Sean C. Crosby, PhD

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WORK EXPERIENCE

Data Scientist 2022 - 2023 (1.7-years)
GoGuardian, Los Angeles, CA
- Created a website categorization system to support web filtering for 22M K-12 students, reducing uncategorized traffic from 20% to less than 2%.
- Developed each categorization component: data-scraping, heuristic and fine-tuned transformer predictions, LLM prompt-engineering, human-labeling.
- Created ML model for sales team that prioritized leads by conversion probability
- Regularly collaborated with data scientists, data engineers, software engineers, and project managers through meetings, written reports, company-wide presentations, and informal seminars.

Coastal Oceanographer 2017 - 2022 (5-years)
U. S. Geological Survey, Bellingham, WA
- Developed, validated, and implemented hydrodynamic and wave models
- Presented results to stakeholders, at conferences, and in journal articles

Graduate Student Researcher 2011 - 2017 (5-years)
Scripps Institution of Oceanography, La Jolla, CA
- Studied mathematics, data analysis, ocean physics, research/wrote dissertation

Business Intelligence Analyst 2010 (1-year)
Encore Capital, San Diego, CA
- Developed revenue projections and assessed AB experiments

EDUCATION

University of California, San Diego - Scripps Institution of Oceanography
PhD Physical Oceanography 2011 - 2017
MS Physical Oceanography 2011 - 2013

University of California, Santa Cruz
BS Applied Physics 2005 - 2009
BA Economics 2005 - 2009
Cum Laude with highest honors in both majors

CODING, TECHNOLOGIES

Python: pandas, numpy, scipy, sklearn, pytorch, transformers, mlflow, xarray
SQL: postgres (Redshift), spark (Databricks)
Matlab: time-series analysis, spectral methods, optimization
AWS: Sagemaker, GroundTruth, S3, Lambda, Redshift, EC2

PROJECTS

SWRL Net, *a deep learning approach to wave forecasting*
- Ocean physics paper lead, Short Summary, 2020 Publication

Python Ocean Lessons, *student learning through data analysis*
- Created jupyter notebooks as ocean lessons with OOI Data Fellowship

- Developed documentation and repository. Blog Post, Repository

Future Flood Hazards, *predicting future coastal flooding*
- Lead wave and flood model development, workflow, analysis, and implementation. Summary

Optimizing coastal wave predictions, *my PhD Dissertation*
- Developed inverse methods for rapid assimilation Summary, 2017 Publication

REFEREED JOURNAL PUBLICATIONS

Crosby, S. C., C. Neederhoff, N. VanArendonk, E. E. Grossman. Efficient modeling of wave generation and propagation in a semi-enclosed estuary. *Ocean Modeling*, 2023.

Nederhoff, K., **Sean C. Crosby**, N VanArendonk, E. E. Grossman, B. Tehranirad, T. Leijnse, W. Klessens, P. Barnard. Dynamic modeling of coastal compound flooding hazards due to tides, extratropical storms, waves, and sea-level rise: a case study in the Salish Sea, Washington (USA). *EarthArXiv*, 2023.

Grossman E. E., **S. C. Crosby**, A. W. Stevens, D. J. Nowacki, N. vanArendonk, and C. A. Curran (USGS Open-file report) Assessment of vulnerabilities and opportunities to restore marsh sediment supply at Nisqually River Delta, west-central Washington. *U. S. Geological Survey Open File Report*, 2022.

Grossman, S. K., E. E. Grossman, J. S. Barber, S. K. Gamblewood, **S. C. Crosby**. Distribution and Transport of Olympia Oyster Ostrea lurida Larvae in Northern Puget Sound, Washington. *BioOne*, 2020.

Mooneyham, J. Z., **S. C. Crosby**, N. Kumar, B. Hutchinson. SWRL Net: a spectral, residual deep learning model for improving short-term wave forecasts. *Journal of Weather and Forecasting*, 2020.

