Dylan R. Sanderson, Ph.D.

Associate Research Scientist
Johns Hopkins University · National Institute of Standards and Technology
sandersondylan@gmail.com

Summary

Research interests in holistically assessing the impacts of natural hazards on communities. Expertise in computational modeling, focusing on geospatial decision-support tools for community resilience planning and coastal hazards. Proven ability to communicate technical findings and collaborate effectively within interdisciplinary teams.

Appointments Held

Associate Research Scientist	Johns Hopkins University	2025-Present
Postdoctoral Fellow	National Institute of Standards and Technology	2023-2025
Graduate Research Assistant	Oregon State University	2018-2023
Research Civil Engineer	US Army Corps of Engineers Research and Development Center	2016-2018

Research Experience

Hurricane Overland Flow Modeling Through the Built Environment 2025-Present

- Computational modeling of hurricane storm surge and wave attenuation through the built environment.
- Hurricane Ian and Fort Myers Beach, Florida used as a testbed.
- Funding from the National Institute of Standards and Technology.

Evaluating Future Impacts of Sea Level Rise on Coastal Communities 2023-2025

- Independently developed research proposal, secured funding through nationally competitive fellowship program, performed research, and prepared two manuscripts.
- Developed methodology to quantify future impacts of sea level rise on buildings and infrastructure.
- Developed agent-based model to simulate household response to impacts of sea level rise. Reinforcement learning used to define agent decision-making.
- Funding from the National Research Council Postdoctoral Fellowship Program.

NIST Community Resilience Center of Excellence 2018-2023

- Multi-hazard and parcel-level community resilience modeling focusing on seismic-tsunami hazards and impacts to the built and social environments.
- Contribute to the development of IN-CORE, a geospatial decision-support tool for community resilience planning for natural hazards.
- Funding from the National Institutes of Standards and Technology.

Interdisciplinary Alternative Futures Modeling for the Oregon Coast 2018-2023

- Analysis of the Oregon coast under different future policy scenarios integrating acute and chronic hazards with social and economic systems.
- Developed decision-support tool to assess "islanding", or lack of access, of coastal communities following Cascadia Subduction Zone earthquake and tsunami.
- Funding from Oregon Sea Grant.

Beach-fx and G2CRM model development 2016-2018

- Principal investigator for two coastal storm risk management models that are used throughout the US Army Corps of Engineers (USACE).
- Independently managed project budget and identified future directions for model development.

Education

Ph.D. 2020-2023

- Civil Engineering, Oregon State University
- Dissertation: *Coastal Community Risk and Resilience Modeling Across Spatial and Temporal Scales*
- 2023 Outstanding Doctoral Student in School of Civil and Construction Engineering

M.S. 2018-2020

- Civil Engineering, Oregon State University
- Thesis: *Assessing the Risk and Resilience of Coastal Communities: An Application to the Joint Seismic-tsunami Hazard at Seaside, Oregon*

B.S. 2012-2016

- Ocean Engineering *Cum Laude*, Texas A&M University
- Dean's List: 2/8 semesters
- Distinguished Student: 4/8 semesters

Publications

Peer Reviewed Papers

[12] **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

[11] **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

[10] 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

[9] Sen Gupta, H., Adluri, T., **Sanderson, D.**, Gonzalez, A., Nicholson, C., and Cox, D. (2024). Multi-objective optimization of mitigation strategies for buildings subject to multiple hazards. *International Journal of Disaster Risk Reduction*, 100. https://doi.org/10.1016/j.ijdrr.2023.104125

[8] 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

[7] 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

[6] **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

[5] **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

[4] **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

[3] **Sanderson, D.**, Cox, D. and Naraharisetty, G. (2022). A spatially explicit decision support framework for parcel- and community-level risk and resilience assessment using Bayesian networks. *Sustainable and Resilient Infrastructure*, 7(5), 531-551. https://doi.org/10.1080/23789689.2021.1966164

[2] **Sanderson, D.**, Kameshwar, S., Rosenheim, N., and Cox, D. (2021). Deaggregation of multi-hazard damages, losses, risks, and connectivity: An application to the joint seismic-tsunami hazard at Seaside, Oregon. *Natural Hazards*, 109(2), 1821-1847. https://doi.org/10.1007/s11069-021-04900-9

[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

Manuscripts Under Review

[1] Meselhe, A., **Sanderson, D.**, and Cox, D. (Under review). Coastal Infrastructure Performance after Cascadia Multihazard: A Coupled Transportation and Building Damage and Recovery Model. Submitted to *International Journal of Disaster Risk Reduction*. https://doi.org/10.2139/ssrn.5351936

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

Archived Software and Datasets

[3] **Sanderson, D.** (2025). Data and codes for manuscript: "Simulating Future Household Adaptation to Sea Level Rise using Agent-Based Modeling and Reinforcement Learning" [Software]. *Zenodo*, https://doi.org/10.5281/zenodo.15120768.

