Curriculum Vitae
Dylan Erin McNamara

Professor, Department of Physics and Physical Oceanography, University of North Carolina Wilmington

601 S College Rd, Wilmington, NC 28403 | mcnamarad@uncw.edu

Education

2006	**Ph.D. Oceanography**, Scripps Institution of Oceanography, UCSD
1999	**M.S. Physics**, San Diego State University
1996	**B.S. Physics**, Salisbury University (Phi Beta Kappa, Summa Cum Laude)

Professional Experience

2017–Present	**Professor**, Department of Physics and Physical Oceanography, UNCW
2016–2022	**Chair**, Department of Physics and Physical Oceanography, UNCW
2013–2016	**Assistant Chair**, Department of Physics and Physical Oceanography, UNCW
2013–2017	**Associate Professor**, Department of Physics and Physical Oceanography, UNCW
2008–2013	**Assistant Professor**, Department of Physics and Physical Oceanography, UNCW
2007–2008	**Postdoctoral Scholar**, Nicholas School of the Environment, Duke University
2006–2007	**Research Scientist**, Rohwer Laboratory, San Diego State University
1999–2006	**Graduate Research Assistant**, Complex Systems Lab, Institute of Geophysics and Planetary Physics, SIO/UCSD
2001–2002	**Adjunct Instructor**, Oceanography, Palomar College
1996–1999	**Teaching Assistant**, Dept. of Physics, San Diego State University Outstanding Teaching Asst. Award (1998)

Publications

1. McNamara, D. E., Lester, C. W., Edwards, C. B., Smith, J. E., Sandin, S. A. (In review). Self-organized pattern formation of a common tropical alga. *The American Naturalist* (available

at bioRxiv).

2. Akiona, A. K., McNamara, D. E., Williams, Z. C., Vardi, T., Lubarsky, K. A., Zgliczynski, B. J., Sandin, S. A. (In review). Using a decision-support model to map the efficacy of coral interventions in the Maldives. *Oecologia*.

3. Singh, S., Werner, B. T., McNamara, D. E. (In review). Quantifying the relationship between inequality and stability of the coupled societal-environmental system in New Orleans. *Communications Sustainability*.

4. Lester, C. W., Wagner, T. J. W., & McNamara, D. E. (2025). A model of near-sea ice phytoplankton blooms. *Limnology and Oceanography Letters*, 10(2), 245–253.

5. Zimmerman, C., Wagner, T., Maroon, E., & McNamara, D. E. (2025). Slowed response of Atlantic meridional overturning circulation not a robust signal of collapse. *Geophysical Research Letters*, 52(2), e2024GL112415.

6. McNamara, D. E., Smith, M. D., Williams, Z., Gopalakrishnan, S., & Landry, C. E. (2024). Policy and market forces delay real estate price declines on the US coast. *Nature Communications*, 15(1), 2209.

7. McNamara, D. E., Lazarus, E. D., Goldstein, E. B. (2023). Human-coastal coupled systems: Ten Questions. *Cambridge Prisms: Coastal Futures*, 1(e20).

8. Sandin, S. A., Edwards, C. B., Zgliczynski, B. J., Pedersen, N. E., Smith, J. E., & McNamara, D. E. (2022). Evidence of biological self-organization in spatial patterns of a common tropical alga. *The American Naturalist*, 200(5).

9. Keeler, A. G., Mullin, M., McNamara, D. E., & Smith, M. D. (2022). Buyouts with rentbacks: a policy proposal for managing coastal retreat. *Journal of Environmental Studies and Sciences*, 12(3).

10. Williams, Z. W. & McNamara, D. E. (2021). Variations in stability revealed by temporal asymmetries in contraction of phase space flow. *Scientific Reports*, 11(1).

11. Lester, C. W., Wagner, T. J. W., McNamara, D. E., & Cape, M. R. (2021). The influence of meltwater on phytoplankton blooms near the sea-ice edge. *Geophysical Research Letters*, 48(2).

12. Sandin, S., Eynaud, Y., Williams, G. J., Edwards, C., & McNamara, D. E. (2020). Modeling the linkage between coral assemblage structure and pattern of environmental forcing. *Royal Society Open Science*, 7(10).

