

# KATHERINE ALYSE ANARDE

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Department of Civil, Construction, and Environmental Engineering  
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## EDUCATION

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<b>Ph.D.</b> Civil & Environmental Engineering	2019
Rice University	
<i>Dissertation: Transformation &amp; morphological impact of low-frequency waves during hurricane attack</i>	
<b>B.A.</b> Geology	2011
University of Colorado Boulder	
<i>Emphasis in Geophysics, Minor in Mathematics</i>	

## PROFESSIONAL EXPERIENCE

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<b>Assistant Professor</b>	2021-present
<i>Department of Civil, Construction, and Environmental Engineering, North Carolina State University</i>	
Faculty Affiliate at the Southeast Climate Adaptation Science Center	
<b>Adjunct Faculty</b>	2023-present
<i>Department of Physics and Physical Oceanography, University of North Carolina Wilmington</i>	
<b>Project Manager</b>	2020-2022
<i>NSF CoPe RCN: Collaboratory for Coastal Adaptation Over Space &amp; Time (C-CoAST)</i>	
<b>Postdoctoral Researcher</b>	
<i>Department of Earth Sciences, University of North Carolina at Chapel Hill</i>	2019-2021
<i>Department of Ocean Engineering, Texas A&amp;M University</i>	2019
<b>Graduate Research &amp; Teaching Assistant</b>	2014-2019
<i>Department of Civil &amp; Environmental Engineering, Rice University</i>	
<b>Associate Geologist</b>	2011-2014
<i>ENVIRON International Corporation, Houston, TX &amp; Irvine, CA</i>	

## HONORS & AWARDS

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Outstanding Engagement Award, North Carolina State University	2025
Academy of Outstanding Faculty in Extension & Engagement, North Carolina State University	2025
Goodnight Early Career Innovators Award, North Carolina State University	2025
National Academies (NASEM), Gulf Research Program, Early Career Award	2022
Dr. Kirk W. Dotson Endowed Graduate Fellowship, Rice University	2018
Link Ocean Engineering & Instrumentation Ph.D. Fellowship	2016
NSF Graduate Research Fellowship Program, Honorable Mention	2016
NSF PIRE International Research Fellowship	2016
Jack F. Maddox Fellowship, Rice University	2014
“Pick Award” - Undergraduate Student of the Year, Rocky Mountain Assoc. of Geologists	2011
“Marks Award” - Outstanding Geoscience Undergraduate Student, University of Colorado	2010
NSF REU: Scripps Institution of Oceanography	2010

## RESEARCH INTERESTS

Climate adaptation, coastal hazards, coupled human-natural systems, barrier islands, sea-level rise, coastal geomorphology, nearshore wave transformation, storm impacts, signal processing

## PUBLICATIONS

*Peer-Reviewed Journal Articles (Published or Accepted)*, \*denotes student or postdoc supervised/mentored

14. Hino, M., **Anarde, K.**, Fridell, T., McCune, R., Thelen, T., Farquhar, E., Woodard, P., & Whipple, A., *in press*. Land-based sensors reveal high frequency of coastal flooding. *Nature Communications Earth and Environment*.
13. \*Thelen, T., **Anarde, K. A.**, Dietrich, C., & Hino, M. (2024). Wind and rain combine with tides to cause frequent and unexpected coastal floods. *Water Research*, 266, 122339. <https://doi.org/10.1016/j.watres.2024.122339>
12. Carr, M. M., Gold, A. C., Harris, A., **Anarde, K.**, Hino, M., Sauers, N., Da Silva, G., Gamewell, C., & Nelson, N. G. (2024). Fecal bacteria contamination of floodwaters and a coastal waterway from tidally-driven stormwater network inundation. *GeoHealth*, 8(4), e2024GH001020. <https://doi.org/10.1029/2024GH001020>
11. van Wiechen, P., Rutten, J., de Vries, S., Tissier, M., Mieras, R., **Anarde, K.**, Baker, C., Reniers, A., & Mol, J.W. (2024). Measurements of dune erosion processes during the RealDune/REFLEX experiments. *Scientific Data*, 11(1), 421. <https://doi.org/10.1038/s41597-024-03156-9>
10. **Anarde, K.**, Moore, L.J., Murray, A.B., & Reeves, I.R.B (2024). The future of developed barrier systems: Part 2. Alongshore complexities and emergent climate change dynamics. *Earths Future*, 12, e2023EF004200. <https://doi.org/10.1029/2023EF004200>
9. **Anarde, K.**, Moore, L.J., Murray, A.B., & Reeves, I.R.B (2024). The Future of Developed Barrier Systems Part I: Pathways Toward Uninhabitability, Drowning, and Rebound. *Earths Future*. 12, e2023EF003672. <https://doi.org/10.1029/2023EF003672>
8. \*Gold, A., **Anarde, K.**, Grimley, L., Neve, R., Srebnik, E. R., Thelen, T., Whipple, A., & Hino, M (2023). Data from the drain: a sensor framework that captures multiple drivers of chronic coastal floods. *Water Resources Research*, 59, e2022WR032392. <https://doi.org/10.1029/2022WR032392>
7. Goldstein, E. B., Buscombe, D., Lazarus, E. D., Mohanty, S. D., Rafique, S. N., **Anarde, K. A.**, ... & Williams, H. E. (2021). Labeling poststorm coastal imagery for machine learning: Measurement of inter-rater agreement. *Earth and Space Science*, 8(9), e2021EA001896. <https://doi.org/10.1029/2021EA001896>
6. Reeves, I. R. B., Moore, L. J., Murray, A. B., **Anarde, K. A.**, & Goldstein, E. B. (2021). Dune dynamics drive discontinuous barrier retreat. *Geophysical Research Letters*, 48(13), e2021GL092958. <https://doi.org/10.1029/2021GL092958>
5. Reeves, I. R. B., Goldstein, E. B., **Anarde, K. A.**, & Moore, L. J. (2021). Remote bed-level change and overwash observation with low-cost ultrasonic distance sensors. *Shore & Beach*, 89(2), 23-30. <https://doi.org/10.34237/1008923>
4. **Anarde, K.**, Cheng, W., Tissier, M., Figlus, J., & Horrillo, J. (2021). Meteotsunamis Accompanying Tropical Cyclone Rainbands During Hurricane Harvey. *Journal of Geophysical Research: Oceans*, 126(1), e2020JC016347. <https://doi-org.libproxy.lib.unc.edu/10.1029/2020JC016347>
3. **Anarde, K. A.**, Figlus, J., Sous, D., & Tissier, M. (2020). Transformation of infragravity waves during hurricane overwash. *Journal of Marine Science and Engineering*, 8(8), 545. <https://doi.org/10.3390/jmse8080545>