[2] Cox, D., Mohammad, A., Amini, M., Barbosa, A., Kameshwar, S., Park, H., and **Sanderson, D.** (2022). Seaside Testbed Data Inventory for Infrastructure, Population, and Earthquake-Tsunami Hazard [Dataset]. *DesignSafe*, https://doi.org/10.17603/ds2-sp99-xv89. *2023 DesignSafe Outstanding Dataset

[1] **Sanderson, D.** (2022). Coupled Urban Change and Hazard Consequence Model (v0.3) [Software]. *Zenodo*. https://doi.org/10.5281/zenodo.6870341

Jupyter Notebooks and Books

[5] **Sanderson, D.** (2024). Quantifying future local impacts of sea-level rise on buildings and infrastructure. (Jupyter Notebook). https://doi.org/10.5281/zenodo.11402964

[4] **Sanderson, D.** (2022). Coupled Urban Change and Hazard Consequence Model Documentation. (Jupyter Book). https://22dylan.github.io/UrbanChange-HazardConsequence/intro.html

[3] **Sanderson, D.** (2021). Seaside Notebook Gallery. (Jupyter Book). https://doi.org/10.5281/zenodo.6998352

[2] **Sanderson, D.** (2020). Spatial Bayesian network for evaluating parcel- and community-level resilience. (Jupyter Notebook). https://github.com/22dylan/pyincore_notebooks/tree/master/20200728_SBN

[1] **Sanderson, D.**, and Naraharisetty, G. (2019). Seaside multi-hazard building damage. (Jupyter Notebook). https://github.com/22dylan/pyincore_notebooks/tree/master/20191219_Seaside_Dist

Conferences

[12] **Sanderson, D.**, McAllister, T., and Helgeson, J. (2025). Preparing for Future Hazards Amplified by Sea Level Rise: Considering Impacts to Infrastructure and Intelligent Agents [Conference Presentation]. *2025 NHERI Computational Symposium*, Los Angeles, CA, United States.

[11] **Sanderson, D.**, McAllister, T., Helgeson, J., and Dulam, R. (2024). A Decision-Support Tool for Coastal Community Resilience: Future Impacts from Sea Level Rise and Self-Learning Agents [Poster]. *American Geophysical Union (AGU) Annual Meeting*, Washington, DC, United States.

[10] **Sanderson, D.**, McAllister, T., and Helgeson, J. (2024). An agent-based model of adaptation to sea-level rise considering impacts to infrastructure. [Conference Presentation]. *2024 Natural Hazards Workshop Researchers Meeting*, Broomfield, CO, United States.

[9] **Sanderson, D.**, Cox, D., Barbosa, A., and Amini, M. (2023). An Agent-Based Model Coupled with IN-CORE to Evaluate Policies to Increase Community Resilience [Conference Presentation]. *ASCE Inspire 2023*, Arlington, VA, United States.

[8] **Sanderson, D.**, Amini, M., Cox, D., and Barbosa, A. (2022). Urban Planning and Coastal Hazards: A Future Oriented Agent-Based Model for Coastal Community Resilience [Conference Presentation]. *ASCE EMI 2022*, Baltimore, MD, United States.

[7] **Sanderson, D.**, Cox, D., Brown, T., Mohney, C., Raskin, J., Reed, M., and Ward, M. (2022). Community Islanding and Recovery after a CSZ Earthquake and Tsunami [Conference Presentation and Panel]. *Oregon State of the Coast 2022*, Newport, OR, United States.

[6] **Sanderson, D.**, Cox., D., and Barbosa, A. (2022). Using IN-CORE to develop a spatially explicit decision support framework to increase community- and parcel-level resilience [Conference Presentation]. *ASCE Lifelines Conference 2021-2022*, Virtual.

[5] **Sanderson, D.**, Kameshwar, S., Park, H., Alam, M., Rosenheim, N., and Cox, D. (2019). Understanding exposure, vulnerability, and risks of cascading seismic-tsunami hazards on infrastructure and society in Seaside, OR [Conference Presentation]. *American Geophysical Union (AGU) Fall Meeting*, San Francisco, CA, United States.

