Dylan R. Sanderson, Ph.D.

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Summary

Coastal engineer with modeling expertise in assessing the impacts of natural and climatic hazards on the built and social environments at regional scales. Experience using coastal models - such as XBeach and SFINCS - to assess the impacts of coastal flooding and improve community resilience. Proven ability to communicate technical findings and collaborate effectively on interdisciplinary teams. Have work experience in academic/government settings and am particularly interested in applying my skills to problems in industry.

Experience

Johns Hopkins University 2025-Present
Associate Research Scientist · NIST PREP Associate | Structures Group

- Numerical modeling of hurricane storm surge and wave attenuation through the built environment using XBeach. Focus on overland hazards such as waves, currents, and storm surge.
- Hurricane Ian and Fort Myers Beach, Florida used as a testbed.

National Institute of Standards and Technology 2023-2025
National Research Council Postdoctoral Fellow | Community Resilience Group

- Developed geospatial decision-support models for community resilience planning for coastal flooding. Involved assessing future flood impacts on buildings and infrastructure under multiple sea level rise scenarios.
- Independently learned to run SFINCS (Super-Fast INundation of CoastS) to simulate future flooding driven by tropical cyclones and sea level rise.
- Collaboratively organized the 2024 Disaster Resilience Research Grant Symposium. Two day symposium held virtually with 300+ attendees and 50+ speakers. Required effective organization and leadership skills.

Oregon State University 2018-2023
Graduate Research Assistant | Coastal Engineering Focus

- Contributed to IN-CORE, a spatially explicit decision-support tool for community resilience planning for natural hazards. Point of contact for Seaside, Oregon virtual testbed. Evaluate damages, losses, and risks from earthquake/tsunami hazards. First author on four journal papers contributing to or using IN-CORE.
- Member of three interdisciplinary teams addressing community risk and resilience to coastal hazards. Collaboratively worked with social scientists, engineers, economists, earth scientists, urban planners, and others.
- Collaboratively established a multi-institution seminar series for late stage graduate students to present their research. This work was completed with a team that was entirely remote.

US Army Corps of Engineers Research and Development Center 2016-2018
Research Civil Engineer | Coastal and Hydraulics Lab

- Principal investigator for two coastal storm risk management models - Beach-fx and G2CRM - that are used throughout the US Army Corps of Engineers (USACE). Served as the primary point of contact for these two models across USACE.
- Completed coastal storm risk management projects. Required beach morphology modeling, working with large coastal hazard databases, and identifying beach renourishment plans.
- Independently managed an annual budget of approximately $300k. This consisted of preparing contracts for future model development and team management.

Education

Ph.D., Civil Engineering, Oregon State University 2020-2023
M.S., Civil Engineering, Oregon State University 2018-2020
B.S., Ocean Engineering, Texas A&M University 2012-2016

Technical Skills

Programming Languages: Python, Julia, Go, Matlab.
Coastal Models and Tools: XBeach, SFINCS, Beach-fx, G2CRM, CSHORE, SBEACH, GENESIS.
Geographic Tools, Software, and Packages: QGIS, Geopandas, GDAL.
Machine Learning Tools and Methods: Flux.jl, Reinforcement Learning, PyTorch (beginner).
Computing: SLURM (HPC), Linux, Google Cloud Computing.

Select Publications

Peer Reviewed Papers

[9] **Sanderson, D.**, McAllister, T., and Helgeson, J. (2025). Simulating Future Household Adaptation to Sea Level Rise using Agent-Based Modeling and Reinforcement Learning. *International Journal of Disaster Risk Reduction*. https://doi.org/10.1016/j.ijdrr.2025.105742

[8] **Sanderson, D.**, and McAllister, T. (2025). Quantifying future local impacts of sea-level rise on buildings and infrastructure. *International Journal of Disaster Risk Reduction*, 127. https://doi.org/10.1016/j.ijdrr.2025.105649

[7] Meselhe, A., Cox, D., **Sanderson, D.**, and Tilt, J. (2025). Human-centered connectivity and transportation network recovery following a Cascadia Subduction Zone Earthquake and Tsunami. *Sustainable and Resilient Infrastructure*, 1-23. https://doi.org/10.1080/23789689.2025.2525697

[6] Amini, M., **Sanderson, D.**, Cox, D., and Barbosa, A. (2024). Methodology to incorporate seismic damage and debris to evaluate strategies to reduce life safety risk for multi-hazard earthquake and tsunami. *Natural Hazards*. https://doi.org/10.1007/s11069-023-05937-8

[5] Amini, M., Jeon, H., **Sanderson, D.**, Cox, D., Barbosa, A., and Cutler, H. (2023). Integrated Engineering-Economic Analysis for Multi-hazard Damage and Loss Assessment. *ASCE Journal of Infrastructure Systems*, 29(4). https://doi.org/10.1061/JITSE4.ISENG-2229

[4] **Sanderson, D.**, and Cox, D. (2023). Comparison of National and Local Building Inventories for Damage and Loss Modeling of Seismic and Tsunami Hazards: From Parcel- to City-Scale. *International Journal of Disaster Risk Reduction*, 93. https://doi.org/10.1016/j.ijdrr.2023.103755

[3] **Sanderson, D.**, Cox, D., Amini, M., and Barbosa, A. (2022). Coupled urban change and natural hazard consequence model for community resilience planning. *Earth's Future*, 10(12). https://doi.org/10.1029/2022EF003059

[2] **Sanderson, D.**, Cox, D., Barbosa, A., and Bolte, J. (2022). Modeling regional and local resilience of infrastructure networks following disruptions from natural hazards. *ASCE Journal of Infrastructure Systems*, 28(3). https://doi.org/10.1061/(ASCE)IS.1943-555X.0000694

[1] **Sanderson, D.**, Gravens, M., and Permenter, R. (2019). Methodology for identifying a subset of representative storm surge hydrographs from a coastal storm modeling database. *Journal of Coastal Research*, 35(5), 1095-1105. https://doi.org/10.2112/JCOASTRES-D-18-00052.1

Technical Reports and Notes

[3] Johnson, B., and **Sanderson, D**. (2020). On the use of CSHORE for Beach-fx. *ERDC/CHL Technical Notes Collection* (ERDC/CHL CHETN-II-59), U.S. Army Engineer Research and Development Center, Vicksburg, MS. http://dx.doi.org/10.21079/11681/37949

[2] **Sanderson, D.**, and Gravens, M. (2017). Representative storm selection tool: An automated procedure for the selection of representative storm events from a probabilistic database. *ERDC/CHL Technical Notes Collection* (ERDC/CHL CHETN-VIII-10), U.S. Army Engineer Research and Development Center, Vicksburg, MS. http://dx.doi.org/10.21079/11681/26829

[1] Gravens, M., and **Sanderson, D.** (2017). Identification and selection of representative storm events from a probabilistic storm database. *ERDC/CHL Technical Notes Collection* (ERDC/CHL CHETN- VIII-9), U.S. Army Engineer Research and Development Center, Vicksburg, MS. http://dx.doi.org/10.21079/11681/26341