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Bia Villas Bôas

Education

2014–2020 | **Ph.D. in physical oceanography**, Scripps Institution of Oceanography.

2012–2014 | **MSc. in physical oceanography**, University of São Paulo.

2007–2011 | **BSc. in physics**, Federal University of Rio Grande do Norte.

Academic Appointments

2021-PRESENT | **Research Assistant Professor - Colorado School of Mines**
Geophysics Department

2021-PRESENT | **Postdoctoral Researcher - Caltech**
My postdoc at Caltech leverages measurements from NASA's Sub-Mesoscale Ocean Dynamics Experiment (S-MODE) to better constrain interactions between surface waves , winds, and currents. Supervisors: Andy Thompson and Ernesto Rodriguez.

2020-2021 | **Postdoctoral Researcher - SIO**
My postdoc at Scripps focuses on understanding the role of surface waves in modulating signals detected by the upcoming SWOT mission and evaluating how surface waves can be used to improve understanding of upper ocean currents.

Fellowships and Awards

2021 | **Fellow of the Machine Learning and the Physics of Climate Program** – The Kavli Institute for Theoretical Physics, University of California, Santa Barbara.

2018 | **Fellow of the Planetary Boundary Layers in Atmospheres, Oceans, and Ice on Earth and Moons Program** – The Kavli Institute for Theoretical Physics, University of California, Santa Barbara.

2017-2020 | **NASA Earth and Space Science Graduate Fellowship** – Awarded by the National Aeronautics and Space Administration.

2017 | **French-American Doctoral Exchange Program** (FADEX-O) Laureate– Awarded by the Embassy of France in the US.

Mentoring

2020-present | **Elena Savidge** – PhD committee, Colorado School of Mines.

2018-present | **Luke Colosi** – Co-advisor (with Sarah Gille), UC San Diego.

2017–2020 | **Roger Wu** – Co-advisor (with Sarah Gille), UC San Diego.

Teaching experience

Fall 2020	**Assistant** – SIOC 221A: *Analysis of Physical Oceanographic Data* (`https://github.com/biavillasboas/SIO221A`), UC San Diego (remote).
2019	**Programming with Python** – School of Global Policy and Strategy, UC San Diego.
2019	**"An impractical guide to surfing surface waves"** – Guest lecturer for SIO 90, UC San Diego.
2017 - Present	**Software and Data Carpentry Instructor** – Certified Software and Data Carpentry Instructor. I have taught several Carpentries workshops for a broad range of audiences, including the Scripps Undergraduate Research Fellowship (SURF) and the UC San Diego Library.

Service

2022–present	US CLIVAR Phenomena Observations and Synthesis (POS) Panel.
2022–present	Air-Sea Transition Zone Study Group.
2022–present	American Meteorological Society Committee on Air-Sea Interaction.
2022	**Session convener** – Convener of "*Understanding Coupled Ocean Wind, Current and Wave Processes through Remotely Sensed and In Situ Observations*" at the Ocean Sciences Meeting, virtual.
2022	**Session convener** – Convener of "*Towards an understanding of how multiscale ocean-atmosphere interactions modulate fluxes in the air-sea boundary layer*" at the Ocean Sciences Meeting, virtual.
2021	**Instructor** – NASA-Openscapes Software Carpentry Workshop.
2020	**Ad hoc panelist for funding agency** – Panel reviewer for the National Aeronautics and Space Administration (NASA), Washington, DC.
2020	**Session convener** – Convener of "*Wave Breaking in Ocean-Atmosphere Exchanges*" at the Ocean Sciences Meeting, San Diego, CA.
2018	**Session convener** – Convener of "*Integrated Observations and Modeling of Surface Currents, Waves, and Winds*" at the AGU Fall Meeting, Washington, DC.
2016–2021	**Ad hoc referee for scientific journals** – Reviewer for the Journal of Physical Oceanography, the Journal of Geophysical Research, Geophysical Research Letters, and Remote sensing of Environment.
2016–present	**Outreach** – Help lead various outreach activities at Scripps' Hydraulics Laboratory running demos in the wave tank.

