

Jake Kritzer, Ph.D.

Northeastern Regional Association of Coastal Ocean Observing Systems
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Education	Ph.D., Marine Biology James Cook University, Australia	B.A. <i>cum laude</i> , Biology Middlebury College, Vermont
Work History	<p>Northeastern Regional Association of Coastal Ocean Observing Systems 2020-present Executive Director</p> <p>Environmental Defense Fund 2017-2020 Lead Senior Scientist and Senior Director, China Oceans 2015-2017 Lead Senior Scientist and Director, Diagnostics & Design 2011-2015 Lead Senior Scientist and Director, Spatial & Ecosystem Initiatives 2008-2011 Senior Scientist 2004-2008 Dennis Puleston Fellow</p> <p>University of Windsor 2001-2004 Postdoctoral Researcher</p>	
Appointments (selected)	<p>2019-present Northeastern University, Visiting Scholar</p> <p>2018-present Blue Ocean Society for Marine Conservation, Board of Directors</p> <p>2017-present Town of Durham, Conservation Commission</p> <p>2017-present University of Maine, Adjunct Professor</p> <p>2013-2016 City of Boston, Conservation Commission</p> <p>2013-2017 Massachusetts Marine Fisheries Institute, Advisory Council</p> <p>2012-present University of Massachusetts, Adjunct Professor</p> <p>2010-2017 Alewife Harvesters of Maine, Board of Directors</p> <p>2010-2012 Town of Nantucket, Shellfish Management Plan Steering Committee</p> <p>2008-2016 New England Fishery Management Council, Scientific & Statistical Committee <i>Chair 2013-2016; Vice Chair 2011-2012</i></p> <p>2007-2017 Atlantic States Marine Fisheries Commission, Habitat Committee <i>Chair 2015-2017; Vice Chair 2013-2015</i></p> <p>2006-2008 New York Dept. Env. Cons., Long Island Freshwater Fisheries Advisory Committee</p> <p>2005-2012 Atlantic States Marine Fisheries Commission, American Eel Advisory Panel <i>Chair 2008-2012</i></p>	
Awards	<p>2010 Senior Fellow, Environmental Leadership Program</p> <p>2009 Spirit Award, Coastal America</p> <p>2003 DIALOG Fellow, American Society for Limnology and Oceanography</p> <p>2000 Marine Science Journalism Prize, Great Barrier Reef Cooperative Research Centre</p> <p>2000 Terry Walker Prize, Australian Coral Reef Society</p> <p>1998 International Postgraduate Research Scholarship, Commonwealth of Australia</p> <p>1996 Postgraduate Scholarship, Leopold Schepp Foundation</p> <p>1995 Stubb Mackey Award for excellence in track & field, Middlebury College</p> <p>1995 A. Bayard Russ Award for top multi-sport athlete, Middlebury College</p> <p>1992 Charles A. Dana Scholar for achievement & leadership, Middlebury College</p>	

Peer-reviewed publications (last 5 years)

- Boenish R, **Kritzer JP**, Kleisner K., Steneck RS, Werner KM, Zhu W, Schram F, Rader D, Cheung W, Ingles J, Tian Y, Mimikakis J (accepted, in revision) The global rise of crustacean fisheries. *Frontiers in Ecology and the Environment*.
- Kritzer JP** (2019) Influences of at-sea fishery monitoring on science, management, and fleet dynamics. *Aquaculture & Fisheries*. doi.org/10.1016/j.aaf.2019.11.005
- Boenish R, Willard D, **Kritzer JP**, Reardon K (2019) Fisheries monitoring: perspectives from the United States. *Aquaculture & Fisheries*. doi.org/10.1016/j.aaf.2019.10.002
- Kritzer JP**, Costello C, Mangin T, Smith SL (2019) Dynamic harvest control rules provide inherent resilience to effects of climate change and scientific uncertainty. *ICES Journal of Marine Science*.
- Kerr LA, **Kritzer JP**, Cadrin SX (2019) Strengths and limitations of Before-After-Control-Impact analysis for testing the effects of marine protected areas on managed populations. *ICES Journal of Marine Science*.
- Alzugaray E, Ouga R, Valle S, Morales O, Govas A, Lopez L, Kleisner K, Bone E, Mangin T, **Kritzer J**, Fujita R, Marquez F, Karr K (2019) A multi-institutional approach for modeling the bioeconomic upside of fisheries management approaches in Cuba. *Revista Cubana de Investigaciones Pesqueras*
- Uiterwyk K, **Kritzer JP**, Novelly A, Smith SL, Starbuck K, Wiggin J (2019) Municipal policy priorities in three communities in the Northeastern United States reveal effects of global climate change. *Ocean and Coastal Management* 168: 177-184. doi.org/10.1016/j.ocecoaman.2018.10.028
- Liu OR, Kleisner KM, Smith SL, **Kritzer JP** (2018) The use of spatial tools in rights-based groundfish fisheries. *Fish and Fisheries*. doi:10.1111/faf.12294
- Gerhartz-Muro JL, **Kritzer JP**, Miller V, Whittle D, Gerhartz-Abraham A, Pina-Amargos F (2018) An evaluation of the national marine environmental policy framework in Cuba. *Bulletin of Marine Science*. doi.org/10.5343/bms.2017.1058
- Puga R, Valle S, **Kritzer JP**, Delgado D, Estela de León M, Giménez E, Ramos I, Moreno O, Karr K (2018) Spatial variation in vulnerability of nearshore tropical finfish: implications for science and management planning. *Bulletin of Marine Science*. doi.org/10.5343/bms.2016.1127
- Karr KA and 25 others (2017) Integrating science and governance to improve the performance of small-scale fisheries. *Frontiers in Marine Science*. doi:10.3389/fmars.2017.00345
- Smith SL, Cunniff SE, Peyronnin NS, **Kritzer JP** (2017) Prioritizing coastal ecosystem stressors in the Northeastern United States under increasing climate change. *Environmental Science & Policy* 78: 46-57.
- Churchill JH, **Kritzer JP**, Sherwood GD, Grabowski JH, Dean MJ (2016) Evaluating connectivity of a proposed closed area within the Gulf of Maine for Atlantic cod (*Gadus morhua*) through larval dispersal modeling. *ICES Journal of Marine Science*. doi:10.1093/icesjms/fsw139
- Kerr LA, Hintzen NT, Cadrin SX, Clausen LW, Dickey-Collas M, Goethel DR, Hatfield EMC, **Kritzer JP**, Nash RDM (2016) Lessons learned from practical approaches to reconciling mismatches between biological population structure and stock units of marine fish. *ICES Journal of Marine Science*. doi:10.1093/icesjms/fsw188
- Klein E, Smith SL, **Kritzer JP** (2016) Effects of climate change on four species of New England groundfish. *Reviews in Fish Biology and Fisheries*. doi:10.1007/s11160-016-9444-z
- Kritzer JP**, DeLucia M, Greene E, Shumway C, Topolski MF, Thomas-Blate J, Chiarella LA, Davy KB, Smith K (2016) The importance of benthic habitats for coastal fisheries. *BioScience* 66: 274-284.
- Liu O, Thomas L, Fujita R, **Kritzer JP**, Clemence M, McDonald G, Szuwalski C (2016) An evaluation of harvest control methods for fishery management. *Reviews in Fisheries Science & Aquaculture* 24: 244-263.