Crosby, S. C., N. Kumar, W. C. O'Reilly, R. T. Guza. Regional swell transformation by backward ray tracing and SWAN. *Journal of Atmospheric and Oceanic Technology*, 2019.

Crosby, S. C., W. C. O'Reilly, B. D. Cornuelle, R. T. Guza. Assimilating global wave model predictions and deep water wave observations in nearshore swell predictions. *Journal of Atmospheric and Oceanic Technology*, 2017.

Kumar, N., D. L. Cahl, **S. C. Crosby**, G. Voulgaris. Bulk vs. Spectral Wave Parameters: Implications on Stokes Drift Estimates, Regional Wave Modeling, and HF Radars Applications. *Journal of Physical Oceanography*, 2017.

Crosby, S. C., W. C. O'Reilly, and R. T. Guza, Modeling long period swell in southern California: practical boundary conditions from buoy observations and global wave model predictions, *Journal of Atmospheric and Oceanic Technology*, 2016.

Ludka, B. C., T. Gallien, **S. C. Crosby**, and R. T. Guza. Mid-El Niño erosion at nourished and unnourished southern California Beaches, *Geophysical Research Letters*, 2016.

Collier K., T. Cunnington, **S. C. Crosby**, V. Fadeyev, F. Martinez-McKinney, K. Mistry, B. A. Schumm, E. Spencer, A. Taylor, M. Wilder. Microstrip electrode readout noise for load-dominated long shaping-time systems, *Nucl. Instr. Meth. Phys. Res.*, Vol. 729, 2013.

CONFERENCE PROCEEDINGS

Crosby, S. C., W. C. O'Reilly, and R. T. Guza. Regional Nearshore Wave Prediction: A Coastal Sediments Perspective. *Proceeding for Coastal Sediments*, San Diego, CA May 2015.

PUBLISHED DATASETS

Crosby, S.C., and E. E. Grossman, Wave observations from nearshore bottom-mounted pressure sensors in Skagit and Bellingham Bays, Washington, USA from Dec 2017 to Feb 2018. *U.S. Geological Survey data release.* 2019

INVITED SEMINARS

Crosby, S. C., E. E. Grossman. Modeling incident wave energy transformation at the coast to inform current and future hazards. *Western Washington University - Geology Dept.*, Bellingham, WA, Apr 2017.

Crosby, S. C., B. D. Cornuelle W. C. O'Reilly, R. T. Guza. Combining global wave model predictions and regional buoy observations: a Southern California case study. *US Army Corps of Engineers - Coastal and Hydraulics Laboratory*, Vicksburg, MI, Nov 2016.

TEACHING EXPERIENCE

Instructor, *Oceanography of the Salish Sea* Spring 2019, 2020
Western Washington University

- Designed and taught upper division capstone course, ESCI 491
- Students performed data analysis, collected CTD data at sea, and presented their findings
- Fostered student learning across several mediums including in-class lectures, discussions, hands-on demonstrations, guided programming labs, and field experience.
- Adapted and taught online in 2020 employing collaborate web-based programming tools for data analysis (Google Collab)

Co-Instructor, *Physics of the Ocean World* Summers 2015, 2016
UCSD Extension, Academic Connections

- Developed and taught introduction to physical oceanography.
- Two summers, each 3-week (75-hour) courses.
- Summer 2016 included a 1-day research cruise aboard the R.V. Sproul
- Our curriculum focused on lab and field experiment driven learning.

Instructor, *Surfzone Waves and Alongshore Current Lab* Summers 2014 - 2016
Upward Bound with Palomar College & UCSD

- Developed and taught 2-day lecture and lab course for high school seniors.

Instructional Assistant Spring 2011
Woodbridge High School, Irvine CA

- Tutored high-school students with learning disabilities using various methods to meet individual needs.

Instructional Assistant Winter-Summer 2006
UCSC Cal-Teach & UCSC COSMOS, Santa Cruz CA

- Tutored high-school students and assisted with classroom activities.