[4] **Sanderson, D.**, Kameshwar, S., Park, H., Alam, M., Rosenheim, N., and Cox, D. (2019). Deaggregation of multi-hazard damages, losses, risks, and connectivity: An application to the joint seismic-tsunami hazard at Seaside, OR [Conference Presentation]. *American Shore and Beach Preservation Association's National Coastal Conference*, Myrtle Beach, SC, United States.

[3] Hadziomerpahic, A., Leung, M., **Sanderson, D.**, and Stanton, K. (2019). Envisioning coastal resilience through alternative futures modeling: A graduate student perspective, [Conference Presentation and Panel]. *10th Annual Northwest Climate Conference*, Portland, OR, United States.

[2] **Sanderson, D.**, Kameshwar, S., Park, H., Alam, M., Rosenheim, N., and Cox, D. (2019). Deaggregation of multi-hazard damages, losses, risks, and connectivity: An application to the joint seismic-tsunami hazard at Seaside, OR [Conference Presentation]. *Young Coastal Scientists and Engineers Conference-Americas*, Corvallis, OR, United States. *Best Presentation Award

[1] **Sanderson, D.**, and Gravens, M. (2017). Use of a probabilistic storm database in Monte Carlo lifecycle modeling [Conference Presentation]. *Young Coastal Scientists and Engineers Conference-Americas*. Dauphin Island, AL, United States. *Best Presentation Award

Invited Talks & Presentations

Invited Talks, Guest Lectures, and Panels

[8] Building Your Professional Brand: The Importance of Networking and Establishing a Research Story (2024). Invited panel member. *NHERI Natural Hazards Research Summit 2024*. College Park, MD, United States

[7] Simulating Mitigation in IN-CORE: Seaside Testbed (2024). Invited presentation for NIST Community Resilience Center of Excellence (CoE) Semi-Annual Meeting Public Webinar. Hybrid: Fort Collins, CO, United States and Virtual.

[6] Introduction to community resilience modeling with IN-CORE (2024). Guest lecture for OSU course *CE 640: Community Resilience*. Oregon State University, Corvallis, OR, United States

[5] Using Python for Simulating Coastal Community Resilience (2023). Guest lecture for OSU course *ENGR 103: Engineering Computation and Algorithmic Thinking*. Oregon State University, Corvallis, OR, United States

[4] Coupled Urban Change and Natural Hazard Consequence Model for Community Resilience Planning (2022). Invited talk for University of Maryland Resilience Seminar. Virtual

[3] Modeling Regional and Local Resilience of Infrastructure Networks Following Disruptions from Natural Hazards (2022). Guest lecture for OSU course *GEOG 451/551: Planning Principals and Practices for Resilient Communities*. Oregon State University, Corvallis, OR, United States

[2] Using Python for Simulating Civil Infrastructure Resilience (2022). Guest lecture for OSU course *ENGR 103: Engineering Computation and Algorithmic Thinking*. Oregon State University, Corvallis, OR, United States

[1] Graduate student perspectives on interdisciplinary research (2020). Guest lecture and panel at OSU course *ENSC 543: Excelling in an interdisciplinary team.* Oregon State University, Corvallis, OR, United States

Presentations

[13] Using Publicly Available Data and IN-CORE to Compute Future Exposure to Sea Level Rise (2023). NIST Community Resilience CoE Semi-Annual Meeting. Gaithersburg, MD, United States.

[12] Comparison of the National Structure Inventory and a Tax-Assessor Database for use in Community Risk Modeling of Seismic and Tsunami Hazards (2023). NIST Community Resilience CoE Semi-Annual Meeting. Fort Collins, CO, United States.

[11] Comparison of Tax Assessor and NSI Data for Damage Estimates and Economic Losses in Seaside (2022). NIST Community Resilience All CoE Meeting. Virtual.

[10] Coastal Community Resilience Modeling (2022). OSU COPRI Undergraduate Recruitment. Corvallis, OR, United States.