2. Ebad Sichani, M., **Anarde, K. A.**, Capshaw, K. M., Padgett, J. E., Meidl, R. A., Hassanzadeh, P., ... & Bedient, P. B. (2020). Hurricane Risk Assessment of Petroleum Infrastructure in a Changing Climate. *Frontiers in Built Environment*, 6, 104. <https://doi.org/10.3389/fbuil.2020.00104>
1. **Anarde, K.**, Kameshwar, S., Irza, J.N., Nitttrouer, J.A., Lorenzo-Trueba, J., Padgett, J.E., Sebastian, A., & Bedient, P.B. (2017). Impacts of Hurricane Storm Surge on Infrastructure Vulnerability for an Evolving Coastal Landscape. *Natural Hazards Review*, 19(1), p.04017020. [https://doi.org/10.1061/\(ASCE\)NH.1527-6996.0000265](https://doi.org/10.1061/(ASCE)NH.1527-6996.0000265)

*Peer-Reviewed Journal Articles (Under Review & In Preparation)*

8. \*Hamidi, E., Peter, B. G., Behzad, N., Moftakhari, H., **Anarde, K.**, & Moradkhani, H. Integrating Multi-Source Remote Sensing and Numerical Simulation Approaches for Enhanced Flood Hazard Assessment. (*in prep for Water Research*)
7. \*Van Blunk, L., **Anarde, K.**, Murray, A. B., Moore, L. J., & Sherwood, C. Outwash accelerates barrier retreat. (*in prep for Geophysical Research Letters*)
6. \*Thelen, T., Hino, M., **Anarde, K.**, Kwass-Mason, I., & Cawley, M. Chronic flood hazards influence relocation preferences of coastal residents. (*in prep for Science Advances*)
5. \*Thelen, T., **Anarde, K.**, Hino, M., Volp, N., Befus, K., & Dietrich, J. C. Tipping points for effectiveness of flood mitigation strategies from community engaged modeling. (*in prep for Water Resources Research*)
4. \*Farquhar, E., Goldstein, E., Bresnahan, P. J., Settlin-Pitarra, B., Stasiewicz, J., **Anarde, K.** Detection of inland coastal flooding with TinyCamML, a low-cost, privacy-aware camera with onboard ML and cellular connectivity. (*in prep for Earth & Space Science*)
3. \*Baker, C., **Anarde, K. A.**, Tissier, M., Rutten, J., van Wiechen, P., Mieras, M., & de Vries, S. Infragrav-ity and sea-swell wave contributions to dune erosion during collision. (*in prep for Geophysical Research Letters*)
2. \*McCune, R., **Anarde, K.**, Goldstein, E., & Baker, C. Quantification of chronic coastal flooding: a machine-learning driven approach to water level extraction. (*in prep for Water Resources Research*)
1. Carr, M., Thelen, T., **Anarde, K.**, Harris, A., Harrison, J., & Nelson, N. Model-based estimates of fecal source contributions to tidal floodwaters. (*in prep for Water Resources Research*)

*Conference Proceedings*

5. \*Baker, C., **Anarde, K. A.**, Tissier, M., Rutten, J., van Wiechen, P., Mieras, M., & de Vries, S. (2025). The role of sea-swell, infragravity waves, and dune geometry on runup excursion during dune collision. *In Coastal Dynamics 2025: The Proceedings of the Coastal Dynamics 2025*.
4. Moore, L. J., **Anarde, K. A.**, Reeves, I. R. B., Murray, A. B., Goldstein, E. B., & Zinnert, J. (2023). Dune-storm interactions, shrubs, and management decisions drive coastal barrier behavior and affect future habitation. *In Coastal Sediments 2023: The Proceedings of the Coastal Sediments 2023* (pp. 2240-2247).
3. van Wiechen, P., Rutten, J., Mieras, R., **Anarde, K.**, Tissier, M., & de Vries, S. (2023). Avalanching of the dune face: field observations and equilibrium theory. *In Coastal Sediments 2023: The Proceedings of the Coastal Sediments 2023* (pp. 739-752).
2. **Anarde, K.**, Figlus, J., Cheng, W., Horrillo, J., Tissier, M., Lynett, P., & Shi, F. (2020). Data-model comparisons of storm processes during Hurricane Harvey. In the Coastal Engineering Proceedings, 2020.

1. **Anarde, K.**, & Figlus, J. (2017). Tilt current meters in the surf zone: benchmarking utility in high frequency oscillatory flow. In *Proceedings of Coastal Dynamics*, 2017. Helsingør, Denmark.

## PRESENTATIONS & POSTERS

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*Oral Presentations*, \*denotes student or postdoc supervised