Reports (selected)

- Liu H, Mimikakis J, Cao L, Han Y, Viridin J, **Kritzer J**, Sun F (2019) Task Team 2: Living Marine Resources and Biodiversity. Special Policy Study on Global Ocean Governance and Ecological Civilization. China Council for International Cooperation on the Environment and Development. Beijing, China.
- Kritzer JP**, Cadrin SX, DeCelles G, Goethel D, Roebuck C, Manderson J, Mirarchi F, Richardson D (2016) Spatial and temporal patterns in habitat use and depth distribution of witch flounder: implications for stock assessment. Working paper submitted to the 62nd Northeast Fisheries Science Center Stock Assessment Workshop (SAW62).
- Takade-Heumacher H, Liu O, Smith SL, **Kritzer JP**, Fujita R (2014) Exploring hypotheses for reduced growth and truncated size structure of Georges Bank yellowtail flounder. Transboundary Resources Assessment Committee Stock Assessment of Georges Bank Yellowtail Flounder, Working Paper #44.
- Kritzer JP** (2013) Considerations for Developing a Risk Policy Underlying Annual Catch Limits. Report to the New England Fishery Management Council. Boston, MA

Jacqueline Ball Motyka

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USA

Professional Preparation

Undergraduate Institution

University of Alaska Fairbanks Wildlife Biology B.S., 2011

Graduate Institution

Southern New Hampshire University Business Administration M.B.A., 2017

Appointments

Operations Manager, NERACOOS	2017-present
Program Coordinator, NERACOOS	2013-2017
Administrative Assistant, NERACOOS	2012-2013
Project Coordinator, HEALTHeLINK	2011-2012
Research Assistant, Institute of Arctic Biology	2009-2011

Synergistic Activities

1. Coordinator & Steering Committee, Integrated Sentinel Monitoring Network, 2012-Present
2. Moderation Panel, OA Information Exchange, 2018-Present
3. Coordinator, Northeast Coastal Acidification Network (NECAN), 2016-2018
4. Project Manager, Regional OA Thresholds Award, 2018-Present
5. Project Manager, Gulf of Maine MBON, 2019-Present
6. CIOOS Atlantic Regional Oversight Committee, 2020-Present

Publications of Relevance

Cross, Jessica N., Jessie Anderson Turner, Sarah R Cooley, Jan A Newton, Kumiko Azetsu-Scott, Christopher Chambers, Darcy Dugan, Kaitlin Goldsmith, Helen Jane Gurney-Smith, Alexandra R Harper, Elizabeth B Jewett, Denise Joy, Teri King, Terrie Klinger, Meredith Kurz, John Ruairidh Morrison, Jackie Motyka, Erica Hudson Ombres, Grace Saba, Emily Luke Silva, Emily Smits, Jennifer Vreeland-Dawson, and Leslie Wickes. (2019). The Knowledge-to-Action Pipeline: Connecting Ocean Acidification Research and Actionable Decision Support.

Runge, J., M. Coté, Jr., B. Thompson, J. R. Morrison, D. Anderson, I. Cetinic, B. Cowie-Haskell, S. Gallager, J. Hare, C. Johnson, J. Salisbury, R. Steneck and R. Young Morse. (2012). Integrated Sentinel Monitoring for the Northeast Region: <http://www.neracoos.org/sentinelmonitoring>.

Neal R. Pettigrew
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School of Marine Sciences
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nealp@maine.edu
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A. Professional Preparation:

Dartmouth College, Physics (*with distinction*), A.B., 1972
Honors: *magna cum laude, Phi Beta Kappa*

Louisiana State University, Marine Science, M.S. 1975
Honors: *Phi Kappa Phi*

MIT/WHOI Joint Program in Oceanography, Physical Oceanography, Ph.D., 1981

B. Appointments:

Director, Maine Center for Autonomous Marine Surveys (MCAMS)	2009-present
Director, Caribbean Coastal Ocean Observing System Buoy Array	2009-present
Professor of Oceanography, University of Maine	2007-present
Director, University of Maine Ocean Observing System (UMOOS)	2001-present
Chief Scientist –Gulf of Maine Ocean Observing System (GoMOOS)	2000-2008
Oceanography Chair, University of Maine	1997-2000
Oceanography Graduate Coordinator, University of Maine	1997-2000
Associate Professor of Oceanography, University of Maine	1991-2007
Associate Research Professor, University of New Hampshire	1986-1991
Research Scientist, University of New Hampshire	1981-1986

C. Products:

Related to project:

Pettigrew, N.R., R.J. Fleming, and C.P. Fikes, 2011. The history of the first decade of the observing system in the Gulf of Maine, and plans for the second decade. IEEE proceedings of Oceans '11 Kona, HI, September 19-22, 1231-1241.

Pettigrew, N.R., C.P. Fikes, and M. Kate Beard, 2011. Advances in the Ocean Observing System in the Gulf of Maine: Technical Capabilities and Scientific Results. MTS Journal, January/February 2011, 85-97.

Pettigrew, N.R., C. S. Roesler, F. Neville, and H.E. Deese, 2008. An operational real-time ocean sensor network in the Gulf of Maine. S. Nittel, A. Labrinidis, and A. Stefanidis (Eds.) DSN 2006, LNCS 4540, pp. 213-238.

James O'Donnell

a. Professional Preparation

B.Sc.(Hons) Applied Physics, 1979. The University of Strathclyde, Glasgow, Scotland
M.S. Marine Studies, 1981, The University of Delaware, Marine Studies, Newark Delaware
Ph.D. Oceanography, 1986 The University of Delaware, Newark Delaware

b. Appointments

- 2014- Executive Director, Connecticut Institute for Resilience and Climate Adaptation (CIRCA)
- 2002-5 Interim Director, Marine Sciences and Technology Center, The University of Connecticut
- 2002-5 Interim Head, Department of Marine Sciences, The University of Connecticut
- 1986- Asst, Assoc. and Full Professor, Department of Marine Sciences, The University of Connecticut.
- 1986-7 Postdoctoral Research Asst, Dept. of Applied Mathematics and Theoretical Physics, Cambridge University.

c. Closely related products

- Liu, C., J.Yia, Y. Onat, A. Cifuentes-Lorenzen, A. Iliia, G. McCardell, T. Fake, and J. O'Donnell (2020) Estimating the annual exceedance probability of water levels and wave heights from high resolution coupled wave-circulation models in Long Island Sound *J. Mar. Sci. Eng.* **2020**, 8, 475.
- Shin, Y., A. Cifuentes-Lorenzen, M.M. Howard Strobel, and J. O'Donnell (2020) Waves in Western Long Island Sound. *J. Geophys. Res.* (submitted)
- Iliia, A. and J. O'Donnell, (2018). An Assessment of Two Models of Wave Propagation in an Estuary Protected by Breakwaters. *J. Marine Sci. and Eng.* 6, 145.
doi:10.3390/jmse6040145.
- O'Donnell, J. (2019) Sea Level Rise in Connecticut. Final Report to Connecticut Department of Energy and Environmental Protection. <https://circa.uconn.edu/wp-content/uploads/sites/1618/2019/02/SeaLevelRiseConnecticut-Final-Report-1.pdf>
- O'Donnell, J., R. E. Wilson, K. Lwiza, et al. (2014). The Physical Oceanography of Long Island Sound. In *Long Island Sound: Prospects for the Urban Sea*. Latimer, J.S., Tedesco, M., Swanson, R.L., Yarish, C., Stacey, P., Garza, C. (Eds.), ISBN-13: 978-1461461258

d. Other Significant Products

- Foster, M., J. O'Donnell, M. Luchenbach, E. Andrews, E. Steinhilber, J. Wells, and M. Davis, zing Resilience in U.S. Universities: Prospects, Opportunities, and Models. (2018). *Marine Tech. Soc. Journal*. V52, 2, pp 106-110.
- McCardell, G.M, J. O'Donnell, A. Souza, and M. Palmer (2015). Internal tides and tidal cycles of vertical mixing in western Long Island Sound. *J. Geophys. Res. (Oceans)*. 121,1063-1084, DOI:10.1002/2015JCO10796
- McCardell, G.M. and O'Donnell, J. (2014). Estimates of Horizontal Fluxes of Oxygen, Heat, and Salt in Western Long Island Sound. *J. Geophys. Res.* 119, 7267–7276,
doi:10.1002/2014JC009904.

Fribance, D. B., J. O'Donnell, and A. Houk (2013), Residual circulation in western Long Island Sound, *J. Geophys. Res. Oceans*, 118, 4727–4745, doi:10.1002/jgrc.20329.

O'Donnell, J., D. Ullman, M. Spaulding, et al. (2005). Integration of Coastal Ocean Dynamics Application Radar (CODAR) and Short-Term Predictive System (STPS) Surface Current Estimates into the Search and Rescue Optimal Planning System (SAROPS). U.S. Coast Guard Technical Report DTTCG39-00-D-R00008/HSCG32-04-J-100052.

e. Synergistic Activities

1. **Director, North East Regional Association of Coastal Ocean Observing Systems (NERACOOS)**, 2008-2013. Developed governance, proposals and priorities for the development an operational coastal ocean observing system in New England.
2. **Chair, Gordon Research Conference on Coastal Ocean Circulation**, New London, NH, USA. 2005-2009. Organized the program, funding and operations for the 2009 Conference
3. **Co-chair, EPA's Long Island Sound Study Technical Advisory Committee** (elected), 2012-2020. Provide advice to EPA to enable better management of coastal resources.
4. **Member, Governor's Council on Climate Change**. 2016-2020. Provide advice to Governor on strategies to reduce CO2 emissions from Connecticut, and their likely impacts.
5. **Member, Ocean Observatories Initiative Facilities Board (OOIFB)**, National Science Foundation. 2017-2019. Provide recommendations to NSF on the effectiveness of the OOI program.