Publications

Peer-Reviewed Articles

Ana B Villas Bôas, Luc Lenain, Bruce D Cornuelle, Sarah T Gille, and Matthew R Mazloff. A broadband view of the sea surface height wavenumber spectrum. *Geophysical Research Letters*, page e2021GL096699, 2022b. doi: 10.1029/2021GL096699

Rui Sun, **Ana B Villas Bôas**, Aneesh C Subramanian, Bruce D Cornuelle, Matthew R Mazloff, Arthur J Miller, Sabique Langodan, and Ibrahim Hoteit. Focusing and defocusing of tropical cyclone generated waves by ocean current refraction. *Journal of Geophysical Research: Oceans*, page e2021JC018112, 2021. doi: 10.1029/2021JC018112

Yao Yu, David Sandwell, Sarah Gille, and **Ana B. Villas Bôas**. Assessment of ICESat-2 for the recovery of ocean topography. *Geophysical Journal International*, 2021. doi: 10.1093/gji/ggab084

Luke V. Colosi, **Ana B. Villas Bôas**, and Sarah T. Gille. The seasonal cycle of significant wave height in the ocean: Local versus remote forcing. *Journal of Geophysical Research: Oceans*, 126(8):e2021JC017198. doi: https://doi.org/10.1029/2021JC017198

Ana B. Villas Bôas, Sarah T. Gille, Matthew R. Mazloff, Bruce D. Cornuelle, and Fabrice Ardhuin. Wave-current interactions at meso and submesoscales: Insights from idealized numerical simulations. *Journal of Physical Oceanography*, 2020b. doi: 10.1175/JPO-D-20-0151.1

Ana B. Villas Bôas and W. R. Young. Directional diffusion of surface gravity wave action by ocean macroturbulence. *Journal of Fluid Mechanics*, 890:R3, 2020. doi: 10.1017/jfm.2020.116

Ana B. Villas Bôas, Fabrice Ardhuin, Ernesto Rodriguez, Christine Gommenginger, et al. Integrated observations of global surface winds, currents, and waves: requirements and challenges for the next decade. *Frontiers in Marine Science*, 2019a. doi: 10.3389/fmars.2019.00425

Ana B. **Villas Bôas**, Sarah T. Gille, Matthew R. Mazloff, and Bruce D. Cornuelle. Characterization of the deep water surface wave variability in the California Current Region. *Journal of Geophysical Research: Oceans*, 122(11):8753–8769, 2017. ISSN 2169-9291. doi: 10.1002/2017JC013280

Ana B. Villas Bôas, Olga T Sato, Alexis Chaigneau, and Guilherme P Castelão. The signature of mesoscale eddies on the air-sea turbulent heat fluxes in the South Atlantic Ocean. *Geophysical Research Letters*, 42(6):1856–1862, 2015. doi: 10.1002/2015GL063105

Guilherme P Castelão, Luiz C Irber, and **Ana B. Villas Bôas**. An objective reference system for studying rings in the ocean. *Computers & Geosciences*, 61:43–49, 2013. doi: https://doi.org/10.1016/j.cageo.2013.07.004

White Papers

Ana B. Villas Bôas and Nicholas Pizzo. The geometry, kinematics, and dynamics of the two-way coupling between wind, waves, and currents. pages 18–26. US CLIVAR, 2021. doi: http://dx.doi.org/10.5065/ybca-0s03

Carol Anne Clayson, Luca Centurioni, Meghan F Cronin, James Edson, Sarah Gille, Frank Muller-Karger, Rhys Parfitt, Laura D Riihimaki, Shawn R Smith, Sebastiaan Swart, **Ana B Villas Bôas**, et al. Super sites for advancing understanding of the oceanic and atmospheric boundary layers. *Marine Technology Society Journal*, 55(3): 144–145, 2021. doi: https://doi.org/10.4031/MTSJ.55.3.11

Christopher Erdmann, Natasha Simons, Reid Otsuji, Stephanie Labou, Ryan Johnson, Guilherme Castelão, **Ana B Villas Bôas**, et al. Top 10 fair data software things. `http://doi.org/10.5281/zenodo.2555498`, 2019