48. **Anarde, K.**, Van Blunk, A., Murray, A. B., Moore, L. J., & Sherwood, C. The role of outwash on barrier evolution: how shoreface-dune couplings influence barrier recovery. *River, Coastal, and Estuarine Morphodynamics*, Barcelona, Spain, 2025.
47. Hino, M., Frankenberg, E., **Anarde, K.**, & Garcia, H. Migration in response to sea level rise and extreme storms. *Population Association of America Annual Conference*, Washington D.C., 2025.
46. Collins, J., Hino, M., McCune, R., **Anarde, K.**, & Frankenberg, E. Tolerating the tide: accommodation and tolerance of chronic coastal flooding in rural North Carolina. *Population Association of America Annual Conference*, Washington D.C., 2025.
45. Garcia, H., Hino, M., Frankenberg, E., & **Anarde, K.**. Residential Mobility Patterns Following Repetitive Flood Exposure in Eastern North Carolina, USA. *Population Association of America Annual Conference*, Washington D.C., 2025.
44. Nelson, N., Carr, M. M., Kraemer, J., **Anarde, K.**, Harris, A., van Woesik, K., & Thelen, T. (2025), Water Quality Hazards of Tidal Floods, National Association of Flood and Stormwater Agencies. (Invited).
43. \*Baker, C. M., **Anarde, K.**, Tissier, M., Rutten, J., van Wiechen, P., Mieras, R., & De Vries, S. The role of sea-swell, infragravity waves, and dune geometry on runup excursion during dune collision. *Coastal Dynamics Conference*, Aviero, Portugal, 2025.
42. **Anarde, K. A.**, Moore, L. J., Murray, A. B., Franklin, B., Reeves, I. R. B., Sahraei, R., & Busch, K. C. Alongshore complexities stemming from dune management on sandy barriers. *AGU Fall Meeting*, Washington, DC, 2024. (Invited).
41. Carr, M. M., **Anarde, K.**, Harris, A., Gold, A., Hino, M., Thelen, T., Harrison, J., & Nelson, N. G. Knowns and unknowns of fecal contamination of floodwaters from tidal inundation. *AGU Fall Meeting*, Washington, DC, 2024. (Invited).
40. Harrison, J., Carr, M. M., Woods, C., **Anarde, K.**, Harris, & Nelson, N. G. Enteric Pathogen Reservoirs in Coastal Stormwater Infrastructure Impacted by Tidal Flooding. *Environmental, Water Resources and Coastal Engineering Graduate Research Symposium*, Raleigh, NC, 2024.
39. Carr, M. M., Thelen, T., **Anarde, K.**, Harrison, J., Harris, A., & Nelson, N. G. Evaluating the causes of fecal contamination in tidal floods. *North Carolina Coastal Conference*, New Bern, NC, 2024.
38. Nelson, N. G., Carr, M. M., Thelen, T., **Anarde, K.**, Harrison, J., & Harris, A. Tidal flooding of stormwater infrastructure and associated water quality impacts. *American Public Works Association, North Carolina Stormwater Management Division Conference*, Wilmington, NC, 2024.
37. Moore, L. J., **Anarde, K.**, Corbett, D. R., Demattia, E., Gopalakrishnan, S., Luettich, R. A., ... & Smith, M. The Collaboratory for Coastal Adaptation over Space and Time (C-CoAST): Enabling Co-produced, Coupled Human-Natural Dynamics Research in Support of Coastal Community Resilience. *AGU Fall Meeting*, Washington, DC, 2024.
36. Carlson, B., Overeem, I., **Anarde, K.**, Dong, T. Y., Gyawali, B., Baker-Stahl, L., & Pierce, E. Efficient sand transport from the delta front to deep water at a prograding Arctic delta. *AGU Fall Meeting*, Washington, DC, 2024.

35. \*Thelen, T., **Anarde, K.**, Dietrich, C., & Hino, M. Multi-driver Modeling of Chronic Coastal Flooding Adaptation Strategies. *AGU Fall Meeting*, Washington, DC, 2024. (Invited).
34. Hino, M., **Anarde, K.**, McCune, R., Thelen, T., Farquhar, E., Fridell, T., Whipple, T., & Woodard, P. Incidence and Impacts of Chronic Coastal Flooding in North Carolina. *AGU Fall Meeting*, Washington, DC, 2024. (Invited).
33. \*McCune, R., **Anarde, K.**, Goldstein, E. B., Srebnik, E. R., Thelen, T., & Hino, M. Quantification of chronic coastal flooding using machine learning. *International Conference of Coastal Engineering*, Rome, Sept. 2024.
32. \*Baker, C. M., **Anarde, K.**, Long, J., Hawkes, A., & Lyon, C. Daily beach evolution with stereo photogrammetry at an undeveloped barrier island. *International Conference of Coastal Engineering*, Rome, Sept. 2024.
31. \*Thelen, T., **Anarde, K.**, Hino, M., & Dietrich, J. C. Community-engaged coastal flood modeling to evaluate sea level rise adaptation strategies. *International Conference of Coastal Engineering*, Rome, Sept. 2024.
30. van Wiechen, P., Mieras, M., Rutten, J., Baker, C., **Anarde, K.**, Tissier, M., Reniers, A., & de Vries, S. Continuous field measurements of dune slumping during storm surges. *International Conference of Coastal Engineering*, Rome, Sept. 2024.
29. \*Thelen, T. It's flooding more than we know, and what to do about it. *USGS St. Petersburg Coastal and Marine Science Seminar Series*, St. Petersburg, May 2024.
28. \*Baker, C. M., **Anarde, K. A.**, Tissier, M., Rutten, J., van Wiechen, P., Mieras, R., & de Vries, S. Infragravity wave dynamics during dune collision. *2024 AGU Ocean Sciences Meeting*, New Orleans, Feb. 2024.
27. Moore, L. J., **Anarde, K.**, Reeves, I. R., Murray, A. B., Goldstein, E. B., Zinnert, J., & Franklin, B. The Role of Dune-Storm Interactions, Dune-Shrub Dynamics and Management Decisions in the Evolution and Future Habitation of Barrier Islands. *AGU Ocean Sciences Meeting*, New Orleans, Feb. 2024.
26. \*Thelen, T., **Anarde, K.**, Hino, M., & Dietrich, J. C. A Community-Engaged Modeling Framework to Simulate Adaptation Strategies for Multi-Driver Chronic Coastal Flooding. *AGU Fall Meeting*, San Francisco, Dec. 2023.
25. \*McCune, R., **Anarde, K.**, & Goldstein, E. B. Semantic Image Segmentation of Coastal Roadway Inundation. *AGU Fall Meeting*, San Francisco, Dec. 2023.
24. Carr, M., Gold, A., Harris, A., **Anarde, K.**, Hino, M., & Nelson, N. Investigating bacterial concentrations in a coastal waterway during stormwater network inundation and minor tidal flooding. *Coastal and Estuarine Research Federation Biannual Conference*, Portland, OR. Nov. 2023.
23. \*Thelen, T., **Anarde, K.**, Dietrich J. C., Hino, M., Measuring and assessing the impacts of chronic coastal roadway flooding to inform adaptation. *UNC University Research Week*, Chapel Hill, Oct. 2023.
22. Nelson, N., Harrison, J., Carr, M., Harris, A., & **Anarde, K.** Impacts of Sunny Day Flooding on Recreational and Shellfish Water Quality, *Interstate Seafood Seminar and Gulf and South Atlantic Shellfish Conference*, Wilmington, NC, Oct. 2023. (Invited)
21. **Anarde, K. A.** & Hino, M. Measuring the Causes and Impacts of Chronic Coastal Flooding. *Coastal Imaging Research Network (CIRN) Annual Meeting*, Duck, May 11, 2023.
20. Moore, L. J., **Anarde, K. A.**, Reeves, I. R. B., Murray, A. B., Goldstein, E. B., & Zinnert, J. Dune-storm interactions, shrubs, and management decisions drive coastal barrier behavior and affect future habitation.