DOUGLAS C. VANDEMARK

Professional Preparation

Hope College	Holland, MI	Physics	B.S. 1986
University of Massachusetts	Amherst, MA	Electrical Engineering	M.S. 1988
University of New Hampshire	Durham, NH	Earth Science/Oceanography	Ph.D. 2005

Appointments

UNH Ocean Process Analysis Laboratory	Research Professor	2014 –
UNH Ocean Process Analysis Laboratory	Director	2011 – 2016
UNH Ocean Process Analysis Laboratory	Research Associate Professor	2005 – 2014
NASA Goddard Space Flight Center	Electronics Engineer	1990 – 2005
McDonnell Douglas Helicopter Co.	Technical Staff	1989 - 1990
University of Massachusetts	Research Assistant	1986 - 1988

Experience

Dr. Vandemark has been involved in the development, deployment and operation of ocean observing sensors and platforms in the Gulf of Maine since 2004. He currently oversees Gulf of Maine Datawell waverider buoy and UNH CO₂ buoy operations (NDBC stations 44073 and 44098) for UNH, NERACOOS and the NOAA Ocean Acidification Program. He is also the UNH PI for ongoing Marine Biodiversity Network (MBON) ocean observing work being conducted in the region.

Publications Closely Related to the Proposed Project

1. Land, P. E., J. D. Shutler, H.S. Findlay, J. Salisbury, D. Vandemark, and R. Bellerby, Optimum satellite and in situ inputs to carbonate system algorithms in the global ocean: Caribbean, Amazon and Bay of Bengal regions, *Rem. Sensing Environ.*, in press.
2. Grodsky, S. A., D. Vandemark, H. Feng, and J. Levin, Satellite detection of an unusual intrusion of salty slope water into a marginal sea: Using SMAP to monitor Gulf of Maine inflows, *Remote Sensing of Environment*, (217), 550-561, 2018, doi.org/10.1016/j.rse.2018.09.004.
3. Cahill, B., J. Wilkin, K. Fennel, D. Vandemark, and M.A.M. Friedrichs, Interannual and seasonal variabilities in air-sea CO₂ fluxes along the U.S. eastern continental shelf and their sensitivity to increasing air temperatures and variable winds, *J. Geophys. Res.-Bio.*, 121, doi:10.1002/2015JG002939, 2016.
4. Irish, J.D., D. Vandemark, S. Shellito, and J. E. Salisbury, Experience with moored observations in the western Gulf of Maine from 2006 to 2012, *Marine Technology Society Journal*, 47:1, 19-32, 2013.
5. Runge, J. A., J. Rubao, C. Thompson, N. Record, C. Chen, D. C. Vandemark, J. E. Salisbury, and F. Maps, Persistence of *Calanus Finmarchicus* in the western Gulf of Maine during recent extreme warming, *J. Plank. Res.*, doi: 10.1093/plankt/fbu098, 2015.
6. Vandemark, D., J. E. Salisbury, C. W. Hunt, S. Shellito, J. Irish, C. L. Sabine, S. Maenner, W. R. McGillis, Temporal and spatial dynamics of CO₂ air-sea flux in the Gulf of Maine, *J. Geophys. Res.*, 116, C01012, doi:10.1029/2010JC006408, 2011.

Other Significant Publications

1. Salisbury J., D. Vandemark, B. Jonsson, J. Mathis, K. Yates, B. Balch, D. Gledhill, B. Hales, S. Lohrenz, A. Mannino, N. Reul, S. Signorini, R. Wanninkhof, and K. K. Yates, How can present and future satellite missions support the studies that address ocean acidification?, *Oceanography* 28(2):108–121, <http://dx.doi.org/10.5670/oceanog.2015.35>, 2015.

2. Hunt, C. W., J. E. Salisbury and D. Vandemark, CO₂ input dynamics and air-sea exchange CO₂ in a large New England estuary, *Estuar. Coast. Shelf. Res., Estuaries and Coasts*, DOI 10.1007/s12237-013-9749-2, 2014.
3. Sabine, C. L. et al., Surface Ocean CO₂ Atlas (SOCAT) data products, *Earth Syst. Sci. Data*, 5, 145-153, doi:10.5194/essd-5-145-2013.
4. Sutton, A. J., C. L. Sabine, R. A. Feely, W.-J. Cai, M. F. Cronin, M. J. McPhaden, J. M. Morell, J. A. Newton, J.-H. Noh, S. R. Olafsdottir, J. E. Salisbury, U. Send, D. C. Vandemark, and R. A. Weller, Using present-day observations to detect when anthropogenic change forces surface ocean carbonate chemistry outside pre-industrial bounds, *Biogeosciences*, 13, 5065-5083, doi:10.5194/bg-13-5065-2016, 2016.
5. Walsh, E. J., M. L. Banner, C. W. Wright, D. C. Vandemark, B. Chapron, J. Jensen, and S. Lee, The Southern Ocean Waves Experiment, Part III: sea surface slope statistics and near nadir remote sensing, *J. Phys. Ocean.*, 38(3), 669-684, 2008.
6. Vandemark, D., B. Chapron, J. Sun, G. H. Crescenti, and H. C. Graber, Ocean wave slope observations using radar backscatter and laser altimeters, *J. Phys. Ocean.*, 34(12), 2825-2842, 2004.

Synergistic Activities

1. Member, Federal Advisory Committee for the US Integrated Ocean Observing System, 2015-
2. Session chair/co-chair for numerous Ocean Sciences and AMS sessions on air-sea fluxes
3. Assoc. Editor, *IEEE Transactions on Geoscience and Remote Sensing*, 2010-2014
4. Member, NASA Earth Science Senior Review Panel, 2013, 2015, and 2016
5. Chair, 2017 NASA Earth Science Senior Review Panel

**CURRICULUM VITAE
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PROFESSIONAL POSITIONS:

- 2003-** **Professor.** School of Marine Sciences, University of Maine, Orono, Maine.
2008-2012 **Associate Director.** School of Marine Sciences, University of Maine, Orono, ME
1999-2003 **Associate Professor.** School of Marine Sciences, University of Maine, Orono, ME
1996-1998 **Research Associate Professor.** School of Marine Sciences, University of Maine
1990-1995 **Executive Director.** Atlantic Centre for Remote Sensing of the Oceans, Bedford, Nova Scotia, Canada.
1989-1990 **Assistant Professor, Senior Research.** College of Oceanography, Oregon State University, Corvallis, Oregon.
1988-1989 **Post-Doctoral Fellow.** College of Oceanography, Oregon State University, Corvallis, Oregon.

EDUCATION:

- 1988** **Ph.D.,** Oceanography, University of British Columbia, Vancouver, B.C., Canada.
1982 **M.Sc.,** Oceanography, University of British Columbia, Vancouver, B.C., Canada.
1979 **B.Sc.,** Biology, McGill University, Montreal, Quebec, Canada.

PUBLICATIONS (since 2017, of > 85 total):

- Bucci, A.F., **A.C. Thomas**, I. Cetinic. **2020.** Interannual variability in the thermal habitat of *Alexandrium catenella* in the Bay of Fundy and the implications of climate change. *Front. in Mar. Sci.*, DOI: 10.3389/fmars.2020.587990.
- Pershing A.J., N.R. Record, B.S. Franklin, B.T. Kennedy, L. McClenachan, K.E. Mills, J.D. Scott, **A.C. Thomas**, N.H. Wolff. Challenges to natural and human communities from surprising ocean temperatures. **2019.** *PNAS*, DOI: 10.1073/pnas.1901084116
- Staudinger, M.D., K.E. Mills, K. Stamieszkin, N.R. Record, C.A. Hudak, A. Allyn, A. Diamond, K. Friedland, W. Golet, M.E. Henderson, C.M. Hernandez, T.G. Huntington, R. Ji, C.L. Johnson, D. S. Johnson, A. Jordaan, J. Kocik, Y. Li, M. Liebman, O.C. Nichols, D. Pendleton, R. A. Richards, T. Robben, **A.C. Thomas**, H.J. Walsh, K. Yakola. **2019.** It's about time: A synthesis of changing phenology in the Gulf of Maine ecosystem. *Fish. Oceanogr.* DOI: 10.1111/fog-12429
- Tavora J.B.P., E.H.L. Fernandes, **A.C. Thomas**, R. Weatherbee, C.A.F. Schetinni. **2019.** The influence of river discharge and wind on Patos Lagoon, Brazil, suspended particulate matter. *Int. J. Rem. Sens.* <https://doi.org/10.1080/01431161.2019.1569279>
- Jaini, M., R.A. Wahle, **A.C. Thomas**. **2018.** Spatial surface temperature correlates of American lobster (*Homarus americanus*) settlement in the Gulf of Maine and southern New England shelf. *Bulletin of Marine Science*, <https://doi.org/10.5343/bms.2017.1141>.
- Friedland, K.D., C.B. Mouw, R.G. Asch, A.S.A. Ferreira, S. Henson, K.J.W. Hyde, R.E. Morse, **A.C. Thomas**, D.C. Brady, **2018,** Phenology and time series trends of the dominant

