BRETT A. BUZZANGA

buzzanga@jpl.nasa.gov www.brettbuzzanga.com
Jet Propulsion Laboratory, 4800 Oak Grove Dr ⋄ Pasadena, CA ⋄ 91109

EDUCATION

Old Dominion University *August 2021*
Doctor of Philosophy

Old Dominion University *August 2017*
Master of Science

Brookdale Community College *May 2013*
A.S. in Science & Mathematics

Rutgers University *May 2011*
B.A in Political Science, Philosophy

EXPERIENCE

UCLA Jifresse/JPL October 2024 - Present
Research Assistant II *Los Angeles, CA*

- measuring and assessing coastal sea level worldwide with satellite, models, and in-situ measurements
- investigating large-scale solar geoengineering impacts on sea level with CESM-GLENS

NASA JPL September 2021 - October 2024
Postdoctoral Fellow *Pasadena, CA*

- measuring and assessing coastal sea level with ICESat-2 and SWOT
- investigating multidecadal variability in terrestrial water storage change
- measuring coastal vertical land motion in coastal cities with full resolution Interferometric Synthetic Aperture Radar (InSAR)
- mapping vertical land motion over the US East Coast in the cloud with products from the Advanced Rapid Imaging and Analysis system
- developing algorithms for state-of-the-art InSAR tropospheric corrections
- understanding the relationship between coastal groundwater and sea-level rise

NASA JPL Summer 2019 - August 2021
Intern *Remote*

- Incorporating state-of-the-art observational data and model results in a statistical framework to quantify regional drivers of 20^{th}-century East Coast sea-level change.
- Evaluated remotely-sensed data from NASA satellite altimeters (ICESat-2, Jason-3) and *in-situ* observations to measure regional sea-level trends.
- Mapped coastal subsidence with high-resolution time-series InSAR and GPS measurements technologies

Old Dominion University May 2015 - Aug 2020
Research Assistant *Norfolk, VA*

Sep 2017 - Aug 2021

- Developed adaptable InSAR & GPS workflows that support ongoing monitoring of coastal vertical land motion
- Leveraged open-source software for InSAR processing and time-series analysis: ISCE & StaMPS for persistent scatter methods; ARIA-tools, GIAnT, and MintPy for the small baseline subset approach

- Applied these software and workflows to quantify the impact of a groundwater injection infrastructure project currently underway in coastal Virginia (`https://www.hrsd.com/swift`)
- Ongoing work with sea-level Practitioners, including the Institute for Coastal Resilience and Hampton Roads Planning District, to incorporate sea-level science and vertical land motion information into decision making

May 2015 - Sep 2017
Front and backend web development of:

- Dr. Ben Hamlington's Ocean Remote Sensing Lab website
- The Socioeconomic and Environmental Information Needs Knowledge Base (`www.seeinkb.net`)

Nathaniel B. Palmer Cruise 16-01 Jan 2016 - Feb 2016
Research Assistant *Palmer Station Antarctica LTER*

- Processed sediment cores and performed chemical analyses aboard an oceanographic research cruise

NASA Develop Fall 2015
Intern *Langley Air Force Base, VA*

- Created a land use/land cover classification of the Albemarle - Pamlico Sound Watershed
- Focused on wetland delineation for use in identifying trends in declining wetland health
- Used GIS and public remote sensing data (LANDSAT)

ReVireo May 2011 - May 2012
Client Relations Manager *New Brunswick, NJ*

- Managed and streamlined client relations in an energy efficiency certification startup
- Assisted in business development decisions

TEACHING

NASA JPL Aug 2021/22/23/24
Teaching Assistant *Virtual*

- InSAR Processing & Time-Series Analysis for Geophysical Applications: ISCE, ARIA-Tools & MintPy

Old Dominion University Aug 2014 - May 2016
Teaching Assistant *Norfolk, VA*

- Introduction to Oceanography
- Introduction to Global Climate Change
- Oceanography for Teachers

Kaplan Test Prep Jan 2013 - Present (Inactive)
SAT Teacher/Tutor *Greater NYC*

- Taught SAT/ACT preparation classes and individually tutored high school students

PUBLICATIONS

- **Buzzanga, B.**, Bekaert, D., Hamlington, B., Eggleston, J., and Handwerger, A., Vertical land motion in and around Washington DC, Science Advances (*in prep*).
- **Buzzanga, B.**, Hamlington, B. Fasullo, J., Landerer, F, and Peidou, A., Interdecadal variability of terrestrial water storage since 2003. Nature Communications Earth & Environment (*submitted*).