13. Brito-Millan, M., Werner, B. T., Sandin, S., & McNamara, D. E. (2019). Influence of aggregation on benthic coral reef spatio-temporal dynamics. *Royal Society Open Science*, 6(2).

14. McNamara, D. E., Cortale, N., Edwards, C., Eynaud, Y., & Sandin, S. (2019). Insights into coral reef benthic dynamics from nonlinear spatial forecasting. *Journal of the Royal Society: Interface*, 16(153).

15. Mullin, M., Smith, M. D., & McNamara, D. E. (2019). Paying to save the beach: effects of local finance decisions on coastal management. *Climatic Change*, 1–15.

16. Alexanian, M. A. & McNamara, D. E. (2018). Anti-diffusion in continuous opinion dynamics. *Physica A: Statistical Mechanics and its Applications*, 503, 1256–1262.

17. Keeler, A. G., McNamara, D. E., & Irish, J. L. (2018). Responding to sea level rise: Does short-term risk reduction inhibit successful long-term adaptation? *Earth's Future*, 6(4), 618–621.

18. McNamara, D. E., & Lazarus, E. D. (2018). Barrier islands as coupled human–landscape systems. In *Barrier Dynamics and Response to Changing Climate* (pp. 363–383). Springer, Cham.

19. Gopalakrishnan, S., McNamara, D., Smith, M. D., & Murray, A. B. (2017). Decentralized management hinders coastal climate adaptation: the spatial-dynamics of beach nourishment. *Environmental and Resource Economics*, 67(4), 761–787.

20. Cortale, N., & McNamara, D. (2017). skedm: Empirical Dynamic Modeling. *Journal of Open Source Software*, 2.

21. Eynaud, Y., McNamara, D. E., & Sandin, S. A. (2016). Herbivore space use influences coral reef recovery. *Royal Society Open Science*, 3(6), 160262.

22. Grimes, D. J., Cortale, N., Baker, K., & McNamara, D. E. (2015). Nonlinear forecasting of intertidal shoreface evolution. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 25(10), 103116.

23. Smith, M. D., Murray, A. B., Gopalakrishnan, S., Keeler, A. G., Landry, C. E., McNamara, D., & Moore, L. (2015). Geoengineering coastlines? From accidental to intentional. *Coastal Zones: Solutions for the 21st Century*, 99–122.

24. McNamara, D. E., Gopalakrishnan, S., Smith, M. D., & Murray, A. B. (2015). Climate adaptation and policy-induced inflation of coastal property value. *PLOS One*, 10(3), e0121278.

25. Harden, C. P., Chin, A., English, M. R., Fu, R., Galvin, K. A., Gerlak, A. K., McDowell, P. F., McNamara, D. E., Peterson, J. M., Poff, N. L., & Rosa, E. A. (2014). Understanding human–landscape interactions in the "Anthropocene". *Environmental Management*, 53(1), 4–13.

26. Moore, L. J., McNamara, D. E., Murray, A. B., & Brenner, O. (2013). Observed changes in hurricane-driven waves explain the dynamics of modern cuspate shorelines. *Geophysical Research Letters*, 40(22), 5867–5871.

27. McNamara, D. E., & Keeler, A. (2013). A coupled physical and economic model of the response of coastal real estate to climate risk. *Nature Climate Change*, 3(6), 559–562.

28. Williams, Z. C., McNamara, D. E., Smith, M. D., Murray, A. B., & Gopalakrishnan, S. (2013). Coupled economic–coastline modeling with suckers and free riders. *Journal of Geophysical Research: Earth Surface*, 118(2), 887–899.

29. Sandin, S. A., & McNamara, D. E. (2012). Spatial dynamics of benthic competition on coral reefs. *Oecologia*, 168(4), 1079–1090.

30. Lazarus, E. D., McNamara, D. E., Smith, M. D., Gopalakrishnan, S., & Murray, A. B. (2011). Emergent behavior in a coupled economic and coastline model for beach nourishment. *Nonlinear Processes in Geophysics*, 18(6), 989–999.

31. Murray, A. B., Gopalakrishnan, S., McNamara, D. E., & Smith, M. D. (2013). Progress in coupling models of human and coastal landscape change. *Computers & Geosciences*, 53, 30–38.

32. McNamara, D. E., Murray, A. B., & Smith, M. D. (2011). Coastal sustainability depends on how economic and coastline responses to climate change affect each other. *Geophysical Research Letters*, 38(7).