- seasonal phytoplankton bloom across global scales. *Global Ecol. and Biogeogr.*, 2018: 1-9, doi:10.1111/geb.12717.
- Alexander, M.A., J.D. Scott, K.D. Friedland, K.E. Mills, J.A. Nye, A.J. Pershing, **A.C. Thomas**, **2018**. Projected sea surface temperatures over the 21st century: changes in the mean, variability and extremes. *Elem. Sci. Anth.*, <https://doi.org/10.1525/elementa.191>.
- Thomas, A.C.**, A.J. Pershing, K.D. Friedland, J.A. Nye, K.E. Mills, M.A. Alexander, N.R. Record, R. Weatherbee, M.E. Henderson, **2017**, Seasonal trends and phenology shifts in sea surface temperature on the North American northeast shelf. *Elem. Sci. Anth.* 5: 48, DOI: <https://doi.org/10.1525/elementa.240>.
- Li, B., K. Tanaka, Y. Chen, D. Brady, and **A.C. Thomas**. **2017**. Assessing the quality of bottom water temperatures from the Finite-Volume Community Ocean Model (FVCOM) in the Northwest Atlantic shelf region. *J. Mar. Systems*, 173, 21-30.
- Snyder, J., E. Boss, R. Weatherbee, **A.C. Thomas**, D. Brady, C. Newell, **2017**, Oyster aquaculture site selection using Landsat 8-derived sea surface temperature, turbidity, and chlorophylla. *Frontiers in Marine Science*, 4:190. doi:10.3389/fmars.2017.00190.
- Henderson, E.M., K. Mills, **A.C. Thomas**, A. Pershing and J. Nye. **2017**. Effects of temperature phenology on fish species distribution and biomass along the northeast United States continental shelf. *Rev. Fish Biol. and Fisheries*. 27:411-424.

MENTORING:

Post Docs: Dr. Guoqi Han (with Moto Ikeda, now at Memorial University, Canada),
Dr. Seunghyun Son (now at NOAA Silver Spring, USA),
Dr. Stephanie Henson (now at NOC, U. Southampton, UK)

Graduate Students: Remy Luerssen, Jennifer Bosch, Kasey Legaard, Chris Proctor (with Colin Roessler), Mahima Jaini (with Rick Wahle), Nick Foukal, Kerstin Cullen, Brianna King, Andre Bucci (current)

TEACHING:

SMS 302: Oceanography (1999-2019),
SMS 540: Satellite Oceanography (~ every other year),
SMS 375: Intro to Computer Programming, Marine Data Analysis and MATLAB (2014-present).

GUEST LECTURER, INTERNATIONAL GRADUATE Programs:

Chile: Olmue 1997, IOCCG Ocean Color & Primary Productivity from Space,
USA: Darling Marine Center 2004, NSF Geostatistics & Marine Data,
China: Shanghai 2009, Summer Grad Program, Satellite Oceanography,
Chile: U. Concepcion 2014, ASI XIV Satellite Oceanography
China: Hanzhou 2017, State Key Lab of SOED, Open Course Series, Satellite Oceanography

OTHER: Senior scientist 18 oceanographic cruises, participating scientist 20 additional cruises, Guest Editor: Deep Sea Research 2

MEMBER: American Geophysical Union

INTERESTS: competitive swimming, wilderness backpacking, hiking, skate-skiing, foreign travel, foreign people, open minds, good wine, good beer & good food

Anthony Kirincich

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Woods Hole Oceanographic Institution
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Professional Preparation

Vanderbilt University	Nashville, TN	Environmental Engineering	B.E., 1997
University of Rhode Island	Kingston, RI	Physical Oceanography	M.S., 2003
Oregon State University	Corvallis, OR	Physical Oceanography	Ph.D., 2007
Woods Hole Oceanographic Inst.	Woods Hole, MA	Postdoctoral Scholar	2007-2009

Appointments

2013-present Associate Scientist, Woods Hole Oceanographic Institution (tenure 2017)
2009-2013 Assistant Scientist, Woods Hole Oceanographic Institution
Spring 2009 Instructor, Massachusetts Maritime Academy
2002-2007 Ph.D. Program Research, Oregon State University
2001-2002 M.S. Program Research, University of Rhode Island
2000-200 Research Technician, Geophysical Fluid Dynamics Laboratory, U. Rhode Island
2001-2002 Teaching Fellow, Office of Marine Programs, University of Rhode Island
1998-1999 Community Environmental Educator, Peace Corps Macedonia

Recent and Relevant Publications

Kirincich, A.R., J. A. Barth, B. A. Grantham, B. A. Menge, and J. Lubchenco, 2005. Wind-driven inner-shelf circulation off central Oregon during summer. *Journal of Geophysical Research*, **110**, C10S03, doi.1029/2004JC002611.

Kirincich, A.R., S.J. Lentz, and J. A. Barth, 2009. Wave-driven inner-shelf motions on the Oregon coast. *Journal of Physical Oceanography*, **39**, 2942-2956, doi: <http://dx.doi.org/10.1175/2009JPO4041.1>.

Kirincich, A.R., and J. A. Barth, 2009. Along-shelf variability of inner-shelf circulation along the central Oregon coast during summer. *Journal of Physical Oceanography*, **39**, 1380-1398, DOI: 10.1175/2008JPO3760.1.

Kirincich, A.R., and J. A. Barth, 2009. Time-varying across-shelf Ekman transport and vertical eddy viscosity on the inner-shelf. *Journal of Physical Oceanography*, **39**, 602-620, doi: <http://dx.doi.org/10.1175/2008JPO3969.1>.

Kirincich, A.R., S. J. Lentz, and G. Gerbi, 2010. Calculating Reynolds stresses from ADCP measurements in the presence of surface gravity waves using the modeled cospectra method. *Journal of Atmospheric and Oceanic Technology*, **27**, 889-907, doi: <http://dx.doi.org/10.1175/2009JTECHO682.1>

Kirincich, A., T. dePaolo, and E. Terrill, 2012. Improving HF radar estimates of surface currents using signal quality metrics, with application to the MVCO high resolution radar system. *Journal of Atmospheric and Oceanic Technology*, **29**, 1377-1390, doi:10.1175/JTECH-D-11-00160.1.