- **Buzzanga, B.**, Hamlington, B. Bekaert, D., Pavelsky, T., et al., Monitoring water from space with the Surface Water and Ocean Topography satellite, Geophysical Research Letters (*Accepted*).
- **Buzzanga, B.**, Bekaert, D., C., Hamlington, B., et al., Widespread Subsidence and Localized Uplift in the NYC Metropolitan Area, Science Advances (2023).
- Adams, K., Reager, J., **Buzzanga, B.**, Sawyer, A. and Hamlington B., (2024), Future vulnerability of near-global coastlines to saltwater intrusion, Geophysical Research Letters (*Accepted*)
- Bekaert et al., (2023) The ARIA-S1-GUNW: The ARIA Sentinel-1 Geocoded Unwrapped Phase Product For Open InSAR Science And Disaster Response, IGARRS 2023.
- **Buzzanga**, B., Piecuch, C., Hamlington, B., Frederikse, T., Caron, L (2023). 20th-century U.S. Atlantic Coast dynamic sea level rise and glacial isostatic adjustment. Geophysical Research Letters (*in prep*).
- Hamlington, B., et al., (2022) Observation-based trajectory of future sea level for the coastal United States tracks near high-end model projections, Nature Communications Earth & Environment.
- **Buzzanga, B.**, Heijkoop, E., Hamlington, B., Nerem, R. S., & Gardner, A. (2021). An assessment of regional ICESat-2 sea-level trends. Geophysical Research Letters, 48, `https://doi.org/10.1029/2020GL092327`.
- **Buzzanga, B.**, Bekaert, D. P. S., Hamlington, B., & Sangha, S. S. (2020). Toward sustained monitoring of subsidence at the coast using InSAR and GPS: An application in Hampton Roads, Virginia. Geophysical Research Letters, 47, `https://doi.org/10.1029/2020GL090013`.
- Bekaert, D.P.S, Hamlington, B., **Buzzanga, B.**, Jones, K., 2017. Spaceborne Synthetic Aperture Radar Survey of Subsidence in Hampton Roads, Virginia (USA), *Scientific Reports*, **7**(1), 14752.
- **Buzzanga, B.**, Precipitation and sea level rise impacts on groundwater levels in Virginia Beach, Virginia, *Masters Thesis, Old Dominion University*

PRESENTATIONS

- **Buzzanga, B.** and Hamlington, B.D. (2024). Towards robust estimates of coastal sea level. *Cryo2Ice Symposium*, Reykjavik, Iceland.
- **Buzzanga, B.**, Hamlington, B.D., and Fasullo, J (2023). CESM2-assisted analysis of GRACE/GRACE-FO Terrestrial Water Storage *AGU Fall Meeting*, Reykjavik, Iceland.
- **Buzzanga, B.**, Hamlington, B.D., and Rodriguez, A. (2023). An ICESat-2 Based Assessment of Coastal Sea-Level Trends and Variability. *Coastal Altimetry Workshop*, Cadiz, Spain.
- **Buzzanga, B.** and Hamlington, B.D. (2022). An initial investigation of multi-sensor coastal zone altimetry. *Ocean Surface Topography Science Team Meeting*, Venice, Italy.
- **Buzzanga, B.**, Hamlington, B.D., and Fasullo, J (2022). Disentangling timescales of terrestrial water storage variability. *GRACE Science Team Meeting*, Potsdam, Germany.
- **Buzzanga, B.**, Bekaert., D., and Hamlington, B.D. (2022). High-Resolution Vertical Land Motion along the U.S. East Coast *Postdoc Poster Day*, Pasadena, CA.
- **Buzzanga, B.**, Hamlington, B.D., and Fasullo, J (2022). Disentangling drivers of regional trends in terrestrial water storage. *American Geophysical Union, Frontiers in Hydrology Meeting*, San Juan, Puerto Rico.
- **Buzzanga, B.**, Piecuch, C.P. Hamlington, B.D., and Frederikse, T (2021). Ocean circulation and climate effects on US East Coast sea-level trends since 1900. *American Geophysical Union, Fall Meeting*, New Orleans, LA.
- **Buzzanga, B.** (2021). Sonification of Global Mean Sea Level. *American Geophysical Union, Fall Meeting*, New Orleans, LA.
- Bekaert, D., **Buzzanga, B.**, et al., (2021).Enabling Cloud-based InSAR Science. *American Geophysical Union, Fall Meeting*, New Orleans, LA.

