

John M. Bane

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I. EDUCATION

| | | | |
|-------|------|-------------------------|-----------------------------|
| Ph.D. | 1975 | Physical Oceanography | Florida State University |
| M.E. | 1971 | Ocean Engineering | Florida Atlantic University |
| B.S. | 1970 | Physics and Mathematics | Western Michigan University |

II. PROFESSIONAL EXPERIENCE

2021-present: Professor

Department of Earth, Marine and Environmental Sciences
University of North Carolina, Chapel Hill

1987-2021: Professor (Dept. Chair, 1995-2000; Dir. of Graduate Studies, 2004-15, 2018-19)

1982-1986: Associate Professor

1976-1981: Assistant Professor

Department of Marine Sciences
University of North Carolina, Chapel Hill

1986, 1991 and 1997: Visiting Scholar

Scripps Institution of Oceanography
University of California at San Diego

1973-1974: Research Associate

Coastal Studies Institute
Louisiana State University, Baton Rouge

1971-1975: Ph.D. Candidate and Research Assistant

Department of Oceanography
Florida State University, Tallahassee

III. CURRENT/RECENT RESEARCH SUPPORT

North Atlantic Dynamics: Developing and Exploiting a Long-Term Cape Hatteras Gulf Stream Time Series (CHATS). National Science Foundation. 2021-2024 (Co-PI: H. Seim, UNC) \$644,000. Three-institution total budget \$1,500,000.

Processes Driving Exchange At Cape Hatteras (PEACH). National Science Foundation. 2016-2023 (Co-PI: H. Seim, UNC) \$1,211,689. Four-institution total budget \$4,979,871.

IV. BIBLIOGRAPHY AND PRODUCTS OF SCHOLARSHIP

A. Refereed Articles

- Bane, J., S. Haines, H. Seim, R. He, J. Zambon (2023) Atmospheric Forcing of the Hatteras Coastal Ocean during PEACH (2017-2018). *Dynamics of Atmospheres and Oceans*. doi.org/10.1016/j.dynatmoce.2023.101364.
- Andres, M., M. Muglia, H. Seim, J. Bane, and D. Savidge (2023) Processes on the Continental Shelf and Slope East of Cape Hatteras, *J. Geophys. Research: Oceans*. 10.1029/2022JC019504
- Mao, S, R. He, J. Bane, G. Gawarkiewicz, R. Todd (2023) A data-assimilative modeling investigation of Gulf Stream variability, *Deep-Sea Res.* doi.org/10.1016/j.dsr2.2023.105319.
- Han, L., Seim, H., Bane, J., Savidge, D., Andres, M., Gawarkiewicz, G., & Muglia, M. (2022). Ocean circulation near Cape Hatteras: Observations of mean and variability. *J. Geophysical Research: Oceans*, 127, e2022JC019274.
- Seim, H., D. Savidge, M. Andres, J. Bane, C. Edwards, G. Gawarkiewicz, R. He, R. Todd, M. Muglia, J. Zambon, L. Han, S. Mao (2022) An Overview of the Processes driving Exchange At Cape Hatteras (PEACH) Program, *Oceanography*.
- Muglia M., Seim H, J. Bane, P. Taylor, (2022) An Observation-Based Study of Gulf Stream Meander Kinematics Offshore of Cape Hatteras. *Front. Mar. Sci.* 9:867439. doi: 10.3389/fmars.2022.867439
- Perez, E., S. Ryan, M. Andres, G. Gawarkiewicz, C. C. Ummenhofer, J. Bane, S. Haines (2021) Understanding physical drivers of the 2015/16 marine heatwaves in the Northwest Atlantic, *Nature Scientific Reports*. doi.org/10.1038/s41598-021-97012-0.
- Han, Lu, H. Seim, J. Bane, R. E. Todd, M. Muglia (2021) A Shelf Water Cascading Event near Cape Hatteras, *J. Phys. Oceanogr.* doi: 10.1175/JPO-D-20-0156.1
- Todd, R. E., and multiple co-authors (2019) Global Perspectives on Observing Ocean Boundary Current Systems, *Front. Mar. Sci.* Vol. 6, Article 423, 1-38, doi: 10.3389/fmars.2019.00423.
- Hoarfrost A., J. P. Balmonte, S. Ghobrial, K. Ziervogel, J. Bane, G. Gawarkiewicz, C. Arnosti (2019) Gulf Stream Ring Water Intrusion on the Mid-Atlantic Bight Continental Shelf Break Affects Microbially Driven Carbon Cycling. *Front. Mar. Sci.* 6:394. doi:10.3389/fmars.2019.00394.
- Andres, M., M. Muglia, F. Bahr, J. Bane (2018), On the Upper Labrador Sea Water at Cape Hatteras, *Scientific Reports*, 8, 4494, doi:10.1038/s41598-018-22758-z.
- Todd R. E., T. G. Asher, J. Heiderich, J. M. Bane, R. A. Luettich (2018) Transient Response of the Gulf Stream to Multiple Hurricanes in 2017. *Geophys. Res. Lettr.*, 10,509-10,519, <https://doi.org/10.1029/2018GL079180>.
- Bane, J. M., R. He, M. Muglia, C. F. Lowcher, Y. Gong, S. M. Haines (2017) Marine Hydrokinetic Energy from Western Boundary Currents. *Annual Review of Marine Science*, doi:10.1146/annurev-marine-010816-060423. Invited Submission. pp 105-123.
- Lowcher, C., J. Bane, Y. Gong, S. Haines, R. He, M. Muglia (2017) Marine Hydrokinetic Power in the Gulf Stream off North Carolina: An Assessment using Observations and Circulation Models. Invited chapter in: *Marine Renewable Energy: Resource Characterization and Physical Effects*, Z. Yang and Andrea Copping, eds. Springer-Nature, pp 237-258. doi: 10.1007/978-3-319-53536-4.
- Li, B., A. R. de Queiroz, J. F. DeCarolis, J. Bane, R. He, A. G. Keeler, V. Neary (2017) The Economics of Electricity Generation from Gulf Stream Currents. *Energy*, pp 649-658.