- Kirincich, A. R., S. J. Lentz, J. T. Farrar, and N. Ganju, 2013. The spatial structure of tidal and mean circulation over the inner shelf south of Martha's Vineyard, Massachusetts. *Journal of Physical Oceanography*, **43**, 1940-1958, doi: <http://dx.doi.org/10.1175/JPO-D-13-020.1>.
- Kirincich, A. R., 2013. Long-term observations of turbulent Reynolds stresses over the inner continental shelf. *Journal of Physical Oceanography*, **43**, 2752-2771, DOI:10.1175/JPO-D-12-0153-1.
- Kirincich, A.R., and G. G. Gawarkiewicz, 2016. Drivers of spring and summer variability in the coastal ocean offshore of Cape Cod, MA. *Journal of Geophysical Research: Oceans*, **121**, 1789-1805, doi:10.1002/2015JC011252.
- Rypina, I.I., A. Kirincich, S. Lentz, and M. Sundermeyer, 2016. Investigating the eddy diffusivity concept in the coastal ocean. *Journal of Physical Oceanography*, **46**, 2201-2218, doi: <http://dx.doi.org/10.1175/JPO-D-16-0020.1>.
- Kirincich, A., 2016b. The occurrence, drivers, and implications of submesoscale eddies on the Martha's Vineyard inner shelf. *Journal of Physical Oceanography*, **46**, 2645-2662. doi: <http://dx.doi.org/10.1175/JPO-D-15-0191.1>.
- Kirincich, A., 2016a. Remote sensing of the surface wind field over the coastal ocean via direct calibration of HF radar backscatter power. *Journal of Atmospheric and Oceanic Technology*, **33**, 1377-1392, doi: <http://dx.doi.org/10.1175/JTECH-D-15-0242.1>.
- Kirincich, A.R., and S.J. Lentz, 2017. The importance of lateral variability on exchange across the inner shelf south of Martha's Vineyard, MA. *Journal of Geophysical Research: Oceans*, **122**, doi:10.1002/2016JC012491.
- Kirincich, A., 2017. Improved detection of the first-order region for direction-finding HF radars using image processing techniques. *Journal of Atmospheric and Oceanic Technology*, **34**, 1679-1691, doi.org/10.1175/JTECH-D-16-0162.1
- Brink, K.H., and A.R. Kirincich, 2017. *Some considerations about coastal ocean observing systems*. In: The Sea: The Science of Ocean Prediction. *Journal of Marine Science*, **75**, 161-188, <https://doi.org/10.1357/002224017821836743>.
- Kirincich, A., B. Emery, L. Washburn, and P. Flament, 2019. Improving surface current resolution using direction finding algorithms for multiantenna high-frequency radars. *Journal of Atmospheric and Oceanic Technology*, <https://doi.org/10.1175/JTECH-D-19-0029.1>
- Bodini, N., J.K. Lundquist, and A. Kirincich, 2020. Offshore wind turbines will encounter very low atmospheric turbulence. *Journal of Physics Conference Series*, **1452**, 012023, doi:10.1088/1742-6596/1452/1/012023
- Lemagie, E., A. Kirincich, and S. Lentz, 2020. The summer heat balance of the Oregon inner shelf over two decades: mean and interannual variability. *Journal of Geophysical Research*, **125**(2), doi.org/10.1029/2019JC015856
- Serra, M., P. Sathe, I. Rypina, A. Kirincich, S.D. Ross, P. Lermusiaux, A. Allen, T. Peacock, and G. Haller, 2020. Search and rescue at sea aided by hidden flow structures. *Nature Communications*, **11** (2525), <https://doi.org/10.1038/s41467-020-16281-x>

MARK F. BAUMGARTNER

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Woods Hole Oceanographic Institution
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Email: mbaumgartner@whoi.edu

PROFESSIONAL PREPARATION

University of Notre Dame, South Bend, Indiana, Mathematics and Computer Science, B.S., 1990.
University of Southern Mississippi, Hattiesburg, Mississippi, Marine Science, M.S., 1995.
Oregon State University, Corvallis, Oregon, Biological Oceanography with Statistics minor, Ph.D., 2002.

APPOINTMENTS

Woods Hole Oceanographic Institution, Biology Department, Woods Hole, Massachusetts.
Senior Scientist (2019-present), Associate Scientist with Tenure (2014-2019), Associate Scientist (2009-2014), Assistant Scientist (2005-2009), Postdoctoral Investigator (2004-2005), Ocean Life Institute Postdoctoral Scholar (2002-2004).
Oregon State University, College of Oceanic and Atmospheric Sciences, Corvallis, Oregon.
NASA Earth System Science Fellow (1999-2002), NASA Space Grant Fellow (1998-1999).
Woods Hole Oceanographic Institution, Physical Oceanography Department, Woods Hole, Massachusetts. Research Associate (1996-1998); Research Assistant (1995-1996).
National Marine Fisheries Service, Stennis Space Center, Bay St. Louis, Mississippi. Computer Specialist (1992-1995).

PRODUCTS

5 Relevant Publications

- Baumgartner, M.F., J. Bonnell, P.J. Corkeron, S.M. Van Parijs, C. Hotchkin, B.A. Hodges, J. Bort Thornton, B.L. Mensi and S.M. Bruner. 2020. Slocum gliders provide accurate near real-time estimates of baleen whale presence from human-reviewed passive acoustic detection information. *Frontiers in Marine Science* 7:100, doi: 10.3389/fmars.2020.00100.
- Baumgartner, M.F., J. Bonnell, S.M. Van Parijs, P.J. Corkeron, C. Hotchkin, K. Ball, L.-P. Pelletier, J. Partan, D. Peters, J. Kemp, J. Pietro, K. Newhall, A. Stokes, T.V.N. Cole, E. Quintana, and S.D. Kraus. 2019. Persistent near real-time passive acoustic monitoring for baleen whales from a moored buoy: system description and evaluation. *Methods in Ecology and Evolution* 10:1476–1489, doi: 10.1111/2041-210X.13244.
- Baumgartner, M.F., K.M. Stafford, P. Winsor, H. Statscewich, and D.M. Fratantoni. 2014. Glider-based passive acoustic monitoring in the Arctic. *Marine Technology Society Journal* 40(5):40-51.
- Baumgartner, M.F., D.M. Fratantoni, T.P. Hurst, M.W. Brown, T.V.N. Cole, S.M. Van Parijs, and M. Johnson. 2013. Real-time reporting of baleen whale passive acoustic detections from ocean gliders. *Journal of the Acoustical Society of America* 134:1814-1823.

Baumgartner, M.F. and S.E. Mussoline. 2011. A generalized baleen whale call detection and classification system. *Journal of the Acoustical Society of America* 129:2889-2902.

5 Additional Publications

Baumgartner, M.F., F.W. Wenzel, N.S.J. Lysiak and M.R. Patrician. 2017. North Atlantic right whale foraging ecology and its role in human-caused mortality. *Marine Ecology Progress Series* 581:165-181.

Baumgartner, M.F. and A.M. Tarrant. 2017. The physiology and ecology of diapause in marine copepods. *Annual Review of Marine Science* 9:387-411.

Baumgartner, M.F., T. Hammar, and J. Robbins. 2015. Development and assessment of a new dermal attachment for short-term tagging studies of baleen whales. *Methods in Ecology and Evolution* 6:289-297.

Baumgartner, M.F., N.S.J. Lysiak, C. Schuman, J. Urban-Rich, and F.W. Wenzel. 2011. Diel vertical migration behavior of *Calanus finmarchicus* and its influence on right and sei whale occurrence. *Marine Ecology Progress Series* 423:167-184.

Baumgartner, M.F., L. Freitag, J. Partan, K. Ball and K. Prada. 2008. Tracking large marine predators in three dimensions: the Real-time Acoustic Tracking System. *IEEE Journal of Oceanic Engineering* 33:146-157.

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Present Appointments

Research Engineer/ CESN Managing Director

School for the Environment – University of Massachusetts in Boston

2008 to current – Boston, MA

- Managing Director for the Center for Coastal Environmental Sensing Networks.
- Responsible for managing all technical aspects of projects in support of the EEOS Research.
- Develops Data Management and Data Mining systems and all necessary software to ensure Data Integrity and Redundancy. Architects software infrastructure for data acquisition and interoperability.
- Designs and constructs electrical and mechanical components and systems to integrate scientific instruments in existing devices. Designs new instrument clusters, and underwater sampling vehicles and equipment. Develops detectors, sensor networks and telemetry solutions for environmental monitoring
- Operates and maintains the EEOS Research Vessel, field equipment and sampling apparatus.

President and CEO Charybdis Group LLC

Engineering Consulting

2008 to current – Boston, MA

- Charybdis Group LLC develops water level monitoring systems, environmental sensing networks, and automation systems in support of environmental remediation, marshland restoration and storm flood detection.

2002 – ‘08 **UMass Boston EEOS Dept. – Research Associate/ Marine technical Manager**

Boston, MA

2000 – ‘02 **Softrax Co. – Senior Software Engineer**

Canton, MA

Professional Preparation

2010 **MS in Computer Science – University of Massachusetts, Boston**

Boston, MA

2000 **BS in Computer Science and Physics – University of Massachusetts**

Boston, MA

Prior **Electrical Engineering Diploma – “Leonardo Da Vinci” Institute**

Florence, Italy

Collaborators

Dr. Chen, Robert F. (EEOS, *University of Massachusetts Boston*), Dr. Zhou, Meng (EEOS, *University of Massachusetts Boston*), Dr. Morris, Robert A. (CS, *University of Massachusetts Boston*), Dr. Little, Thomas (Electrical and Computer Engineering, *Boston University*), Dr. Hellweger, Ferdi L. (Civil and Environmental Engineering, *Northeastern University*), Dr. Chant, Robert (IMCS, *Rutgers University*) Dr. Cherrier, Jennifer (School of the Environment, *FAMU*), Dr. Cable, Jay (Oceanography and Coastal Sciences, *UNC-CH*), Dr. Meile, Christof (Marine Sciences, *UGA*). Industry collaborators list available upon request.