S. T. Gille, R. Abernathey, T. Chereskin, B. Cornuelle, P. Heimbach, M. Mazloff, C. Rocha, S Soares, M. Sonnewald, **Ana B Villas Bôas**, et al. Open code policy for NASA Space Science: A perspective from NASA-supported ocean modeling and ocean data analysis. White paper submitted in support of National Academies study on *Open Source Software Policy Options for NASA Earth and Space Sciences,* `https://www.nap.edu/resource/25217/whitepapers/pdf/41_GilleSarahT.pdf`, 2018

Data and Software

Ana B. Villas Bôas. Source code for: A Broadband View of the Sea Surface Height Wavenumber Spectrum. `https://github.com/biavillasboas/BroadbandSpectrum`, 1 2022

Ana B. Villas Bôas, Luc Lenain, and Nicholas Statom. Data from: "A broadband view of the sea surface height wavenumber spectrum". `https://doi.org/10.6075/J0W0963R`, 2022

Luke V. Colosi. Source code for: "The seasonal cycle of significant waveheight in the ocean: Local vs remote forcing". `https://github.com/lcolosi/WaveClimatology`, 2021

Ana B. Villas Bôas and Guilherme P. Castelão. Data from: "Wave-current interactions at meso and submesoscales: Insights from idealized numerical simulations". `https://doi.org/10.6075/J0X928V6`, 2020

Ana B. Villas Bôas. Source code for: "Wave-current interactions at meso and submesoscales: Insights from idealized numerical simulations". `https://github.com/biavillasboas/IdealizedWaveCurrent`, 2020

Ana B. Villas Bôas. Source code for: "Characterization of the deep water surface wave variability in the California Current region". `https://github.com/biavillasboas/CaliforniaWaveVariability`, 2020

Selected Conference Presentations

Work led by students that I advise are marked with a star.

Ana B Villas Bôas, Luc Lenain, Bruce D Cornuelle, Sarah T Gille, and Matthew R Mazloff. A broadband view of the sea surface height wavenumber spectrum (talk). Ocean Sciences Meeting, virtual, 2022a

Ana B. Villas Bôas, Sarah T. Gille, Matthew R. Mazloff, Bruce D. Cornuelle, and Fabrice Ardhuin. Wave-current interactions at meso and submesoscales: Insights from idealized numerical simulations (talk). Ocean Sciences Meeting, San Diego, 2020a

William Young and **Ana B. Villas Bôas**. Diffusion of surface gravity waves by submesoscale turbulence at the sea surface (talk). Ocean Sciences Meeting, San Diego, 2020

Luke Colosi*, **Ana B. Villas Bôas**, and Sarah T. Gille. The seasonal cycle of significant wave height: Local vs. remote forcing (poster). Ocean Sciences Meeting, San Diego, 2020

Ana B. Villas Bôas. Wind, wave, and current interactions (**invited talk**). US CLIVAR - Surface Currents in the Coupled Ocean-Atmosphere System, La Jolla, 2020

Ana B. Villas Bôas, Weiguang Wu*, and Sarah T. Gille. Upper-ocean response to alongshore winds off the California coast (talk). International Ocean Vector Winds Science Team Meeting, Portland, ME, 2019d

Ana B. Villas Bôas, Fabrice Ardhuin, et al. Upper-ocean response to alongshore winds off the California coast (talk). SWOT Science Team Meeting, Bordeaux, France, 2019b

Ana B. Villas Bôas, Sarah T. Gille, Matthew R. Mazloff, Bruce D. Cornuelle, Donata Giglio, Shang-Ping Xie, et al. Wind, wave, and current interactions from CFOSAT: Processes in the california current region (**invited talk**). CFOSAT Science Team Meeting, Brest, France, 2019c

Ana B. Villas Bôas, Sarah T. Gille, Matthew R. Mazloff, and Bruce D Cornuelle. The surface wave variability in the California Current region: Potential implications for SWOT (talk). SWOT Science Team Meeting, Toulouse, France, 2017