

Curriculum Vitae

Neal R. Pettigrew

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Education

A.B. (1972) Physics, Dartmouth College
Honors: Phi Beta Kappa, Magna Cum Laude, with distinction in Physics

M.S. (1975) Marine Science, Louisiana State University.

Ph.D. (1981) Physical Oceanography, Massachusetts Institute of Technology /
Woods Hole Oceanographic Institution, Joint Program in Oceanography.

Professional Experience:

Professor of Oceanography, University of Maine, (2007-present)
Head, University Ocean Sensor Development Group- (2004-present)
Director, Univ. of Maine Ocean Observing (2002-present)
Chief Scientist – Gulf of Maine Ocean Observing System (2000-present)
Director, Physical Oceanography Group, School of Marine Sciences (1998-present)
Oceanography Program Coordinator, University of Maine, (1997-2000)
Associate Professor of Oceanography, University of Maine (1991-2006)
Associate Research Professor, Institute of Earth Oceans and Space, University of
New Hampshire (1986-1991)
Senior Research Scientist, University of New Hampshire (1983-1986)
Research Scientist, University of New Hampshire (1981-1983)

Research Experience:

Principal Investigator or Co-Principal Investigator on more than 30 projects since 1981 with more than \$20 million extra-mural funding secured.

Selected Project History

Principal Investigator, The Gibraltar Experiment, (1984-1987)
Principal Investigator, Gulf of Maine Circulation Experiment (1994-1997)
Principal Investigator, Penobscot Bay Circulation Experiment (1996-2001)
Principal Investigator, South China Sea Circulation Experiment (1998-2002)
Co-Principal Investigator, Ecology and Oceanography of Harmful Algal Blooms: Gulf of Maine
(1998-2003)
Principal Investigator, Circulation and Physical processes in Blue Hill Bay, Maine. (1998-2001)
Co-Principal Investigator, Agulhas-South Atlantic Thermohaline Transport Experiment (2003-2006)
Chief Scientist, Gulf of Maine Ocean Observing System (GoMOOS) (2000-present)

Co-Principal Investigator, Information Integration through Events (2004 –present)
Co-Principal Investigator, GOMTOX (2006-present)
Co-Principal Investigator, New England Regional Association Coastal Ocean Observing System (2007-present)
Co-Principal Investigator, Caribbean Integrated Coastal Ocean Observing System (2008-present)

Research Focus:

My research over the last 20 years has emphasized the physical oceanography of marginal seas, sea straits, and continental shelf regions; ocean observatory science; and interdisciplinary studies relating physical processes and the circulation in coastal regions to questions of larval and contaminant transport, harmful algal blooms, aquaculture, coastal mixing.

Synergistic Activities:

- 1) Designed, built, implemented, and maintain the Gulf of Maine Ocean Observing System (GoMOOS) data acquisition array. Established an operational IOOS as a national prototype in the Gulf of Maine. System includes 11 real-time telemetering data buoys designed to withstand the rigors of the Gulf of Maine winters.
- 2) Implemented database, automated QC, and real-time web-based data delivery system so that data from the Penobscot Bay Collaborative and the GoMOOS program were made available to scientists, mariners, educators, regulators and the general public.
- 3) Provided scientific consulting over the last decade to both the salmon aquaculture industry and its opponents on site selection and environmental impacts.
- 4) Participated in the design specification and testing of both the original RDI acoustic Doppler profiler and, more recently, the Aanderaa Doppler profiler.
- 5) Co-developer of a modification of the response method of tidal analysis that allows accurate tidal analysis of data with gaps and/or large amplitude features (tidal bores) that are phase-locked with the tides.

Publications excluding abstracts:

Sonu, C. J., Pettigrew, N.R., and Fredericks, R. G., (1974). Measurement of swash profile and orbital motion on the beach. In: Ocean Wave Measurement and Analysis. Vol. I, pp. 621-38. (Am. Soc. Civ. Eng.)