Synergistic Activities

- Engineered customized autonomous winch systems for tow-yow operations on research vessels.
- Holds provisional patents for an e-coli real-time bacterial detector and a cryogenic laser ablation cell.
- Member IEEE, Open Geospatial Consortium, American Geophysical Union, American Society of Limnology and Oceanography, Golden Key National honor Society

Selected Related Publications

- **Peri, F.**, Jiang, M., Zhou, M., Chen, R.F., 2012, A real-time sea-level monitoring network for Massachusetts Bay – At: ASLO 2012 Ocean Science Meeting – Salt Lake City UT
- **Peri, F.**, Chen, R.F., Gardner, B.G., Arriola, J. 2010, *Boston Environmental Area Coastal Observation Network* At: ASLO 2010 Ocean Sciences Meeting – Portland OR
- Calder, M., Morris, R. **Peri, F.** 2009. *Machine reasoning about anomalous sensor data* - Journal of Ecological Informatics, ISEI6 special issue
- **Peri, F.**, Chen, R.F., Pollard, M., 2008. *Integration of C.O.T.S. technology into low cost Coastal Sensing Platforms* – At : ASLO 2008 Ocean Science Meeting – Orlando FL

David R. Walsh, M.S.

Senior Project Manager/Coastal Scientist

(Team Leader, Coastal Measurements and Sediments Group)

Field Party Chief/Field Oceanographer

(Team Leader, Offshore Metocean Monitoring Systems Group)

EXPERTISE

Design and implementation of real-time data monitoring systems in coastal and estuarine environments. Oceanographic data collection systems. Coastal and deep-water mooring system instrumentation and deployment techniques. Field operations logistics, efficiency, safety, and shipboard deck operations. Programming, deployment, and data analysis of oceanographic instruments including the ADCP, ADV, and CTD. Mooring design, floatation/hardware components, and acoustic releases.

Research interests in coastal geomorphology and sedimentology. Application of field and laboratory research to resolve and evaluate physical and geologic processes within coastal, estuarine, and oceanic environments. Utilization of GIS and other geospatial software packages to map and define geomorphological processes and sediment characteristics, including the presence of contaminants. Design, acquisition, and interpretation of bathymetric, side-scan sonar, and sub-bottom sonar surveys. Implementation of sediment sampling strategies to ground-truth geophysical survey data (physical properties, sediment stratigraphy, layer thickness) and estimate sedimentation rates.

QUALIFICATION SUMMARY

- 22 years of experience
- Extensive field/shipboard operations and logistics management of geologic and oceanographic sampling
- Experienced in the deployment/recovery of oceanographic mooring systems, instrumentation, and data processing
- Specializes in oceanographic data collection program management and operational logistics for both surface and subsurface systems.
- Use of ADCPs for temporal (moorings) and spatial (vessel surveys) oceanographic studies
- Sediment core collection and characterization
- Geochronological analysis of sediment cores using radioisotopes activities and contaminant histories
- GIS geospatial analysis applications, cartographic transformations, and digital terrain modeling of topographic and bathymetric data
- Geophysical survey data acquisition, processing, and interpretation (bathymetric, side-scan, sub-bottom)



Education

- 2004 – M.S.
Marine Studies -
Oceanography
University of Delaware
- 1999 – B.S.
Geoscience
Hobart College

Work Experience

- 2020-Present Woods Hole Group, Inc. (Team Leader, Offshore Metocean Monitoring Systems)
- 2018-Present Woods Hole Group, Inc. (Team Leader, Coastal Measurements and Sediments Group)
- 2012-Present Woods Hole Group, Inc. (Sr. Project Manager)
- 2004-2012 Woods Hole Group, Inc. (Coastal Scientist)
- 2001-2004 University of Delaware (Research Assistant)
- 1999-2001 USGS Coastal and Marine Geology Program (Sediment Lab and Mooring Systems Technician)

KEY PROJECTS

Measurements of Currents Along the 501 North Offshore Export Cable Corridor. Vineyard Wind-1. 2020.

Project Manager/Field Party Chief

Vineyard Wind, LLC contracted Woods Hole Group, Inc. to provide a continuous time series of tidal current velocity (magnitude and direction) profiles and near-bottom turbidity at four locations along the Offshore Export Cable Corridor (OECC) from Lease OCS-A 0501 (501 North) through the Muskeget Channel and Nantucket Sound to Cape Cod, Massachusetts. Data were collected over two complete lunar cycles (58-days) at four study locations selected by the client. Current data were collected using bottom mounted (upward profiling) acoustic Doppler current profilers mounted in trawl resistant bottom mounts with an acoustic release system. Conductivity, temperature, pressure, and turbidity data were collected by a Seabird 16plus V2 with ECO-NTU sensor. All operations were conducted safely and on schedule, despite a study area characterized by high currents and mobile seafloor sediment. A quality-controlled data summary report was provided as a final deliverable.

Measurements of Salt Flux in the Delaware Estuary. Philadelphia Water Department. 2019–Present. Project Manager/ Field Party Chief

The Philadelphia Water Department (PWD) is in the process of developing a hydrodynamic water quality model of the tidal Delaware Estuary between Trenton, NJ and Delaware City, DE. As part of this process, the PWD contracted the Woods Hole Group (WHG) to collect data that will be used to calibrate and validate the PWD model. The salt flux study was designed as an intensive, short-term measurement program to characterize the impact of transverse bathymetric interactions on longitudinal and lateral transport processes in the Delaware River estuary. The timing of this study was vital to collecting valuable data; sufficient salt concentration and low flow conditions were needed. Salinity and river discharge conditions were monitored by Woods Hole Group and PWD through August and September 2019. The study was mobilized when increasing salinity values, reaching higher than 7psu at Reedy Island Jetty, were observed in September. The data collection program consisted of two parts: 1) continuous in-situ measurements via moored instrumentation, and 2) a vessel-based survey of cross-channel current and CTD profiles over a 13-hour period. Logistically, a cross-sectional array of five instrumentation stations was deployed across one transect perpendicular to the channel axis for 60 days. Stations consisted of three (3) bottom-mounted ADCPs with CTDs (conductivity, temperature and depth logger), and two (2) surface buoy moorings equipped with downward-looking ADCPs and two CTDs. During the vessel-based survey, a 1200-kHz TRDI ADCP was interfaced with a Trimble RTK GPS and mounted to vessel to collect repetitive cross-channel profile data over the course of the tidal cycle. Collection of CTD profiles at multiple locations took place on the transect alternated with current data collection.

Regional Current Velocity Mapping and Long-term Observations, Strait of Gibraltar, 2007. Field Party Chief.

Mr. Walsh managed the planning and design of a field survey of tidal currents offshore Europa Point, Gibraltar and Ceuta, Spain. The vessel-based survey was performed using a TRDI 150 kHz Quartermaster ADCP with bottom-tracking in order to profile currents out to a depth of approximately 350 meters and collect bathymetric soundings. Subsequent to a rigorous spatial survey mapping current magnitude and direction over a 6-day period, the current meter was deployed in a subsurface mooring to collect a time-series of the complete lunar cycle of tidal currents over 30 days.

KEY PROJECTS (CONTINUED)

WatchDog-1000 Real-time Metocean Mooring System. BP America. 2013–present. Field Party Chief

Woods Hole Group has successfully deployed the WatchDog-1000 ocean monitoring systems in the deep Gulf of Mexico, in Green Canyon 782, for over seven years. At the start of the program, Mr. Walsh was Field Party Chief responsible for the successful annual service, which included offshore operations and inshore refurbishment of instrumentation and mooring components. The WatchDog monitoring system is a rugged, moored metocean monitoring system that is open-ocean survivable and adaptable for use from coastal to deep-water locations. The WatchDog system is designed to operate without servicing for up to one year and independent of deep-water vessels or facilities. WatchDog-1000 is customizable to offer a wide variety of data acquisition solutions including wind, wave, and current profiles in real-time (for example, every twenty minutes 24/7/365) in a variety of environments. The WatchDog-1000 is designed to meet and exceed the data collection and reporting requirements of the BOEM Notice to Lessees (NTL) 2009-G02 during deep-water drilling and producing operations. The basic WatchDog system consists of three primary components – a surface buoy, a subsurface

Cape Cod Physical Oceanographic Real-Time Systems (PORTS). NOAA CO-OPS. 2019–Present. Project Manager and Field Party Chief

In collaboration with the Northeast Regional Association of Coastal Ocean Observing Systems (NERACOOS), Mr. Walsh has helped develop, design, install and maintain the stations that make up the new Cape Cod PORTS system for NOAA. Duties have included procurement, logistics, on-site service and maintenance, and reporting. Mr. Walsh is knowledgeable with PORTS measurement systems, including current meters, wave buoys, water level, meteorological stations and data telemetry, and the rigorous quality control procedures required by NOAA.