- Muglia, M., C. Lowcher, P. Taylor, R. He, H. Seim, J. Bane, B. Edge (2015) Observation and regional model based Gulf Stream marine hydrokinetic energy resource estimates for North Carolina, *Marine Tech. Society*, 978-0-933957-43-5.
- Nelson, J., R. He, J. C. Warner, J. Bane (2014) Air-sea interaction during strong winter extratropical storm, *Ocean Dynamics*, doi:10.1007/s10236-014-0745-2.
- Mienis, F., G. Duineveld, A. J. Davies, M. Lavaleye, S. W. Ross, H. Seim, J. Bane, H. van Haren, M. Bergman, H. de Haas, S. Brooke, T. van Weering (2014) Cold-water coral growth under extreme environmental conditions, the Cape Lookout area, NW Atlantic. *Biogeosciences*, 11, 2543-2560. doi:10.5194/bg-11-2543-2014.
- Chen, K., G. G. Gawarkiewicz, S. J. Lentz and J. M. Bane (2014) Diagnosing the Warming of the Northeastern U.S. Coastal Ocean in 2012: A linkage between the atmospheric jet stream variability and ocean response. *J. Geophys. Res.*, 119, 1–10, doi:10.1002/2013JC009393.
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- Mienis, F., G. C. A. Duineveld, A. J. Davies, S. W. Ross, H. Seim, J. Bane and T. C. E. van Weering (2012) The influence of near-bed hydrodynamic conditions on cold-water corals in the Viosca Knoll area, Gulf of Mexico. *Deep-Sea Res. I*, 57, 32-45.
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- Savidge, D. K., and J. M. Bane (1999b): Cyclogenesis in the Deep Ocean Beneath the Gulf Stream: 2. Dynamics. *J. Geophys. Res.*, 104(C8), pp. 18,127-18,140.
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- Xue, H. J., J. M. Bane and L. M. Goodman, 1995: Modification of the Gulf Stream through Strong Air-Sea Interactions in Winter: Observations and Numerical Simulations. *J. Phys. Oceanogr.*, 25(4), pp. 533-557.
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- Bane, J. M., 1988: The Gulf Stream off the East Coast of the United States. *Chinese J. Oceanol. Limnol.*, 6(4), pp. 334-342.
- Bane, J. M., O. B. Brown, R. H. Evans, and P. Hamilton, 1988: Remote Forcing of Shelfbreak Currents by the Gulf Stream in the Mid-Atlantic Bight. *Geophys. Res. Letters*, 15(5), pp. 405-407.
- Bane, J. M., and W. K. Dewar, 1988: Gulf Stream Bimodality and Variability downstream of the Charleston Bump. *J. Geophys. Res.*, 93(C6), pp. 6695-6710.
- Osgood, K. E., J. M. Bane and W. K. Dewar, 1987: Vertical Velocities and Dynamical Balances in Gulf Stream Meanders. *J. Geophys. Res.*, 92(C12), pp. 13,029-13,040.
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- Bane, J. M., and M. H. Sessions, 1984: A Field Performance Test of the Sippican Deep Aircraft-Deployed Expendable Bathythermograph. *J. Geophys. Res.*, 89(C3), pp. 3615-3621.
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Heistand, E. N., J. M. Bane, and E. P. Strzelinski, 1975: An Impact Test for the Hardness of Compressed Powder Compacts. *J. Pharm. Sci.*, 60, pp. 758-763.