33. Magliocca, N. R., McNamara, D. E., & Murray, A. B. (2011). Long-term, large-scale morphodynamic effects of artificial dune construction along a barrier island coastline. *Journal of Coastal Research*, 27(5), 918–930.

34. Smith, M. D., Slott, J. M., McNamara, D. E., & Murray, A. B. (2009). Beach nourishment as a dynamic capital accumulation problem. *Journal of Environmental Economics and Management*, 58(1), 58–71.

35. Murray, A. B., Lazarus, E., Ashton, A., Baas, A., Coco, G., Coulthard, T., Fonstad, M., Haff, P., McNamara, D. E., Paola, C., & Pelletier, J. (2009). Geomorphology, complexity, and the emerging science of the Earth's surface. *Geomorphology*, 103(3), 496–505.

36. McNamara, D. E., & Werner, B. T. (2008). Coupled barrier island–resort model: 2. Tests and predictions along Ocean City and Assateague Island National Seashore, Maryland. *Journal of Geophysical Research: Earth Surface*, 113(F1).

37. McNamara, D. E., & Werner, B. T. (2008). Coupled barrier island–resort model: 1. Emergent instabilities induced by strong human-landscape interactions. *Journal of Geophysical Research: Earth Surface*, 113(F1).

38. Werner, B. T., & McNamara, D. E. (2007). Dynamics of coupled human-landscape systems. *Geomorphology*, 91(3–4), 393–407.

39. Davis, J. A., Smith, D. A., McNamara, D. E., Cottrell, D. M., & Campos, J. (2001). Fractional derivatives—analysis and experimental implementation. *Applied Optics*, 40(32), 5943–5948.

40. Davis, J. A., McNamara, D. E., Cottrell, D. M., Campos, J., Yzuel, M. J., & Moreno, I. (2001). Encoding complex diffractive optical elements onto a phase-only liquid-crystal spatial light modulator. *Optical Engineering*, 40(2), 327–329.

41. Davis, J. A., McNamara, D. E., Cottrell, D. M., & Sonehara, T. (2000). Two-dimensional polarization encoding with a phase-only liquid-crystal spatial light modulator. *Applied Optics*, 39(10), 1549–1554.

42. Davis, J. A., McNamara, D. E., Cottrell, D. M., & Campos, J. (2000). Image processing with the radial Hilbert transform: theory and experiments. *Optics Letters*, 25(2), 99–101.

43. Davis, J. A., McNamara, D. E., & Cottrell, D. M. (1998). Analysis of the fractional Hilbert transform. *Applied Optics*, 37(29), 6911–6913.

Research Grants

All Co-PI awards list UNCW $ portion only; Member UNCW Million Dollar Club.

- Co-PI: Collaborations in Ecology and Evolution: Letter of Intent Vision Statement, Simons Foundation, Pending (full proposal invitations announced 3/2/26).
- Co-PI: NSF Collaborative Proposal: Prospects and limitations of predicting a potential collapse of the AMOC, National Science Foundation. Award: $284,446. Dates: 2024–2027.
- Co-PI: CoPe RCN – Collaboratory for Coastal Adaptation over Space and Time (C-Coast), National Science Foundation. Award: $15,000. Dates: 2018–2022.
- Lead PI: Cooperative Agreement – The Dynamics of Coastal Community Stability, U.S. Geological Survey. Award: $24,000. Dates: 2020–2021.

- Lead PI: Climate Change Adaptation in a Coupled Geomorphic-Economic Coastal System, National Science Foundation. Award: $1,490,000. Dates: 2017–2022.
- Lead PI: Reefs in Space and Time (RIST): A Cross-Cutting Program to Document and Predict Trajectories of Coral Reefs Using New Spatial Data Technologies, NOAA–CIOERT. Award: $213,196. Dates: 2016–2019.
- Lead PI: Machine Learning and Forecasting of Coral Reef Images, University of California San Diego. Award: $14,750. Dates: 2015–2016.
- Lead PI: Wave and Rip Current Model Validation in North Carolina, North Carolina Sea Grant. Award: $20,000. Dates: 2015–2016.
- Co-PI: Building a Coastal Resilience Network on the Eastern Shore of Virginia to Catalyze Integrated, Science-Based Hazard Mitigation Actions, National Fish and Wildlife Foundation (via subcontract from The Nature Conservancy). Award: $44,000. Dates: 2014–2015.
- Senior Personnel: The Reefs Tomorrow Initiative, Gordon and Betty Moore Foundation. Award: $180,000. Dates: 2013–2016.
- Co-PI: Collaborative Research: Coastal Geomorphic Consequences of Wave Climate Change, National Science Foundation. Award: $90,191. Dates: 2011–2014.
- Co-PI: Collaborative Research: Environment, Society, and Economy: Modeling New Behaviors Emerging from Coupling Physical Coastal Processes and Coastal Economies, National Science Foundation. Award: $107,035. Dates: 2010–2013.