*Coastal Sediments*, New Orleans, April 11, 2023. (Invited)

19. Franklin, B., Moore, L. J., Barksdale, M. B., Hein, C. J., Kirwan, M. L., **Anarde, K. A.**, & Reeves, I. R. B. Calculating blue-carbon fluxes from barrier-island migration. *AGU Fall Meeting*, Chicago, Dec. 16, 2022.
18. \*Thelen, T., **Anarde, K. A.**, Hino, M., McCraw, H., & Dietrich, C. Data-model intercomparisons of roadway flooding due to sea-level rise. *AGU Fall Meeting*, Chicago, Dec. 16, 2022.
17. \*Van Blunk, L., **Anarde, K. A.**, Murray, A. B., Moore, L. J., & Sherwood, C. Modeling the effects of outwash events on barrier island evolution. *AGU Fall Meeting*, Chicago, Dec. 16, 2022.
16. van Wiechen, P., Rutten, J., Tissier, M., De Vries, S., Mieras, M., & **Anarde, K. A.** Field observations of dune erosion with two artificially created dunes. *International Conference of Coastal Engineering*, Sydney, Dec. 5, 2022.
15. \*Thelen, T., **Anarde, K. A.**, Hino, M., McCraw, H., & Dietrich, C. Community-focused analysis and communication of chronic coastal flooding events. *National Adaptation Forum*, Baltimore, Oct. 24, 2022.
14. **Anarde, K. A.** Simulating linkages between landscape evolution and coastal real estate markets with the CoASTal Community-lAnDscape Evolution (CASCADE) model (*Keynote*). *Community Surface Dynamics Modeling System Annual Meeting*, Boulder, CO, May 18, 2022.
13. **Anarde, K. A.** & Hino, M. Measuring the Causes and Impacts of Sunny Day Flooding in Coastal Communities. *North Carolina Beach, Inlet & Waterway Associations 2022 Spring Meeting*, Emerald Isle, May 5, 2022.
12. \*Thelen, T., Gold, A., Hino, M., **Anarde, K. A.**, Whipple, A., & Neve, R. Data from the Drain: Assessing drivers of chronic coastal flooding. *Environmental, Water Resources, and Coastal Engineering Research Symposium*, North Carolina State University, February 26, 2022.
11. Moore, L.J., **Anarde, K. A.**, Corbett, D.R., Gopalakrishnan, S., Luettich, R., McNamara, D., Mullin, M., Murray, A.B., Smith, M., & Watzin, M. Enabling Convergent, Co-produced, Coupled Human-Natural Dynamics Research to Support Coastal Resilience: Building the Collaboratory for Coastal Adaptation over Space and Time (C-CoAST). *AGU Ocean Sciences Meeting 2022*, Virtual Conference, February 28, 2022.
10. \*Gold, A., Hino, M., **Anarde, K. A.**, Whipple, A., & Neve, R. Assessing drivers of chronic coastal flooding using a low-cost sensor network. *AGU Ocean Sciences Meeting 2022*, Virtual Conference, February 28, 2022.
9. **Anarde, K. A.**, Moore, L.J., Murray, A.B., Reeves, I.R.B., & Franklin, B. Pathways to barrier drowning arising from coastal management of the nearshore to the back barrier. *AGU Fall Meeting 2021*, New Orleans, Dec. 14, 2021. (Invited)
8. **Anarde, K. A.**, Reeves, I.R.B., Murray, A.B., & Moore, L.J. A coupled model framework for simulating barrier island and coastline response to climate change and land use. *AGU Fall Meeting 2020*, Virtual Meeting.
7. **Anarde, K. A.**, Cheng, W., Tissier, M., Figlus, J., & Horrillo, J.J. Field and numerical assessment of meteotsunamis associated with tropical cyclone rainbands in the Gulf of Mexico. *AGU Ocean Sciences Meeting 2020*, San Diego, February 21, 2020.
6. **Anarde, K. A.** & Figlus, J. On the importance and origin of very low-frequency waves in the nearshore during Hurricane Harvey. *AGU Fall Meeting 2018*, Washington D.C., Dec. 10, 2018.

5. Figlus, J., **Anarde, K. A.**, Dellapenna, T., & Bedient, P.B. COASTRR: COAstal STorm Rapid Response Measurements of Hurricane Harvey Impact and Recovery on Two Texas Barrier Islands. *ICCE 2018*, Baltimore, Maryland, July 30, 2018.
4. **Anarde, K. A.**, Figlus, J., Fang, N., Dellapenna, T., & Bedient, P.B. Hurricane Harvey rapid response: field measurements of hydrodynamic forcing and morphological evolution on Matagorda Peninsula and Follets Island, TX. *AGU Ocean Sciences Meeting 2018*, Portland, Oregon, Feb. 12-16, 2018.
3. **Anarde, K. A.**, Figlus, J., Dellapenna, T., & Bedient, P.B. Hurricane Harvey rapid response: observations of infragravity wave dynamics and morphological change during inundation of a barrier island cut. *AGU Fall Meeting 2017*, New Orleans, Louisiana, Dec. 11-15, 2017.
2. Swanson, T., Lorenzo-Trueba, J., **Anarde, K.**, Odezulu, C., Anderson, J., & Nittrouer, J. Exploring the morphodynamic response of coastal barriers to sea-level rise along the Texas Gulf Coast. *AGU Fall Meeting 2017*. New Orleans, LA, Dec. 11-15, 2017.
1. **Anarde, K. A.** & Figlus, J. Tilt current meters in the surf zone: benchmarking utility in high-frequency oscillatory flow. *Coastal Dynamics 2017*, Helsingør, Denmark, June 12-16, 2017.

