalhousie University*, Halifax NS, Canada, 2017. Talk.

Competing frictional and diabatic potential vorticity fluxes at ocean fronts. *AGU Fall Meeting*, San Francisco, CA, 2016. Talk.

Ocean boundary layer dynamics and air-sea interaction. *Physical Oceanography Dissertation Symposium (PODS) IX*, Honolulu, HI, 2016. Talk.

Dynamics of the diurnal cycle in the upper ocean: Theory, observations, and future challenges. *Environmental Fluid Mechanics and Hydrology Seminar, Stanford University*, Stanford, CA, 2016. Talk.

Implications of spatially varying boundary layer turbulence at a frontal system. *48<sup>th</sup> International Liège Colloquium on Ocean Dynamics*, Liège, Belgium, 2016. Talk.

The time-dependent vertical structure of mixed layer currents. *Ocean Sciences Meeting*, New Orleans, LA, 2016. Poster.

On the influence of winds, waves, and fronts on ocean currents. *School of Oceanography, University of Washington*, Seattle, WA, 2015. Talk.

Wind, waves, and fronts: An analytic solution to the generalized Ekman model. *20<sup>th</sup> Conference on Atmospheric and Oceanic Fluid Dynamics*, Minneapolis, MN, 2015. Talk.

Dynamics of the surface layer diurnal cycle in the equatorial Atlantic Ocean. *Physical Oceanography Seminar, University of Washington*, Seattle, WA, 2014. Talk.

A WKB approximation to the generalized Ekman equation, with application to the diurnal cycle. *Applied Mathematics MS Symposium, University of Washington*, Seattle, WA, 2014. Talk.

The diurnal cycle of near-surface stratified shear flow at 0°N, 23°W. *Ocean Sciences Meeting*, Honolulu, HI, 2014. Poster.

Near-surface shear flow on the Equator. *Physical Oceanography Seminar, University of Washington*, Seattle, WA, 2013. Talk.

Near-surface shear, stratification, and the mixed layer momentum budget at 0°N, 23°W. *Tropical Atlantic Variability Conference*, Kiel, Germany, 2012. Poster.

Near-surface eddy viscosity at 0°N, 23°W inferred from ADCP and wind stress data. *Ocean Sciences Meeting*, Salt Lake City, UT, 2012. Poster.

#### TEACHING EXPERIENCE

##### **Stanford University**, Stanford, CA

Project Mentor, <i>SURGE Undergraduate Summer Research</i>	<b>Summer 2018</b>
Guest Instructor, <i>Geophysical Fluid Dynamics</i>	<b>Autumn 2017</b>
Guest Instructor, <i>Atmosphere, Ocean, and Climate Dynamics</i>	<b>Spring 2017</b>

##### **University of Washington**, Seattle, WA

Instructor, <i>Physics across Oceanography</i>	<b>Winter 2015</b>
Course Development, <i>Huckabay Teaching Fellow</i>	<b>Autumn 2014</b>
Tutorial Instructor, <i>Physics 121 and 123: Mechanics and Waves</i>	<b>Autumn 2014</b>
Teaching Assistant, <i>Physical Processes in the Ocean</i>	<b>Winter 2012</b>

SERVICE AND  
LEADERSHIP

**Conferences**

- *Chair: Air-Sea Interaction at the Mesoscale and Submesoscale, Ocean Sciences 2018*
- *Session proposer: The role of submesoscale instabilities and coherent structures in the turbulent mixing of the surface boundary layer, Ocean Sciences 2020*

**Reviewing**

- *2019 AMS Editor's award, Journal of Physical Oceanography*
- *Journal of Physical Oceanography, Journal of Fluid Mechanics, Geophysical Research Letters, Journal of Geophysical Research, Nature, Quarterly Journal of the Royal Meteorological Society, Nature Scientific Reports, Journal of Atmospheric and Oceanic Technology*
- *NASA Physical Oceanography proposal review panels, NSF proposal reviewer*
- *Pre-publication chapters of: Atmospheric and Oceanic Fluid Dynamics II, G.H. Vallis.*
- *NOAA Ernest F. Hollings Undergraduate Scholarship program, 2012-2014, 2016.*