B. Notes, Published Abstracts and Presentations

Bane J., H. Seim, S. Haines, R. He, J. Zambon and G. Gawarkiewicz (2020). Atmospheric Forcing of the Hatteras Coastal Ocean during PEACH.

Gawarkiewicz, G., F. Bahr, B. Hogue, M. Andres, R. Todd, H. Seim, S. Haines, J. Bane, M. Muglia, C. Edwards, and D. Savidge (2020). Variability of Shelfbreak Currents North of Cape Hatteras.

Han, L., H. Seim, J. Bane and R. Todd (2020). A subsurface shelf water export event at Cape Hatteras in January 2018.

Mao, S., R. He, J. Bane, G. Gawarkiewicz, R. Todd (2020). Data Assimilative Modeling Investigation of Gulf Stream Dynamics Along the U.S. East Coast Seaboard.

Seim, H., C. Edwards, D. Savidge, S. Haines, L. Han, J. Bane, Glen Gawarkiewicz (2020). Variations in the Mass Field Over 1.5 Years at a Persistent Convergent Shelf Front.

Bane, J., R. He, M. Muglia, C. Lowcher, Y. Gong, S. Haines, J. VanZwieten (2016) Marine Hydrokinetic Energy from Western Boundary Currents. Presentation at Amer. Geophys. Un. Meeting in San Francisco, December 2016.

Muglia, M., Taylor, P., Bane, J., Haines, S., Seim, H., Lowcher, C., Gong, Y. (2016). Gulf Stream Hydrokinetic Energy Resource Characterization off Cape Hatteras, N.C., Marine Energy Technology Symposium, Washington, D.C. April 2016.

Bane J. and R. He, Gulf Stream Power Assessment, 5th Annual North Carolina Renewable Ocean Energy Symposium, Coastal Studies Institute, March 16, 2016.

He, R. Bane, J., Muglia M., Lowcher, C., Taylor P., Gong, Y., Gulf Stream marine hydrokinetic energy resource characterization off Cape Hatteras, North Carolina, invited talk presented at MTS/Oceans 2016, Shanghai, China, April 10-13, 2016.

Chen, K., G. Gawarkiewicz, S. Lentz, Y. Kwon, G. Zhang, J. Bane, Heat Balance in the Northwest Atlantic Coastal Ocean: the Role of Atmospheric Forcing versus Ocean Advection during an Extreme Warming, Presentation at Ocean Sciences Meeting, New Orleans, February 2016.

Fewings, M., L. Washburn, C. Dorman, C. Gotschalk, K. Brown, K. Chen, and J. Bane, The Effect of Jet Stream Position on Wind Relaxations off Central and Southern California, U.S.A. Presentation at Ocean Sciences Meeting, New Orleans, February 2016.

Muglia M., He R., Lowcher, C., Bane J., Taylor P., Gong, Y., Gulf Stream marine hydrokinetic energy resource characterization off Cape Hatteras, North Carolina, Poster presented at American Geophysical Union meeting: December 14-18, 2015. San Francisco.

Muglia M., He R., Lowcher C., Bane J., Taylor P., Edge B. Observation and regional model based Gulf Stream marine hydrokinetic energy resource estimates for North Carolina, Paper presented at MTS/IEEE Oceans 2015: May 18-21, 2015. Genova, Italy. doi: 10.1109/OCEANSGenova.2015.7271441