Suhayda, J.N. and N.R. Pettigrew, 1977. Observations of wave height and wave celerity in the surf zone, *Journal of Geophysical Res.*, vol. 82, pp. 1419-1424.

Irish, J.D., N.R. Pettigrew, K. Deines, and F. Rowe, 1983. A New, Bottom-Mounted, Internally Recording Doppler Acoustic Profiling Current Meter. IEEE Proc. Third Working Symposium on Oceanographic Data Systems, 109-113.

Pettigrew, N.R. and JD Irish. 1983. An evaluation of a bottom-mounted Doppler acoustic profiling current meter. IEEE Proc. Oceans '83, pp. 182-186.

- Brown, W.S., N.R. Pettigrew, and J.D. Irish, 1985. The Nantucket Shoals Flux Experiment (NSFE79). Part II: The Structure and Variability of Across-Shelf Pressure Gradients. *Journal of Physical Oceanography*, 15, No.6, 749-771.
- Pettigrew, N. R., R. C. Beardsley and J. D. Irish ,1986. Field Evaluations of a Bottom Mounted Acoustic Doppler Profiler and Conventional Current Meter Moorings, Proceedings of the IEEE Third Working Conference on Current Measurement, January 22-24, 1986, Airlie, Virginia, 153-162.
- Pettigrew, N.R. and J.D. Irish, 1986. Acoustic Doppler Profiling from the Sea Floor. In, *Current Practices and New Technology in Ocean Engineering*, Eds. T. McGuinness and H.H. Shih, 15-21.
- Pettigrew, N.R. and S.P. Murray, 1986. The Coastal Boundary Layer and Inner Shelf. In, *Baroclinic Processes on Continental Shelves*, Ed. C.N.K. Mooers. Coastal and Estuarine Sciences, 3, AGU, 95-108.
- Pettigrew, N.R., J.D. Wood, E.H. Pape, G.J. Needell, and J.D. Irish, 1987. Acoustic Doppler Current Profiling from Moored Subsurface Floats. *IEEE Proc. Oceans '87*, 110-116.
- Pettigrew, N.R. and Needell, G.J., 1989. Flow structure and variability in the Tarifa Narrows section of the Strait of Gibraltar. In Almazán, J.L., Bryden, H., Kinder, T. and Parrilla, G. (eds), *Seminario sobre la Oceanografía Física del Estrecho de Gibraltar*. SECEG, Madrid, pp. 207-230.
- Pettigrew, N.R., 1989. Direct Measurements of the Flow of Western Mediterranean Deep Water over the Gibraltar Sill. *Journal of Geophysical Research*, 94, 18089-18093.
- Pettigrew, N.R. and R.A. Hyde, 1990. *The Structure of the Internal Bore in the Strait of Gibraltar and its Influence on the Atlantic Inflow*. In, *The Physical Oceanography of Sea Straits*, Ed. L.J. Pratt. Kluwer Academic Publishers, 493-508.
- J.D. Irish, K. Morey, and N. R. Pettigrew, 1992. Solar-powered, temperature/conductivity, Doppler profiler moorings for coastal waters; with ARGOS positioning and GOES telemetry. *IEEE Proceedings of Oceans'92*, 730-735.
- Hyde, R. A., and N.R. Pettigrew, 1993. A modification of the Response Method of tidal analysis. *Journal of Geophysical Research* , 98, C12, 22753-22757.
- Pettigrew, N.R., 1994. The observational basis for subtidal circulation in the Gulf of Maine. *Gulf of Maine Circulation Modeling: Workshop Proceedings*, RARGOM Report 94-1, Braasch, E. Editor. 3-19.
- Townsend, D.W., L. M. Cammen, P.M. Holligan, D. E. Campbell, and N.R. Pettigrew, 1994. Implications of variability in the timing of spring phytoplankton blooms. *Deep Sea Research*, 41, 747-765.
- Pettigrew, N.R., D. A. Kistner, G.P. Barbin, A. K. Laursen., D.W. Townsend, and J. Christensen, 1996. Some Sound: Fjord or well-mixed estuary? *Northeast Naturalist*, 4, 107-116.
- Townsend, D.W., and N.R. Pettigrew, 1996. The role of frontal currents in larval fish transport on Georges Bank. *Deep-Sea Research II*, 43, 1773-1792.
- Pettigrew, N., and D. Byrne, 1997. Moving Waters: Currents and Circulation. Proceedings of Rim of the Gulf conference, Portland ME, May, 1997, 23-41.
- Townsend, D.W., and N.R. Pettigrew, 1997. Nitrogen Limitation of Secondary Production on Georges Bank. *Journal of Plankton Research*, 19, 221-235.