Administrative Accomplishments

Department Chair, Physics and Physical Oceanography, UNCW (2016–2022)

- Designed new curriculum for B.S. Degree in Coastal Engineering.
- Led successful approval process within UNCW for B.S. Degree in Coastal Engineering.
- Led successful approval process at UNC System for B.S. Degree in Coastal Engineering.
- Hired 3 professors (2 Assistant, 1 Associate/Director) for Coastal Engineering program.
- First graduating class B.S. Degree Coastal Engineering (2023), 20 students.
- Current size of Coastal Engineering B.S. degree approx. 110 students.
- Secured internal funding for $600,000 wave flume.
- Led a newly formed advisory board for Coastal Engineering which now contributes approx. $15,000 per year in scholarships.
- Started the internship program in Coastal Engineering.
- Argued successfully for and helped design new Coastal Engineering building.
- Hired 5 professors (2 replacement, 3 new) in Physics and Physical Oceanography.
- Led complete redesign of B.A. Physics curriculum.
- Led complete redesign of B.S. Physics curriculum.
- During tenure as Chair, department research grants increased ~500% on a per-year basis.

- Revamped entire department Policies and Procedures manual.
- Oversaw and led the transition from 0% to 100% online learning during the COVID pandemic.
- Established relationship with G.E. Nuclear for curriculum input, student mentoring, and future internships.

Selected Invited Talks

- 2023 – Texas A&M University: A Nonlinear Dynamics Approach to Understanding and Measuring Sustainability.
- 2022 – University of Wisconsin: A Nonlinear Dynamics Approach to Understanding and Measuring Sustainability.
- 2019 – Old Dominion University: The Dynamics of Abandonment along Human-Occupied Coastlines.
- 2016 – Duke University: Dynamical Insight in Coral Reef and Coastal Systems from Attractor Reconstruction.
- 2016 – Virginia Tech University: The Dynamics of Coastal Adaptation to Sea Level Rise.
- 2014 – UCLA: Emergence, Tipping Points, and Bubbles in the Coupled Human-Coastal Landscape.
- 2013 – Old Dominion University: Flood, Fortify, or Flee: Modeling Coupled Physical and Economic Coastline Dynamics.
- 2013 – UNCW Planet Oceans Seminar: Flood, Fortify, or Flee: Linking Economics and Natural Coastline Dynamics.
- 2012 – UNC Chapel Hill: Flood, Fortify, or Flee: Coupled Physical and Economic Modeling of Coastal Real Estate.
- 2012 – UNC IMS: A Coupled Economic and Physical Model of Coastal Adaptation and Abandonment: When to Flood, Fortify, or Flee?
- 2010 – East Carolina University: Coupled Morpho-economic Dynamics at the Coastline.
- 2009 – Woods Hole Oceanographic Institution: Coupled Morpho-economic Dynamics at the Coastline.
- 2009 – UNCW: What will the North Carolina Coastline (sorta) Look like in 50 (ish) Years?
- 2008 – National Center for Earth Surface Dynamics: Emergence in Coupled Human Landscape Systems.
- 2007 – Binghamton Geomorphology Symposium, Duke University: Dynamics of Coupled Human Landscape Systems.
- 2007 – Duke University: Emergence in Coupled Human Landscape Systems.

Selected Conference Presentations

Only those as presenting author or student/postdoc presenting.

- McNamara, D. E., Maroon, E., Wagner, T., Zimmerman, C. Attractor Reconstruction and Stability Signatures of the Atlantic Meridional Overturning Circulation, presented at 2023 Fall Meeting, AGU, Washington, D.C.