Herring River Real-Time Observation Network (HeRRON). Friends of Herring River. 2015–2019. Project Manager

Woods Hole Group successfully designed and installed a network of five real-time water quality monitoring stations in the Herring River, Wellfleet, MA, which is part of the Cape Cod National Seashore, managed by the National Park Service. The HeRRON station data were used to provide baseline data for the restoration of the Herring River estuary, and also to provide monitoring information that can be used to assess the management of restoration through implementation of flow controls on a structure that will be constructed as part of the project. Stations are anticipated to provide data for the next 10-years: before, during, and after the restoration construction. All stations are autonomously power with a solar array and transmit data at 30-minute intervals. Sensors are surveyed to provide water level information relative to the vertical datum of NAVD88. Data parameters included water level, temperature, conductivity, pH, dissolved oxygen, and turbidity.

Current and Wave Data Collection at Morris Cove, New Haven, Connecticut. USACE-New England District. 2011–2012. Field Party Chief.

In the investigation for the potential use of a remnant borrow pit as a confined aquatic disposal (CAD) cell for dredged material, the USACE-NAE contracted Woods Hole Group to deploy an acoustic Doppler current profiler (ADCP) in Morris Cove, New Haven Harbor, CT. Data were collected by the ADCP to characterize the wave and current energy prior to reaching the pit location and to identify the largest waves arriving from the longest fetch location. The first deployment was from May 11 to July 2, 2011. However, due to low wave and ambient current conditions, the ADCP was unable to detect a reliable set of current and wave data over this time period. Therefore,

the ADCP system was redeployed from September 28 to December 1, 2011. During this deployment there was more significant energy (increased waves and winds), and the system performed well throughout the deployment. Upon instrument recovery, current and wave data were post-processed for QA/QC and time series of current components, wave height and period, and plots of directional wave energy were provided to USACE-NAE.

Rhode Island Regional Sediment Management Program, Washington County, RI. USACE-New England District. 2010–2012. Field technician.

Woods Hole Group was the prime contractor for an IDIQ contract with the U.S. Army Corps of Engineers New England District. Under this IDIQ contract, a major data collection Task Order was contracted in the support of the Regional Sediment Management (RSM) Study for the State of Rhode Island. The overall purpose of the study is to develop both local and regional sediment budgets along the coast of Rhode Island and to develop a management plan for the south coast of Rhode Island, incorporating ecosystem concerns, sediment management, and sea level rise considerations. The physical data collected as part of this program were used to develop, calibrate, and validate a comprehensive set of hydrodynamic, wave, sediment transport, and water quality models that are intended to help guide the Rhode Island (RI) RSM Study.

The field measurement program for the Rhode Island RSM Study consists of long-term (yearlong) observations of a wide variety of physical processes, including: twelve (12) real-time tide stations deployed throughout numerous coastal inlets and ponds along the RI shoreline; three (3) real-time wave and current profile (ADCP) stations located offshore of the RI coastline in approximately 30-35 feet of water; one meteorological station; four (4) in-situ horizontal current profilers observing current/sediment flux at coastal inlets; optical backscatter observations; vessel-based acoustic doppler current profile (ADCP) surveys. Data were provided via real-time and available on the Internet. Data were collected to provide a description of the annual conditions along the coastline and within the coastal inlets/ponds. Data will be analyzed with specific focus placed on the sediment management aspects of the program.

ADCP and Tide Data Collection Piscataqua River, Portsmouth, New Hampshire Harbor, Searsport, Maine. USACE-New England District. 2010–2012. Field Party Chief.

As part of a 5-year/\$15M Task Order Contract, the USACE-NAE contracted Woods Hole Group to measure the tidal currents at selected locations in the region over approximately one complete semi-diurnal tidal cycle (12.4 hours), and water levels over a complete 28-day lunar cycle. Current observations were collected using a 1200-kHz Acoustic Doppler Current Profiler (ADCP) with bottom tracking capabilities mounted to a small survey vessel. The vessel transited 4 transects throughout the survey period at each location. Tide (water level) amplitude was collected by mounting a Seabird 37SM to a fixed structure for 30-days, recording data at a 6-minute interval, and providing a surveyed elevation of the pressure sensor, which was used to convert the pressure time series to a water level relative to the NAVD88 vertical datum. Following the data collection, all data were post-processed for QA/QC according to QARTOD guidelines, tide harmonics were calculated, maps of current velocity were created, and all were reported to USACE-NAE for further analysis.

THOMAS A. SHYKA

Product and Engagement Manager
NERACOOS
195 New Hampshire Avenue, Suite 240
Portsmouth, NH, 03801
Tel – 603-570-3025
Email – tom@neracoos.org

Professional Preparation

Colby College	Biology/Environmental Science	B.S., 1990
University of Maryland	Marine Ecology	M.S., 2000

Appointments

2016-Present Product and Engagement Manager, The Northeastern Regional Association of Coastal Ocean Observing Systems (NERACOOS), Portsmouth, NH

2010-2016 Outreach and Communications Specialist, The Northeastern Regional Association of Coastal Ocean Observing Systems (NERACOOS), Portsmouth, NH

2009-2010 Program Manager, Gulf of Maine Research Institute (GMRI), Portland, ME

2006-2009 Chief Operating Officer, Gulf of Maine Ocean Observing System (GoMOOS), Portland, ME

2002-2006 Program Specialist, Gulf of Maine Ocean Observing System (GoMOOS), Portland, ME

2001-2002 Associate Scientist, Northern Ecological Associates, Portland, ME

1999-2002 Marine Ecology Consultant, National Oceanic and Atmospheric Administration, Silver Spring, MD

1998-1999 Dean John A. Knauss Marine Policy Fellowship, National Oceanic and Atmospheric Administration, Silver Spring, MD

Publications

Chen, C., Lin, Z., Beardsley, R. C., **Shyka, T.**, Zhang, Y., Xu, Q., Qi, J., Lin, H., Xu, D. (2020 in press) Impacts of Sea Level Rise on Future Storm-Induced Coastal Inundations over Massachusetts Coasts. *Natural Hazards*

Iwamoto, M., Dorton, J., Newton, J., Yerta, M., Gibeaut, J. C., **Shyka, T.**, Kirkpatrick, B., Currier, R. (2019) Meeting Regional, Coastal and Ocean User Needs with Tailored Data Products: A Stakeholder-Driven Process. *Frontiers in Marine Science*, section Ocean Observation <https://doi.org/10.3389/fmars.2019.00290>

Morrison, J.R., **Shyka, T.**, Durette, C., Chen, C., Beardsley, R., Diers, T., Pettigrew, N., O'Donnell, J., Salisbury, J., Hanson, Al., Young Morse, R., Smith, P., Kite-Powell, H., Tilburg, C., Graham, W., Frankel, S., Manning, J., Spaulding, M., Richert, E., Trowbridge, J.

2012. The Northeastern Regional Association of Coastal Ocean Observing Systems (NERACOOS). Community White Paper for US IOOS Summit. <http://www.iooc.us/summit/>

Shyka, T., Mountain, D., Richert, E. and Bogden, P. 2007. “The Gulf of Maine Ocean Data Partnership – Building a Region-wide Information System to Support Gulf of Maine Resource Management. In: Proceedings of Coastal GeoTools Conference, Myrtle Beach, South Carolina.

Bogden, P., **Shyka, T.**, McIlhagga, D. 2005. Developing a Framework for Distributed and Dynamic Data Sharing Among the Coastal Ocean Community: Gulf of Maine Spatial Data Project and the Open IOOS Portal”. In: Proceedings of the American Geophysical Union, Fall Meeting 2005, San Francisco, CA.

Presentations

Coastal Flooding and Solutions Workshop: Modeling, Prediction, and Sensor Networks for Coastal Flooding in the US East Coast. July 23, 2020: Northeast Coastal Ocean Forecast System (NECOFS): Coastal Inundation Forecast System for Predicting Coastal Flooding from Past and Future Extratropical Nor’easter Storms.