- Maurer, J, Bekaert, D., Sangha, S., **Buzzanga, B.**, et al., (2021). RAiDER: Raytracing Atmospheric Delay Estimation for RADAR,. *American Geophysical Union, Fall Meeting*, New Orleans, LA.
- **Buzzanga, B.**, (2021). Measuring Subsidence in Hampton Roads from Space. Virtual Presentation to the Atmospheric and Planetary Sciences Department of Hampton University, VA (Invited).
- **Buzzanga, B.** and Hamlington, B., 2020. Assessing the role of ICESat-2 in understanding coastal sea level. *American Geophysical Union, Fall Meeting*, Virtual.
- **Buzzanga, B.**, Bekaert, D., Hamlington B., Sanga, S., 2019. Towards Sustained Monitoring of Subsidence using InSAR and GNSS. *American Geophysical Union, Fall Meeting*, San Francisco, CA.
- **Buzzanga, B.**, Plag, H.P., 2017. Linking earth observations and models to societal information needs: The case of coastal flooding. *Old Dominion University*, Norfolk, VA.
- **Buzzanga, B.**, 2016. Sea level rise impacts on precipitation-induced flooding. *American Geophysical Union, Fall Meeting*, San Francisco, CA.
- **Buzzanga, B.**, Plag, H.P., 2016. Linking earth observations and models to societal information needs: The case of coastal flooding. O*American Geophysical Union, Fall Meeting*, San Francisco, CA.
- Roberts-Pierre, B., **Buzzanga, B.**, Pasco, M., Charlam, B., Patrick, J., 2015. Sensing the Sounds: An updated land use/landcover classification of the Albemarle and Pamlico Sounds. *NASA Langley*, Langley Air Force Base, Hampton, VA.

HONORS AND AWARDS

- NASA ROSES-2024: NASA Sea-level Change Team (Co-Investigator)
- SERDP-2023: Improved Methods to Determine Coastal Vertical Land Motion (Co-Investigator)
- SERDP-2023: Integrative Approaches to Resolving Sea-Level Related Data and Datum Gaps Worldwide (Co-Investigator)
- NASA ROSES-2022: Studies with ICESat-2 (Principal Science Investigator)
- ROSES-2022: Coastal Resilience (Co-Investigator)
- SERDP-2022: Saltwater Impacts on DOD Installation Infrastructure (Co-Investigator)
- NISAR Team Award (Tropospheric Model Downselection)
- NASA ROSES 2020: New Investigator Program: (Co-Investigator)
- Student delegate for university forum on climate change moderated by Secretary of State John Kerry
- Dorothy Brown Smith Scholarship $\times 2$

PROFESSIONAL ACTIVITIES

- AGU Editor-in-Chief Selection Committee (2024)
- Zen and the Art of Saving the Planet (Online Course; Fall 2024)
- NASA ROSES Review Panel (2024)
- ICESat-2 Science Team (Principal Investiatior: 2022-2025)
- **U**nlearning **R**acism In **Ge**oscience (URGE; JPL Sea level and Ice 'Pod' Spring 2021)
- NASA Sea-Level Change Team (Co-Investigator; 2021-2028)
- Reviewer for Geophysical Research Letters, Ocean Science, Nature Communications
- Preparing Future Faculty Certification (Awarded Summer 2020)
- UNAVCO InSAR Theory & Processing Course Alumnus (Summer 2018)
- Capra Course Alumnus (Fall 2017)
- Member of the American Geophysical Union (since 2015)

SOFTWARE DEVELOPMENT

- **ARIA-tools**, a suite of Python libraries with Jupyter documentation for manipulating standard ARIA interferograms,
- **RAiDER**, a Python and C library for tropospheric corrections for interferograms,
- **MintPy**, a Python library for InSAR time-series analysis,
- **bayesGRD**, an extension to bayesGIA (`https://github.com/christopherpiecuch/bayesGIA`), a Bayesian model of 20$^{\text{th}}$ Century East Coast relative sea-level change written in MATLAB,
- **ModSWMM**, a Python framework coupling the groundwater flow model MODFLOW-2005 (Fortran) and rainfall/runoff model SWMM (C; `https://github.com/bbuzz31/ModSWMM`),
- **Github**, www.github.com/bbuzz31