[9] Integrated Urban Change and IN-CORE Simulation to Evaluate Policy Scenarios (2022). NIST Community Resilience CoE Semi-Annual Meeting. Herndon, VA, United States

[8] Coupling IN-CORE with an agent-based model of land use change for policy evaluation (2022). NIST Community Resilience CoE Semi-Annual Meeting. Fort Collins, CO, United States

[7] Multi-scale infrastructure resilience and seismic-tsunami hazards (2022). OSU EERI General Body Meeting. Oregon State University, Corvallis, OR, United States

[6] A spatially explicit decision support framework for parcel- and community-level resilience assessment using Bayesian networks (2021). NIST IN-CORE User Workshop. Virtual

[5] Parcel-level decision support framework using pyIncore: An application to seismic-tsunami hazards (2020). NIST IN-CORE Technical Meeting. Virtual

[4] Nearshore numerical methods (2017). USACE Coastal and Hydraulics Laboratory Symposium. Joint Presentation with Ashley Frey. Vicksburg, MS, United States

[3] Probabilistic lifecycle analysis modeling with Beach-fx and G2CRM (2017). Coastal Science and Engineering Collaborative. Galveston, TX, United States

[2] A demonstration of the representative storm selection tool. USACE Coastal and Hydraulics Laboratory Research Forum Seminar (2017). Vicksburg, MS, United States

[1] An overview of the Coastal and Hydraulics Laboratory / Probabilistic life-cycle analysis modeling (2017). MTS/SNAME Student Meeting. Texas A&M University, College Station, TX, United States

Broader Impacts

Journal Reviewer

ASCE Journal of Infrastructure Systems
Applied Geography
Sustainable and Resilient Infrastructure
Transportation
Natural Hazards and Earth System Sciences
International Journal of Disaster Risk Reduction [co-review]
Natural Hazards Review [co-review]
Pure and Applied Geophysics [co-review]
Structure and Infrastructure Engineering [co-review]

Press Releases and New Coverage

Oregon Coastal Futures Project - National Engagement Award 2024
2024 W.K. Kellogg Foundation Community Engagement Scholarship Award.
One of four nationally recognized research projects.
Contributed earthquake and tsunami resilience analyses to this project.
https://tinyurl.com/ocf-award

Modeling Regional and Local Resilience of Transportation Networks 2022
Lead author on research that was published in Oregon State University press release.
Picked up by various media outlets (UNDRR Prevention Web, KTVZ, KOIN, etc.)
Live radio interview with Jefferson Public Radio
Co-author (Dan Cox) gave live radio interview with Oregon Public Broadcasting – Think Out Loud
https://tinyurl.com/rgnl-locl-resilience

Service

Co-Chair for NIST / NSF Disaster Resilience Research Grant (DRRG) Symposium 2024
Organized 2024 DRRG Symposium.
Held virtually with an attendance of 300+ people.

Committee Involvement 2024-Present
ASCE Risk and Resilience Measurements Committee.
ASCE Civil Infrastructure and Lifeline Systems Committee.

Western Coastal Collaboratorium (WCC) 2021-2022
Co-founding member of the WCC.
Student-lead monthly seminar series.
Participation includes multiple West Coast Universities with coastal research interests.
Graduate student speakers travel to one of the participating universities to present on research.

Omega Epsilon 2015-2016
Vice President of Omega Epsilon.
Texas A&M University Ocean Engineering Honor Society.

Trainings

Beyond the Horizons Career Development Coaching Program
Mentoring Core Skills for NRC Postdocs
NOAA Facilitation Basics for Coastal Managers
DEI: Strategies to achieve more faculty and student diversity
Respectfully Engaging Tribes 101

Awards & Recognitions

Oregon Coastal Futures Project - National Engagement Award	2024
National Research Council (NRC) Research Associate Program Fellowship	2023
School of Civil and Construction Engineering Outstanding Doctoral Student	2023
DesignSafe Outstanding Dataset Award for Seaside Testbed	2023
Oregon State University Civil Engineering Professional Development Travel Grant	2022
Best presentation: Young Coastal Scientists and Engineers Conference - Americas	2019
Oregon State University Civil and Construction Engineering Graduate Fellowship	2018
Oregon State University Civil and Construction Engineering Scholarship Award	2018
Best presentation: Young Coastal Scientists and Engineers Conference - Americas	2017
Marine Technology Society Chuck Richards Scholarship	2015

Mentoring & Teaching

Mentoring

Nat Solomonov	Undergraduate	Verification & validation of community resilience models	2024
Amina Meselhe	Graduate (M.S.)	Modeling regional and local resilience of transp. networks	2022-Present
Amy Kellogg	Undergraduate	Georeferencing and vectorizing historic building inventory	2022

Teaching

Tutor for Engineering Mechanics: Statics (Texas A&M University at Galveston) 2014

Affiliations

National Postdoctoral Association	2024-Present
American Geophysical Union	2019-Present
American Society of Civil Engineers	2017-Present
American Shore and Beach Preservation Association	2019-2022
Omega Epsilon – Texas A&M University Ocean Engr. Honor Society	2014-2016