- McNamara, D. E., Williams, Z. Y., Li, X., Gopalakrishnan, S. Variations in Stability of Socio-Economic Systems Subject to Natural Disasters, presented at 2021 Fall Meeting, AGU, New Orleans, LA.
- McNamara, D. E., Fair, M., Eynaud, Y., Edwards, C., Sandin, S. Self-organization of newly observed patterns in coral reef systems, presented at 2018 Ocean Sciences Meeting, AGU, Portland, OR.
- Ells, K. D., Eynaud, Y., Edwards, C., Sandin, S., Lammers, M., McNamara, D. E. Machine Learning Classification of Coral Reef Benthic Species in Large-scale Image Mosaics, presented at 2018 Ocean Sciences Meeting, AGU, Portland, OR.
- Ells, K. D., McNamara, D. E., Cortale, N., Grimes, D. J. Distinguishing one-way from coupled dynamical interactions in nearshore morphodynamics, presented at 2016 Ocean Sciences Meeting, AGU, New Orleans, LA.
- McNamara, D. E., Cortale, N., Armstrong, S., Lazarus, E., Ells, K. Attractor reconstruction of interspike intervals with application to a coupled human-natural system, presented at 2016 Conference on Mathematical Geophysics, Paris, France.
- McNamara, D. E., Keeler, A. Modeling the human occupied coastline as a complex adaptive system: Is the coastline future primitive?, presented at 2014 Ocean Sciences Meeting, AGU, Honolulu, HI.
- Grimes, D., McNamara, D. E. The Anthromorphodynamicam: Predicting coastline morphodynamics and the human response with a monitoring camera, presented at 2014 Ocean Sciences Meeting, AGU, Honolulu, HI.
- Ells, K. D., McNamara, D. E., Murray, A. B. Potential cascading failures of long-term shoreline stabilization in a coupled morphoeconomic coastline evolution model, presented at 2013 Fall Meeting, AGU, San Francisco, CA.
- Whitley, A. E., McNamara, D. E. Improved wave transformation in a large-scale coastline model to explore the role of wave climate change in driving coastal erosion, presented at 2013 Fall Meeting, AGU, San Francisco, CA.
- Whitley, J. W., McNamara, D. E. Modeling catastrophic barrier island dynamics, presented at 2012 Fall Meeting, AGU, San Francisco, CA.
- McNamara, D. E., Keeler, A., Smith, M., Gopalakrishnan, S., Murray, A. How sea level rise and storm climate impact the looming morpho-economic bubble in coastal property value, presented at 2012 Fall Meeting, AGU, San Francisco, CA.
- Williams, Z. C., McNamara, D. E., Murray, A. B., Smith, M. The race to nourish: Exploring resource equity in a coupled human coastline model, presented at 2011 Fall Meeting, AGU, San Francisco, CA.
- McNamara, D. E., Keeler, A. A Coupled Economic and Physical Model of Coastal Adaptation and Abandonment: Are human occupied coastlines a bubble waiting to burst?, presented at 2011 Fall Meeting, AGU, San Francisco, CA.
- McNamara, D. E., Lazarus, E. D., Murray, A. B., Smith, M., Gopalakrishnan, S. Emergent Dynamics of Sustainability and Resource Equity in Coupled Human Coastline Systems, presented at 2010 Fall Meeting, AGU, San Francisco, CA.