#### Poster Presentations

17. Goldstein, E., Farquhar, E., Bresnahan, P., Settin, B., Stasiewicz, J., & **Anarde, K.**. Detecting inland coastal flooding with TinyCamML, a low-cost, privacy-aware camera with on-device ML and cellular connectivity. *CSDMS Annual Meeting*, Boulder, CO, 2025.
16. Henry, H., Moore, L. J., Franklin, B., **Anarde, K.**, & Dalyander, S. The Effect of Climate and Management Strategies on Barrier Island Evolution: Insights from a Case Study of Hatteras Island. *CSDMS Annual Meeting*, Boulder, CO, 2025.
15. Hino, M. & **Anarde, K.**. Engaging communities to measure and mitigate chronic coastal flooding. *Southeast & Caribbean Disaster Resilience Partnership*, Wilmington, NC, 2025.
14. **Anarde, K.**, Hino, M., Cawley, M., Amspacher, K., Frankenburg, E., Thelen, T., Collins, J., & McCune, R. Approaches to community-engaged research on flooding from sea level rise in under-resources communities. *Coastal Dynamics Conference*, Aviero, Portugal, 2025.
13. Wang, C., Pavelsky, T., **Anarde, K.**, Hino, M., & Sebastian, A. Can Capella's Commercial SAR Effectively Capture High-Tide Flooding. *AGU Fall Meeting*, Washington, DC, 2024.
12. Franklin, B., Moore, L. J., **Anarde, K.**, Murray, A. B., & Busch, K. C. Simulating the Influence of Management Scenarios on Island Evolution, Ocracoke Island, North Carolina. *AGU Fall Meeting*, Washington, DC, 2024.
11. \*McCune, R., **Anarde, K.**, Hino, M., Frankenburg, E., & Amspacher, K. Rising tides, drowning ditches: Analysis and communication of chronic coastal flooding in rural communities. *National Adaptation Forum*, Baltimore, May 2024.
10. \*Sahraei, R., **Anarde, K.**, & Sciaduone, B. Comparison of PlanetScope Imagery and Airborne Images for Landcover Classification in Coastal Areas. *YCSECA 2024 Meeting*, Quebec, June 2024.
9. \*Lyon, C., **Anarde, K.**, Baker, C., Long, J. W., & Hawkes, A. Developing a Stereo Reconstruction Workflow to Derive Elevation Maps of the Subaerial Beach. *YCSECA 2024 Meeting*, Quebec, June 2024.
8. \*Toburen, C., Grimes, D., & **Anarde, K.** Developing a nearshore hydrographic survey system for a personal watercraft. *YCSECA 2024 Meeting*, Quebec, June 2024.

7. Gungor, N., Carlson, B., **Anarde, K.**, & Dong, T. Y.. Proglacial Delta-Front Sediment Transport in West Greenland. *AGU Fall Meeting*, San Francisco, Dec. 2023.
6. **Anarde, K.**, Goldstein, E., Bolewitz, J., McCune, R., Gold, A., & Hino, M. On-device machine learning for identifying the spatial extent of chronic coastal floods. *International Conference of Coastal Engineering*, Sydney, Dec. 5, 2022.
5. Palermo, R., Wallace, E.J., Joshi, S., **Anarde, K.**, Ashton, A., Brideau, L., Cortes, I., Evans, R., Gillen, M., Goldstein, E., Gostic, M., Housego, R., & Kinsman, N. Anti-Racism in Women in Coastal Geoscience and Engineering. *AGU Fall Meeting 2021*, New Orleans, LA, Dec. 15, 2021.
4. **Anarde, K.**, Kameshwar, S., Irza, J.N., Lorenzo-Trueba, J., Nittrouer, J.A., Padgett, J.E. Extreme storms, sea level rise, and coastal change: implications for infrastructure reliability in the Gulf of Mexico. *AGU Fall Meeting 2016*, San Francisco, CA, Dec. 12-18, 2016.
3. \*Do, C., **Anarde, K.**, Prouse, W., & Figlus, J. UAS photogrammetry for rapid response characterization of subaerial coastal change. *AGU Fall Meeting 2016*, San Francisco, CA, Dec. 12-18, 2016.
2. \*Myres, B.H., **Anarde, K.**, & Figlus, J. Tilt current meter field validation in the surf zone. *AGU Fall Meeting 2016*, San Francisco, CA, Dec. 12-18, 2016.
1. **Anarde, K.**, & Laske, G. A joint Rayleigh and Love wave analysis for the Hawai‘ian PLUME Project. *AGU Fall Meeting 2010*, San Francisco, CA, Dec. 13-17, 2010.

*Other Invited Lectures or Research Presentations (not listed above)*

14. Seminar: Water Resources Research Center. University of Hawaii Manoa. It’s flooding more than we know. Upcoming: October 25, 2024.
13. Seminar: Beaty Water Research Center. Queen’s University. It’s flooding more than we know. September 25, 2024.
12. Seminar: Department of Physics and Physical Oceanography. University of North Carolina Wilmington. The future of developed barrier systems. April 12, 2024.
11. Seminar: Department of Earth & Climate Sciences, Nicholas School of the Environment. Cascading Feedbacks Arising from Coastal Management. March 1, 2024.
10. Lunchtime Lecture Series: NC Department of Environmental Quality. Its Flooding More Than We Know. December 6, 2023.
9. Seminar: Ocean and Earth Sciences Department, Old Dominion University. The future of developed barrier systems. November 16, 2023.
8. Seminar: Water, Wetlands, and Watersheds Webinar, University of Florida. The future of developed barrier systems. April 5, 2023.
7. Seminar: Department of Geological and Environmental Sciences, Appalachian State University. The future of developed barrier systems. February 24, 2023.
6. Seminar: Department of Marine, Earth, and Environmental Sciences, University of North Carolina at Chapel Hill. *Cascading feedbacks arising from coastal management*. February 18, 2022.
5. Guest Lecture: Department of Civil, Construction, and Environmental Engineering, North Carolina State University. Introduction to Coastal Engineering. *Storm Impacts and Development*. March 31, 2021.
4. Seminar: University of North Carolina at Chapel Hill, Collaboratory for Coastal Adaptation Over Space and Time (C-COAST). *Disciplines 101: Storm Impacts and Development*. April 8, 2021.