- Fewings, M., L. Washburn, C. Dorman, C. Gotschalk, K. Brown, K. Chen, J. Bane, D. Oldenburg, and K. Flynn, Wind relaxations off California and the ocean response, Presentation at the Gordon Research Conference, July 2015.
- Muglia M., He R., Lowcher C., Bane J., Taylor P., Edge B. Observation and regional model based Gulf Stream marine hydrokinetic energy resource estimates for North Carolina, Paper presented at MTS/IEEE Oceans 2015: May 18-21, 2015. Genova, Italy. doi: 10.1109/OCEANSGenova.2015.7271441
- Lowcher, C. F., Bane, J. M., He, R., Muglia, M., Gong, Y.: Gulf Stream MHK Power Characteristics off Cape Hatteras, North Carolina, Ocean Sciences Meeting, Honolulu, 2014.
- Lowcher, C. F., Bane, J. M., Muglia, M., He, R., Gong, Y., Gulf Stream Power Characteristics Near Cape Hatteras, Regional Model vs. Direct Current Observation, AGU Fall Meeting, 2014, San Francisco.
- Fewings, M., M Aristizábal, K. Brown, L. Washburn, C. Gotschalk, D. Oldenburg, C. Dorman, K. Chen, J. Bane, Wind Relaxations Near Pt. Conception, California and the Ocean Response, Presentation at the AGU/ASLO Meeting, 2014.
- Fewings, M., L. Washburn, C. Dorman, C. Gotschalk, K. Chen, J. Bane, K. Brown, Wind Relaxations in the California Current Upwelling System. International Ocean Vector Winds Science Team Meeting, French Research Institute for Exploitation of the Sea (IFREMER), Brest, France, June 2014.
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- Bane, J. M., 1975: Barotropic and Baroclinic Coastal-Trapped Waves in an Upwelling Frontal Zone. Ph.D. Dissertation, Dept. of Oceanography, The Florida State University, Tallahassee, Florida, 112 pp.
- Physical Oceanography (appendix III), Environmental Assessment of a Louisiana Offshore Oil Port and Appertinent Pipeline and Storage Facilities, 1974. *Technical Report of the Center for Wetlands Resources*, Louisiana State University, Baton Rouge. Four Volumes, 1033 pp.
- Petzold, M. L., T. W. Brooks and J. M. Bane, 1969: Preparation of 6-amino-2,4-bis(dimethyl-amino)-s- triazine. *U.S. Patent No. 3,479,353*.

V. TEACHING ACTIVITIES (Last Five Years)

Courses Taught

- MASC/EMES 052 *FYS: Living with our Oceans and our Atmosphere* (F20, S22, S24)
- MASC/EMES 108 *Our Energy and Climate Transitions* (S19, S20, F21, F23)
- MASC 563 *Descriptive Physical Oceanography* (S18, S21)
- MASC 560 *Fluid Dynamics* (F23)
- MASC 761 *Geophysical Fluid Dynamics* (S24)

Direction of Students and Post-Doctoral Scholars

Undergraduate Students Directed

- Caroline F. Lowcher, Honors B.S. in Applied Mathematics and Interdisciplinary Studies (ocean physics and biology). Honors Thesis: Gulf Stream Power Characteristics Near Cape Hatteras: Regional Model vs. Direct Current Observations. Graduation date May 2015.

M.S. Students Directed

- Chen-San Du: Some Aspects of the Theory of Topographic Rossby Waves in a Baroclinic Boundary Current. 1980.
- Karen R. Lorenson: Three-Dimensional, Mesoscale Characteristics of the Gulf Stream Thermal Frontal Zone South of Cape Hatteras. 1980.
- Mark E. Luther: Coastal-Trapped and Frontal-Trapped Waves in a Continuously Stratified Western Boundary Current. 1980.
- Carroll A. Hood: Subsurface Energetics of the Cyclonic Gulf Stream Frontal Zone off Onslow Bay, North Carolina. 1981.
- Cynthia M. Seay: Characteristics of the Gulf Stream Sea Surface Temperature Field Between Savannah, Georgia and Cape Hatteras, North Carolina. 1981.
- Leonidas Cordova: The Gulf Stream's Western Surface Temperature Front Between Cape Canaveral and Cape Hatteras, 1976-1978: Basic Statistical and Principal Component Analyses. 1984.
- Kenric E. Osgood: Vertical Velocities, Structure and Dynamics of Gulf Stream Meanders in the South Atlantic Bight. 1986.
- John R. Schultz: Structure and Propagation of Topographic Rossby Waves Northeast of Cape Hatteras North Carolina. 1987.
- Lauren M. Goodman: The Heat Budget of the Gulf Stream during Strong Atmospheric Forcing. 1988.

Sankey L. Blanton: Computations of Vertical Velocity in the Gulf Stream Northeast of Cape Hatteras, North Carolina. 1991.

Melanie Meaux: The Marine Atmospheric Boundary Layer over the Oregon Coastal Upwelling System During Summer 2001. 2004.

Elaine Monbureau: The Atmospheric Internal Boundary Layer in a Coastal Upwelling Region: Atmospheric Structure and Oceanic Consequences. 2009.