- McNamara, D. E., Murray, A. B., Smith, M., Gopalakrishnan, S., Slott, J., Crowley, T., Orbach, M., Ramus, J. Coastline change and coastal economies coupled through beach nourishment, presented at 2010 Spring Meeting, AAG, Washington, D.C.
- Hopkins, C., McNamara, D. E., Coco, G. Forecasting large-scale coastline change using a genetic algorithm, presented at 2010 Ocean Sciences Meeting, AGU, Portland, OR.
- Carroll, A., McNamara, D. E., Schupp, C. Modeling the Response of Human Altered Natural Barrier Island Dynamics Along Assateague Island National Seashore to Climate Change, presented at 2009 Fall Meeting, AGU, San Francisco, CA.
- Lazarus, E. D., McNamara, D. E., Murray, A. B. Unexpected emergent behavior in a coupled economic and coastline model for stabilized shorelines, presented at 2009 Fall Meeting, AGU, San Francisco, CA.
- McNamara, D. E., Murray, A. B., Moore, L. J., Brenner, O. Modeling Coastline Response to Changing Storm Climate, presented at 2009 Fall Meeting, AGU, San Francisco, CA.
- McNamara, D. E., Murray, A. B., Smith, M. Beach Nourishment Dynamics in a Coupled Large-Scale Coastal Change and Economic Optimization Model, presented at 2008 Fall Meeting, AGU, San Francisco, CA.
- McNamara, D. E., Werner, B. T. New Orleans after Hurricane Katrina: An Unnatural Disaster?, presented at 2005 Fall Meeting, AGU, San Francisco, CA.
- McNamara, D. E., Werner, B. T. Emergent Behavior of Coupled Barrier Island – Resort Systems, presented at 2004 Fall Meeting, AGU, San Francisco, CA.

Teaching Experience

- Introduction to Oceanography
- The Physics of Surfing
- Algebra Based Introductory Physics I – Mechanics
- Calculus Based General Physics I – Mechanics
- Calculus Based General Physics II – Electricity and Magnetism
- Classical Dynamics
- Computational Physics and Complexity (Graduate and Undergraduate)
- Fluid Mechanics (Graduate and Undergraduate)
- Coastal and Estuarine Processes (Graduate and Undergraduate)

Mentoring

Postdoctoral

- Conner Lester – UNCW (in progress)
- Zachary Williams – UNCW (completed 2021)
- Yoan Eynaud – Scripps Institution of Oceanography, Co-Supervisor (completed 2018)
- Kenneth Ells – UNCW (completed 2015)
- Eli Lazarus – Duke University, Co-Supervisor (completed 2010)

Masters

- John Holloway – UNCW, Center for Marine Science (completed 2018)
- Jon Whitley – UNCW, Earth and Ocean Sciences (completed 2016)
- Nick Cortale – UNCW, Center for Marine Science (completed 2016)
- Andrew Whitley – UNCW, Center for Marine Science (completed 2014)
- Zachary Williams – UNCW, Center for Marine Science (completed 2012)

Undergraduate Honors Thesis

- Mia Biondi – UNCW, Dept. of Physics and Physical Oceanography (ongoing)
- Matt Fair – UNCW, Dept. of Physics and Physical Oceanography (completed 2018)
- John Holloway – UNCW, Dept. of Physics and Physical Oceanography (completed 2015)
- Derek Grimes – UNCW, Dept. of Physics and Physical Oceanography (completed 2014)
- Kurt Baker – UNCW, Dept. of Physics and Physical Oceanography (completed 2013)
- Iain Joseph – UNCW, Dept. of Physics and Physical Oceanography (completed 2011)
- Zachary Williams – UNCW, Dept. of Physics and Physical Oceanography (completed 2010)
- Chelsea Hopkins – UNCW, Dept. of Physics and Physical Oceanography (completed 2010)

Professional Service

- Member of the American Geophysical Union.
- Journal reviewing: Science Advances; Journal of Geophysical Research; Climatic Change; Environmental Management; Journal of Coastal Research; Earth's Future; Oecologia.
- Session Chair, 2023 AGU Fall Meeting – "Science off the Beaten Path: From Desert Pavement to the Technosphere".
- Session Chair, 2012 AGU Fall Meeting – "The Future of Human Landscapes".
- Session Chair, 2009 AGU Fall Meeting – "Coastal Geomorphology and Morphodynamics".
- Moderator, Community Surface Dynamics Modeling System All Hands Meeting (2010) – "Coupling Human, Biological and Physical Models".
- Board of Directors, Bald Head Island Conservancy.
- Scientific Advisor on the Environmental Issues Team for the Surfrider Foundation.
- Coach of the UNCW Surf Team (Rated 1st East Coast 2009–2014; 2nd Nationally 2009; 4th Nationally 2010; 3rd Nationally 2011; 3rd Nationally 2012).
- Organizing committee for Complex Systems Group at Scripps.
- Frequent appearances on community radio station radioActive San Diego to explain the science of complexity.
- Cape Fear Museum speaker and consultant for Physics of Surfing exhibit.
- Media coverage: NY Times; Discover online; National Geographic online; phys.org.