3. Panelist: 2021 Workshop on SHared Operational REsearch Logistics In the Nearshore Environment (SHORELINE21): Uniting field and lab research across disciplines to reduce hurricane impacts to the built and natural environment. *The Nearshore Extreme Events Reconnaissance Organization*. April 26, 2021.
2. Seminar: US Naval Research Laboratory, Sediment Dynamics Section. *Transformation and morphological impact of low-frequency waves during hurricane attack*. June 7, 2019.
1. Seminar: Department of Civil and Environmental Engineering, University of Delaware. *Nonlinear evolution and morphological impact of low-frequency waves during hurricane-induced overwash*. October 23, 2018.

## INNOVATION

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4. **Sunny Day Flood Sensors (SuDS)**: low-cost, open-source sensor framework consisting of a storm drain water level sensor, roadway camera, and wireless gateway that transmit data in real-time to a web-app: [go.ncsu.edu/sunny](https://go.ncsu.edu/sunny). Designed to measure chronic coastal floods outside of extreme events. Two versions, for use in urban (v1) or rural communities (v2). Featured in the Washington Post's Anatomy of a flood and PBS' State of Change documentary .

*Associated publication*: \*Gold, A., **Anarde, K.**, Grimley, L., Neve, R., Srebnik, E. R., Thelen, T., Whipple, A., & Hino, M (2023). Data from the drain: a sensor framework that captures multiple drivers of chronic coastal floods. *Water Resources Research*.

*Github*: Hayden-Lowe, J., et al., (2022). sunny-day-flooding-project/tutorials: v1.0.1. <https://doi.org/10.5281/zenodo.7017187>

3. **TinyCamMLs**: low-cost, open source, smart cameras that can detect flooding on roadways using machine learning, while decreasing data transmission costs and preserving privacy. Featured in a short video by EPICS in IEEE

*Github*: Settin, B., et al., (2024). TinyCamML/Boron-and-OpenMV: V0.1 (V0.1). <https://doi.org/10.5281/zenodo.13386489>

2. **C3POs**: low-cost, open source, conductivity probes (i.e., the Coastal Conductivity Communication Probe) that can detect whether roadway floodwaters are composed of freshwater or saltwater.

*Github*: <https://github.com/COAST-Lab/c3po>

1. **Measuring Overwash (MeOw) stations**: open-source ultrasonic sensors for measuring storm-driven overwash.

*Associated publication*: Reeves, I.R.B., Goldstein, E.B., **Anarde, K.A.**, and Moore, L.J. (2021). Remote bed-level change and overwash observation with low-cost ultrasonic distance sensors. *Shore & Beach*, 89(2), 23-30. <http://doi.org/10.34237/1008923>

## ARCHIVED SOFTWARE AND DATASETS

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5. \*Thelen, T, **Anarde, K.**, Dietrich, J. C., & Hino, M. (2024). Data from: Wind and rain compound with tides to cause frequent and unexpected coastal floods [Dataset]. Dryad. <https://doi.org/10.5061/dryad.2280gb633>
4. **Anarde, K.**, Hutton, E., & Williams, Z. (2024b). UNC-CECL/CASCADE: the CoAStal Community-lAnDscape Evolution (CASCADE) model (v1.0.0). Zenodo. <https://doi.org/10.5281/zenodo.10655831>

3. **Anarde, K. A.**, & Moore, L. J., Murray, A. B., & Reeves, I. R. B. (2023). Simulations for “The Future of Developed Barrier Systems: Pathways Toward Uninhabitability, Drowning, and Rebound”. figshare. <https://doi.org/10.6084/m9.figshare.22295413.v1>
2. \*Reeves, I. R. B., **Anarde, K. A.**, & Moore, L. J. (2022). Record of storm events and associated water levels for the Virginia Coast Reserve, 1980-2013. Virginia Coast Reserve Long-Term Ecological Research Project Data Publication. <https://www.vcr.lter.virginia.edu/cgi-bin/showDataset.cgi?docid=knblter-vcr.352.1>
1. Figlus, J. & **Anarde, K.** (2019). COAstal STorm Rapid Response (COASTRR): in-situ hydrodynamic and sediment transport measurements during Hurricane Harvey on two Texas barrier islands. PRJ-2537. DesignSafe-CI. <https://doi.org/10.17603/ds2-m0bc-n829>

## GRANTS

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*Awarded (all amounts are direct)*

18. Nelson, N., Harris, A., Anarde, K., & Grimes, D. Rising seas, failing infrastructure: characterizing microbial risks from exposure to tidal floods. NSF, Environmental Engineering, 08/01/2024-07/31/2027, \$499,992 (Anarde \$85,977).
17. Nelson, N., Harris, A., & Anarde, K. Assessing Factors Driving Health Risks of Contaminated Tidal Floodwaters in NC Communities. NC Policy Collaboratory, 07/01/2024-06/30/2025, \$75,000 (Anarde \$20,000).
16. Anarde, K. Characterizing the hydrodynamics of potential borrow areas on Frying Pan Shoals. Moffat and Nichol on behalf of the Town of Oak Island, 05/01/2024-04/30/2025, \$117,087 (Anarde \$117,087).
15. Hino, M. & Anarde, K. Enhancing chronic flood communication for improved preparedness. Department of Homeland Security, Coastal Resilience Center, 07/01/2024-06/30/2025, \$233,306 (Anarde \$150,542).
14. Dello, K., Bowden, J., & Anarde, K. Developing Downscaled Climate Projections for North Carolina. North Carolina Office of Recovery and Resilience. 11/01/2023-07/31/2024, \$47,518 (Anarde \$15,000).
13. Long, J., Hawkes, A., Scharf, F., Posey, M., Grimes, D., Briseno-Avena, C., Suanda, S., Leonard, L., Klotzko, S., & Anarde, K. Fish Fry: Frying Pan Shoals Ecosystem Dynamics (Supplemental #1). Bureau of Ocean Energy and Management, 10/01/2023-09/30/2026, \$2,207,917 (Anarde \$49,946).
12. Anarde, K., Hino, M., Amspacher, K., Goldstein, E., Wang, C., & Nelson, N. It is flooding more than we know: climate injustice from floods due to sea level rise. NASA, Interdisciplinary Research in Earth Science, 07/01/2023-06/30/2026, \$1,211,982 (Anarde \$505,509).
11. Moore, L. J., Murray, A. B., Anarde, K., & Busch, K. C. Understanding the Long-term Effects Adaptation Strategies on Cape Hatteras National Seashore and Ocracoke Island through Co-Production. National Park Service Cooperative Agreement, 07/01/2023-06/30/2025, \$200,088 (Anarde \$14,667).
10. Hino, M., Shuler, C., Grecni, Z., Anarde, K., & Widlansky, M. Enabling equitable adaptation to changing coastal flood risks through community-engaged modeling in North Carolina and Hawaii. NOAA, Cross-CAP/RISA Program, 09/01/2023-08/31/2026, \$475,000 (Anarde \$44,119).
9. Hino, M., Anarde, K., & Dietrich, C. Evaluating coastal adaptation strategies in the face of chronic and extreme events. Department of Homeland Security, Coastal Resilience Center, 07/01/2023-06/30/2024, \$154,798 (Anarde \$92,054).
8. Nelson, N., Harris, A., & Anarde, K. Characterizing Water Quality Impacts of Tidal Floods on NC Communities. NC Policy Collaboratory, 07/01/2023-06/30/2024, \$49,979 (Anarde \$13,045).