- Pettigrew, N.R., D.W. Townsend, J. P. Wallinga, P. J. Brickley, R. D. Hetland, and H. Xue, 1998. Observations of the Eastern Maine Coastal Current and its Offshore Extensions in 1994. *Journal of Geophysical Research*, 103, C13, 30,623-30,639.
- Xue, H., F. Chai, and N. R. Pettigrew, 2000. A model study of the seasonal circulation in the Gulf of Maine. *Journal of Physical Oceanography*, 30, 1111-1135.
- Xue, H., F. Chai, N. R. Pettigrew, D. Xu, and M. Shi, 2000: Upper Ocean Circulation in the Northern South China Sea. Proceedings - Second International Ocean and Atmosphere Conference COAA 2000, 73-78.
- Xue, H., Y. Xu, D. Brooks, N. R. Pettigrew, and J. Wallinga, 2000: Modeling the circulation in Penobscot Bay, Maine. *Proceedings of the 6th International Conference on Estuarine and Coastal Modeling*, ASCE, 1112-1127.
- Kistner, D. A. and N. R. Pettigrew, 2001. A Variable turbidity Maximum in the Kennebec Estuary, Maine. *Estuaries*, 24, 5, 680-687.
- Townsend, D. W., N. R. Pettigrew, and A. C. Thomas, 2001. Offshore blooms of the Red Tide Dinoflagellate, *Alexandrium* sp., in the Gulf of Maine. *Continental Shelf Research*, 21, 347-369.
- Wallinga, J.P, N.R. Pettigrew, and J. D. Irish, 2003. The GoMOOS Buoy Design. IEEE Proc. Oceans 2003, pp. 2596-2599.
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- Churchill, J.H., N.R. Pettigrew, and R.P. Signell, 2005. Structure and Variability of the Western Maine Coastal Current. *Deep Sea Res. II*, 52: 2392-2410.
- Janzen, C.D., J.H. Churchill, N.R. Pettigrew, 2005. Observations of bay/shelf exchange between eastern Casco Bay and the western Gulf of Maine. *Deep Sea Res. II*, 2411-2429.
- Kirn, S.L., D.W. Townsend, and N.R. Pettigrew, 2005. Suspended *Alexandrium* spp. Hypnozygote Cysts in the Gulf of Maine. *Deep-Sea Res. II*, 52: 2543-2559.
- Pettigrew, N.R., J. H. Churchill, C.D. Janzen, L.J. Mangum, R.P. Signell, A.C. Thomas, D.W. Townsend, J.P. Wallinga, H. Xue, 2005. The kinematic and hydrographic structure of the Gulf of Maine Coastal Current. *Deep Sea Res. II*, 52: 2369-2391.
- Pettigrew, N.R., and C. S. Roesler, 2005. Implementing the Gulf of Maine Ocean Observing System (GoMOOS). IEEE proceedings of Oceans '05 (Europe), Brest France, 1234-1241.
- Pettigrew, N. R., J.P. Wallinga, and R. Fleming, 2005. Field comparison tests of a bottom-mounted Aanderaa RDCP600 with an RDI Workhorse 600 ADCP, and a moored string of Aanderaa RCM9 MKII current meters. IEEE Proceedings, Eighth Current Measurement Technology Conference 2005, 41-45.
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Pettigrew, N.R., and H. Xue, 2006. The response of the Gulf of Maine Coastal Current system to late spring northeasterly wind forcing. Proceedings: MIT Sea Grant Symposium on the *Alexandrium* Red Tide of 2005. 1-9.