Ph.D. Students Directed

Yubeen Jeong: current student (co-advisor)

Lu Han: 2023 (co-advisor)

Raj Saha: 2011 (co-advisor)

May-Ling Becker: 2007 (co-advisor).

Dana K. Savidge: Cyclogenesis in the Deep Ocean Beneath the Gulf Stream. 1997.

Wei Wang: Gulf Stream Downstream of Cape Hatteras: Model/Data Comparisons. 1991.

Mark E. Luther: Mixed Instabilities in the Gulf Stream over the Continental Slope. 1982.

Post-Doctoral Scholars Directed

Dana K. Savidge, 1997-98

Huijie Xue, 1991-92

Wei Wang, 1991

William K. Dewar, 1983-84

VI. PROFESSIONAL ACTIVITIES

University and State of North Carolina Service Activities

Department of Marine Sciences Director of Graduate Studies (2004-15, 2018-19)

Department of Marine Sciences Performance Committee Chair (2004-15, 2018-19)

UNC Graduate School Administrative Board (2009-15)

UNC Graduate School Academic Policy Committee (2009-15)

UNC Academic Calendar Committee (2007-2015)

UNC Research Data Management Committee (2003-05)

UNC Faculty Council (2002-05)

Chair, UNC Department of Marine Sciences (1995-2000)

Department of Marine Sciences Acting Department Chair (1991)

Department of Marine Sciences Admissions Committee Chair (2000-03)

Curriculum in Marine Sciences Graduate Examination Committee Chair (1987-90)

Curriculum in Marine Sciences Computer Coordinator (1982-92)

Curriculum in Marine Sciences Equal Employment Opportunity Officer (1983-95)

Gubernatorially-appointed representative on the scientific review panel for evaluation of ocean circulation studies off North Carolina (1990-92)

National, International, and Entrepreneurial Activities

Principal Scientific Advisor, Apex Wind Energy (2010-14)

Co-Founder, Outer Banks Ocean Energy Corp. (2008-10)

Principal Scientist, Outer Banks Ocean Energy Corp. (2008-10)

Charter Member and First Chairman, SECOM (Southeast Coastal Oceanography and Meteorology) (2007-11)

Convenor, First Airborne Ocean Science Conference (May 2006)

Chair, UNOLS Scientific Committee on Aircraft Oceanographic Research (2002-07)
 Member, UNOLS Council (2002-07)
 Member, Scientific Review Group, MMS Gulf of Mexico Programs (1997-present)
 Associate Editor *Journal of Physical Oceanography* (1992-2000)
 Member, CORE Education Committee (1996-2000)
 Program Committee, AGU-ASLO Ocean Sciences Meeting (1999-2000)
 Member, ONR Coastal Altimetry Working Group (1997)
 Member, Science Steering Committees: NSF CoPO and CoOP Programs (1986-94)
 Member, NCAR C-130 Research Aircraft Science Panel (1992-94)
 NSF Review Panel Member: WOCE Indian Ocean Core Program 1 Studies (1992-94)
 AMS Committee on Meteorology and Oceanography of the Coastal Zone (1990-94)
 Member, SRG, MMS Straits of Florida, Cape Hatteras, N. Atlantic Programs (1989-94)
 NCAR Mid-Sized Jet Scientific Review Committee (1989)
 NCAR Research Aviation Facility Review Panel Member (1987-90)
 Interagency Task Group on Airborne Geoscience (1987-88)
 Consulting Investigator: MASAR and FRED Programs
 SYNOP Pilot Study Coordinator (1985-86)
 Oceanographic Coordinator for the GALE Program (1985-86)
 Session Chairman, AGU Fall 1979, Spring 1981, Spring 1995 Meetings

Reviewer for:

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| <i>Bulletin of the American Meteorological Society</i> | <i>Journal of Atmospheric and Oceanic Technology</i> |
| <i>Journal of Applied Meteorology</i> | <i>Journal of Marine Research</i> |
| <i>Journal of Geophysical Research</i> | <i>Journal of Marine Environmental Engineering</i> |
| <i>Journal of Physical Oceanography</i> | <i>Continental Shelf Research</i> |
| <i>Coastal, Estuarine and Shelf Science</i> | <i>Geophysical Research Letters</i> |
| <i>Estuaries</i> | <i>Limnology and Oceanography</i> |
| <i>Gulf of Mexico Science</i> | <i>Remote Sensing of Environment</i> |
| <i>Progress in Oceanography</i> | National Science Foundation |
| Department of Energy | NOAA National Undersea Research Center |
| National Ctr for Atmospheric Research | |