7. Anarde, K & Sciaudone, B. Shoreline Monitoring at Oregon Inlet Terminal Groin. North Carolina Department of Transportation, Research Program FY2022, 08/16/2022-08/15/2025, \$534,252.
6. Nelson, N., Carr, M, Harris, A, & Anarde, K. Characterizing fecally-associated bacteria in tidal floodwaters and associated risks to pedestrians. North Carolina Sea Grant, Minigrant, 01/01/2022-01/31/2023, \$9,999 (Anarde \$487).
5. Anarde, K. 2022 Early-Career Research Fellowship: Environmental Protection and Stewardship (Track Two). National Academies of Science and Engineering, Gulf Research Program, 09/01/2022-08/31/2024, \$76,000 (Anarde \$76,000).
4. Hino, M., Anarde, K., & Frankenburg, E. The effects of chronic flooding on coastal migration. National Science Foundation, Human, Environmental, and Geographical Sciences (HEGS)/CAS-Climate, 10/01/2022-09/30/2025, \$399,622 (Anarde \$76,315).
3. Goldstein, E., Anarde, K., & Sciaudone, B. Evaluation of Road Network Resilience to Natural Hazards using Network Analysis. North Carolina Department of Transportation, Research Program FY2022, 08/01/2022-07/31/2024, \$207,923 (Anarde \$149,055).
2. Anarde, K., Hino, M., Gold, A., & Dietrich, C. Identifying the drivers of chronic coastal flooding: a community-centric approach. North Carolina Sea Grant, 2022-2024 Biennial Competitive Research Call, 02/01/2022-01/31/2024, \$119,411 (Anarde \$87,522).
1. Mieras, M. & Anarde, K. Distributed wireless sensors for real-time measurement of waves and water levels during hurricane impact. North Carolina Sea Grant. Minigrant, 12/01/2020-11/31/2022, \$9,947 (Anarde \$1,100).

#### *Pending*

3. Bridge, J., Phillips, B., Cox, D., & Anarde, K. Hx Ian: Developing robust coastal hazard and structural response data collection and validation for hurricane landfall. NIST, 2025-2027, \$446,565 (Anarde \$79,223).
2. Tulbure, M., Caineta, J., Gaines, M., & Anarde, K. Urban flash flooding with high-resolution satellite data. NASA, Commercial Satellite Data Earth Science Research and Applications, 10/01/2025-09/30/2027, \$490,000 (Anarde \$87,597).
1. Nelson, N., Harris, A., Anarde, K., & Befus, K. Investigating Tidal Floodwater Contamination Pathways from Sewage Exfiltration in Low-Lying Coastal Communities. North Carolina Sea Grant, 2022-2024 Biennial Competitive Research Call, 02/01/2026-01/31/2028, \$149,883.

#### **STUDENT AWARDS, GRANTS & FELLOWSHIPS**

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NSF-ASI for Coastal Hazards: Indonesia Fellow. Awardee: Thomas Thelen	2025
NCSU CCEE Three Minute Thesis 1st Place. Awardee: Thomas Thelen	2025
NCSU CCEE Callanan Graduate Award. Awardee: Thomas Thelen	2025
CSDMS ESPin School Travel Award - Boulder. Awardee: Ryan McCune	2025
CSDMS ESPin School Travel Award - Boulder. Awardee: Roya Sahraei	2025
National Defense Science & Engineering Graduate Award. Awardee: Ryan McCune	2024-2027
People's Choice Award: EWC Engineering Symposium. Awardee: Thomas Thelen	2024
Kiets Climate Leaders Program Fellowship. Awardee: Ryan McCune	2024
Southeast Climate Center Fellowship. Awardee: Thomas Thelen	2023-2024
NSF International Research Experience Fellowship-Netherlands. Awardee: Thomas Thelen	2023 CSDMS
ESPin School Travel Award - Boulder. Awardee: Lexi Van Blunk	2022

## TEACHING & MENTORSHIP

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### Primary Instructor

Coastal Hydrodynamics (CE 582), NCSU	2025-present
Engineering Aspects of Coastal Processes (CE 583), NCSU	2022-present
Introduction to Coastal Engineering (CE 487/587), NCSU	2022-present

### Graduate Advisor (university, track)

Brooke Gaenzle (NCSU, PhD)	2024-present
Roya Sahraei (NCSU, PhD)	2023-present
Ryan McCune (NCSU, PhD)	2022-present
Thomas Thelen (NCSU, PhD)	2021-present
Alexis Van Blunk (NCSU, MS)	2021-2023

### Postdoctoral Researchers (university, track)

Ebrahim Hamidi (NCSU)	2025-present
Christine Baker (NCSU)	2023-2024

### Staff Advisor

Elizabeth Farquhar, Field Technician	2024-present
Dallas Hoffman, Research Specialist	2024

### Undergraduate Advisor (university)

Billy Hopkins (NCSU)	2025-present
Victoria Kidd (NCSU)	2025-present
Lexi Jacobson (NCSU)	2025-present
Rachel Spaulding (NCSU)	2025-present
Nyshita Ramadugu (NCSU)	2025-present
Paul Hurley (UNCW)	2024-Present
Levi Lavengood (NCSU)	2024-present
Cory Toburen (UNCW)	2024
Colby Lyon (UNCW)	2023-2024
Lucas Snoddy (NCSU)	2023
Perri Woodard (NCSU)	2023-2024
Harper McCraw (NCSU)	2022-2023
Jasmine Hayden-Lowe (NCSU)	2022
Joe Bolewitz (NCSU)	2022
William Prouse (Texas A&M University)	2018
Connie Do (Rice University)	2016
Hunter Myres (Texas A&M University)	2016