Pelegrí, J.L., J.H. Churchill, A.D. Kirwan, Jr., S.-K. Lee, R.E. Munn and N.R. Pettigrew, 2006. Gabriel T. Csanady: Understanding the physics of the ocean. *Progress in Oceanography*, 70, 91-112.

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Beard, K., Deese, H., Pettigrew, N.R. 2008. A framework for visualization and exploration of events. *Information Visualization*, 7, 133-151.

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Wanamaker, A.D., K.J. Kreutz Jr., B.R. Schone, N.R. Pettigrew, H.W. Borns Jr., D.S. Introne, D. Belknap, K.A. Maasch, and S. Feindel, , 2008. Coupled North Atlantic Slope Water forcing on Gulf of Maine temperatures over the past millennium, *Climate Dynamics*, 31, 183-194.

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Pettigrew, N.R., J. P. Wallinga, L. J. Mangum, and F. Neville, Retrospective and Prospective Views of the Ocean Observing System in the Gulf of Maine. Proceedings of Oceans08, Quebec City, Canada. 1-9.

Manning, J.P., D.J. McGullicuddy, N.R. Pettigrew, J.H. Churchill, and L.S. Incze, 2008. Drifter observations of the Gulf of Maine Coastal Current. *Cont Shelf Res.* (in Press)

Incze, L., H Xue, N. Wolff, D Xu, C. Wilson, R. Steneck, R. Wahle, P. Lawtons, N. Pettigrew, and Y Chen, 2009. Connectivity of lobster populations in the coastal Gulf of Maine Part II. Coupled biophysical dynamics. (submitted to *Fisheries Oceanography*).

Technical Reports:

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Gong, B., B. Pearce, and N. Pettigrew. 1995. Casco Bay, Maine- Circulation Modeling. 95 pp. plus appendices A, B, C.

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Pearce, B., N. Pettigrew, B. Gong. 1996. Final Report : Casco Bay, Maine Circulation Modeling. 33 pp, plus appendix.

Pettigrew, N. R., 1996. Cruise III, April 13-22, 1993. In: Murray, S. P., and J. Donely (eds.), *Mississippi River plume hydrography: Second annual report*. OCS Study MMS 96-0022. U. S. Dept. Interior, Minerals Mgmt. Service, Gulf of Mexico OCS Region, New Orleans, La. 5-24.

Wallinga, J., B Wallinga, R. Stessel, N.R. Pettigrew, 1997. Penobscot Bay Experiment: Hydrography and Time Series Data. POG Data Report 9701. 200 pp.

Pettigrew, N.R., 1997. Vernal Circulation Patterns and Processes in Penobscot Bay, Maine: Year I. PhOG Technical report 1998, 22 pp.

Pettigrew, N.R., 1998. Vernal Circulation Patterns and Processes in Penobscot Bay, Maine: Year II. PhOG Technical report 1998, 18 pp.

Pettigrew, N.R., John Wallinga, and Linda Mangum, 1999. Blue Hill Physical Oceanographic Studies, Summer, 1999. PhOG. Data Report: 9902, 98pp.

Pettigrew, N.R., 1999. Vernal Circulation Patterns and Processes in Penobscot Bay, Maine: Year III. PhOG Technical report 1999, 9 pp.

Wallinga, J., B. Wallinga, D. Byrne, N.R. Pettigrew, 1999. The Penobscot Bay Experiment: Hydrography and Current Survey, April 27-30, 1998. PhOG Data Report 9901, 142 pp.

Baker, T, K. Boyle, D. Mageean, N. R. Pettigrew, J. Rubin, J. L. Ward, 2005. Maine's Recovery of Recreational Damages Due to Coastal Oil Spills. Margaret Chase Smith Center, Technical Report, 40 pp (plus appendices).