### Graduate Committee Member (university, track)

Javier Zumbado Gonzales (NCSU, PhD)	2025-present
Hannah Henry (UNC-CH, PhD)	2025-present
Juan Conde (NCSU, PhD)	2024-present
Julia Harrison (NCSU, PhD)	2024-present
Jenero Knowles (NCSU, PhD)	2024-present
Megan Carr (NCSU, PhD)	2024-present
Savannah Paliotti (NCSU, MS)	2024-present

Tomas Cuevas (NCSU, MS)	2023-2024
Jessica Gorski (NCSU, MS)	2022-2023
Sophia Rosenberg (NCSU, MS)	2022-2023
Chris O'Connor (UNCW, MS)	2021-2023
Pegah Gashemi (NCSU, PhD)	2022-2023
Brooke Rumbaugh (NCSU, MS)	2021

**External Examiner** (university, track)

Laura Szczyrba (Queen's University, PhD)	2024
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**PROFESSIONAL DEVELOPMENT WORKSHOPS ATTENDED**

Coastal Imaging Research Network Workshop, Duck, North Carolina	2023
NHERI & RAPID Facility Joint Workshop, Corvallis, Oregon	2019
OpenFOAM Training: Essential and Applied CFD, Houston, Texas	2017
Delft Software Days (Delft3D, XBeach), Delft, Netherlands	2016

**PROFESSIONAL SERVICE***External*

Human Dimensions Group Co-Chair, Community Surface Dynamics-Modeling System	2024-present
Award Nomination Co-Coordinator, Women in Coastal Geoscience & Engineering	2024-present
Steering Committee, Young Coastal Scientists & Engineers Conference Americas	2022-present
Scientific Program Committee, CSDMS 2024 Annual Meeting	2023-2024
Panelist, Earth Day "Inundation" Event, ECU	2024
Task Group Member, NSF NHERI Decadal Visioning Study	2023

*Internal*

Panelist, UNC System PREPP Program	2025
Guest Speaker, Kiets Climate Leaders Program	2024, 2025
Faculty Lead, NCSU EWC Seminar Committee	2025
Guest Speaker, Coastal Community Resilience Immersive Training	2024
Panelist, Blue Economy Workshop	2024
Member, NCSU CCEE Recruitment and Retention Committee	2024-present
Faculty Advisor, NCSU ECE Senior Capstone	2022-2024
Member, NCSU CCEE Undergraduate Programs Committee	2023-2024
Member, NCSU CCEE Graduate Programs Committee	2021-2023
Panelist, Sea-level Rise Impacts, North Carolina Sea Grant Conference	2022
Member, NCSU CCEE Faculty Search Committee	2022

*Technical Referee - Proposals*

NSF Career Award (2021), Texas Sea Grant Biennial Research Program (2022), NSF, Smart and Connected Communities Program (2023), National Academies Gulf Research Program Fellowship (2024)

*Technical Referee - Manuscripts*

Scientific Reports (1), Journal of Geophysical Research - Oceans (6), Journal of Geophysical Research - Earth Surface (1), ASCE Natural Hazards Review (1), Earth's Future (2), and 5 other journals

*Workshops & Conference Planning*

Community Surface Dynamics Modeling System (CSDMS) 2024 Annual Meeting. Montclair State University, NJ. May 2024. *Scientific Program Committee.*

Nearshore Processes. AGU Fall Meeting, Chicago, IL. December 12-16, 2022. *Session Co-convenor.*

Coastal Geomorphology and Morphodynamics. AGU Fall Meeting, New Orleans, LA. December 13-17, 2021. *Session Convener.*

### *Professional Affiliations*

American Geophysical Union (AGU), Women in Coastal Geoscience and Engineering (WICGE)

## **ENGAGEMENT**

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Envisioning Flood Resilience in Carolina Beach Workshop Series	2024-2025
North Carolina Office of Resiliency and Recovery, Invited talk	March 2025
Core Sound Waterfowl Museum & Heritage Center - Community Meetings	Sept 2023, May 2025
Town of Carolina Beach - Town Council Meetings	March 2022, May 2023, May 2024, May 2025
Town of Beaufort - Town Council Meetings, Beaufort, NC.	May 2023, May 2025
Down East Resilience Meeting, Davis and Harkers Island, NC	January 2025
Down East RCCP Update, Davis, NC	Nov 2024
Parlor Talk, Core Sound Waterfowl Museum & Heritage Center	August 2024
North Carolina Coastal Resources Commission, Sea Level Rise Update	April 2024
City of New Bern - Planning Meetings, New Bern, NC.	May 2023
North Carolina Beach, Inlet & Waterway Associations 2022 Spring Meeting	May 2022

## **OUTREACH**

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Tide Talk: East Carteret High School, NC	2024, 2025
NC Future Cities Competition, Raleigh, NC	2024
Society of Women Engineers, UNCW Chapter	March 2024
Sensor Development Day, Tesla STEM High School, Redmond, Washington	2022
Rice Earth Day, Girl Scouts of San Jacinto Texas	2019
Young Owls Leadership Program, Rice University	2014-2018
Girls STEM Initiative, Rice University	2016-2018
Grad STEM Share, Rice University and Lanier Middle School	2016

## **SELECTED RECENT MEDIA**

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2022: PBS North Carolina, Why “sunny day” flooding is becoming a problem
2023: Coastal Review, Flooding study reveals factors NOAA forecasts don’t include
2023: White House Fact Sheet, Biden-Harris National Climate Resilience Framework
2024: NC Sea Grant, Sunny with a chance of floods
2024: Eos, Barrier Islands Are at the Forefront of Climate Change Adaptation
2024: Fox Weather Live, Homes falling into the ocean in Rodanthe
2024: Washington Post, Anatomy of a flood
2024: Earth’s Future, Transdisciplinary Research Supports the Sustainability of Barrier Island Systems Threatened by Climate Change