American Meteorological Society’s 100th Annual Meeting: January 2020, Boston, MA. Panel Discussion 2: Saving More Lives and Livelihoods in the Next Century: The Era of Operational Ecological Forecasting. NERACOOS: A foundation for Ecological Forecasting.

American Meteorological Society’s 97th Annual Meeting: January 2017, Seattle, WA. 9B.2: A New Tool for Producing and Visualizing Coastal Erosion, Overwash and Coastal Flooding in New England.

Synergistic Activities

2018-Present Transition P.I. for IOOS COMT Award NA18NOS0120156 Improvement and Technology Transition of the Northeast Coastal Ocean Forecast System (NECOFS) for NOAA and IOOS forecast Operations.

2010-Present Member of the IOOS Association Outreach Committee

2009-Present Management Team Member of the Casco Bay Estuary Partnership

2010-2016 Chair, Northeast Ocean Data Partnership

Riley Young Morse

Senior Program Manager, Ocean Data Products
Gulf of Maine Research Institute
350 Commercial Street, Portland, ME 04101
Tel - 207-228-1663
Email - rmorse@gmri.org

Professional Preparation

Eckerd College, St. Petersburg, FL	B.S. Marine Science, Biology track	1993
University of Rhode Island, Kingston, RI	Fisheries Science M.S. program	1993-1996

Appointments

Senior Program Manager	Ocean Data Products - GMRI	2018-present
Program Manager	Ocean Data Products - GMRI	2009-2018
Product Development Manager	Gulf of Maine Ocean Observing System	2006-2009
Director of Products	JobsInTheUS.com	2004-2006
Web Designer/Developer	JobsInTheUS.com	2000-2004
Program Coordinator	University of Maine Cooperative Extension	1999-2000
Aquaculture Technician	Spinney Creek Shellfish, Eliot, ME	1998-2000
Marine Research Specialist	Graduate School of Oceanography, URI	1997-1998
Research Assistant	Massachusetts Division of Marine Fisheries	1997

Publications

Twardowski, M.S., D.W. Townsend, J.M. Sullivan, C. Koch, N.R. Pettigrew, J. O'Donnell, C. Stymiest, J. Salisbury, T. Moore, **R. Young-Morse**, N.D. Stockley and J. Ruairidh Morrison. 2015. Developing the first operational nutrient observatory for ecosystem, climate and hazard monitoring for NERACOOS. *Mar. Tech. Soc. J.* 49(3): 1-9.

Peros, J.M., **Young Morse, R.** 2015. Reducing Bycatch in New England's Groundfish Sectors: The Development of a Fishing Area Selectivity Tool. Fisheries Bycatch - Global Issues and Creative Solutions Paper presented at 29th Wakefield Fisheries Symposium: Anchorage, AK. Publisher: Alaska Sea Grant College Program, Fairbanks, AK.

Bogden, P., J. Cannon, **R. Young Morse**, I. Ogilvie, B. Blanton, W. Perrie. "Forecasting Storm Damage on the Maine Coast". *Journal of Ocean Technology, An Eye on Poseidon*, Vol. 3, No. 3, 2008.

The Uncommon Guide to Common Life In Narragansett Bay, Save the Bay. 1998 (republished in 2008) R. Young - Illustrator/Lead Writer. *ISBN-13: 978-0615229010*.

Presentations

2018 AGU Fall Meeting: December 2018, Washington, D.C. ED53A-07: *Community Resilience Informed by Science and Experience (C-RISE): Data to Action*

2017 AGU Fall Meeting: December 2017, New Orleans, LA. IN31C-0085: *Visualizing Coastal Erosion, Overwash and Coastal Flooding in New England*; ED53J-04: *Community Resilience Informed by Science and Experience (C-RISE)*

2017 AMS Applied Climatology, June 28th, 2017, Asheville, NC: *Development of an Online Climate and Fisheries Data Dashboard for Stakeholders in the Northeast Shelf Large Marine Ecosystem*

2016 AGU Fall Meeting: December 2016, San Francisco, CA. IN51D-05: *Development of an Online Climate and Fisheries Data Dashboard for Stakeholders in the Northeast Shelf Large Marine Ecosystem*

2014 National Environmental Information Exchange Network Annual Meeting: February 2014. Philadelphia, PA. *A WQX-Enabled Decision Support Tool for Planners in the Northeast*.

Synergistic Activities

1. Lead all initiatives of the Ocean Data Products team to develop, implement and adapt web-based information technologies in support of data discovery, access and integration for marine and coastal data.
2. Serve as lead PI supporting all aspects of data management and cyberinfrastructure (DMAC) infrastructure for NERACOOS (Northeastern Regional Association of Coastal and Ocean Observing Systems).
3. Over 20 years' experience leading web development and data management initiatives.
4. Formal education and significant work experience in ocean observing, marine science and fisheries domains.
5. Develop partnerships and collaborations to develop data-driven, decision support products for broad array of stakeholders in the marine realm.
6. Design and implement technology solutions for acquiring, processing and visualizing large time-series data sets, such as real-time observation, satellite (NASA and NOAA resources) and forecast/hind cast model output.

Research Management Experience – Senior Program Manager, Gulf of Maine Research Institute

Manage a professional staff of four GMRI software developers and an annual budget of \$750,000.

Management of the full product development lifecycle of data products to implement and adapt web based information technologies in support of data discovery, access and integration for marine and coastal data.

Lead the team in developing technology solutions for handling large time-series data sets, (e.g., for real-time observation and forecast/hind cast modeling). Includes: business development, defining projects, schedules, budgets and development of work plans, developing scientific and technical requirements for developers, creating mockups and wireframes of product prototypes and designing the user interfaces, data visualization and front-end tools. Provide outreach and communication to stakeholder and end-user communities. Includes ability to translate scientific and technical informatics material to a lay audience via graphical and written media.

Technical Skills

Languages: HTML, JavaScript, CSS, SQL, XML, ArcGIS, CMS (Drupal, WordPress, Django, Wagtail); familiarity with ASP, .NET, VBScript, PERL, PHP, MySQL

Alexander Kerney

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Experience

Web Application Developer, Gulf of Maine Research Institute, Portland, ME August 2018 - Present

- Developed citizen science platform with focus on classroom usage while maximizing student privacy
- Setting up new common infrastructure in Digital Ocean and AWS for application deployment on Kubernetes
- Developed lightweight ERDDAP summary server and user focused single page front end
- Explored cloud native data ingestion capability to build a common data platform for IOOS that supports a wide range of users from scientific batch data access to real time tsunami warnings
- Created a knowledge graph infrastructure that could support reasoning over geospatial fisheries and climate data with an initial focus on exploring by the impact of climate on the species fished by various ports but capable of supporting various climate related questions

Network Administrator, Bridgton Academy, North Bridgton, ME Summer 2013 - December 2017

- Provided technology support and guidance for a school of ~250 students and employees
- Managed a 1-1 iPad deployment using JAMF Casper Suite
- Designed and taught Introduction to Programming in Python
- Built and implemented school website redesign in WordPress
- Migrated admissions, development and student information system to Filemaker Server from MSSQL
- Created tools to integrate data between Active Directory, Google Apps, Filemaker, Tableau and other systems

Search and Rescue Volunteer, Mahaosuc Mountain Rescue Team, Bethel, ME Summer 2014 - Present

- Providing technology and logistical support including the orchestration of GPS and real time inReach tracking for the statewide SAR conference in 2017

Wilderness Trip Leader, Chewonki Foundation, Wiscasset, ME Summers 2009, 2011, 2012, 2013 & 2016

Interim IT Manager, The Winchendon School, Winchendon, MA Winter 2012 - Spring 2013

- Provided technology support and guidance for a school of ~350 students and employees
- Managed vSphere high availability cluster, Aruba and HP ProCurve equipment providing network services

Research and Technical Assistant, Patagonia Research Foundation, Puerto Williams, Chile Fall 2010 - Spring 2011

- Conducted field research using post processing GPS, ArcGIS, and fixed wing drones
- Executed GIS terrain generation through aerial photo surveys
- Researched feasibility of long range wireless connections to bring stable internet access to Puerto Williams
- Documented field and technology procedures

Field Assistant, Colorado College Geology Department, Colorado Springs, CO Fall 2010

- Collected data from Quanterra seismic instruments that were part of the IRIS EarthScope Flexible Array
- Implemented end of field project station demobilization and data collection
- Coordinated and implemented winter station service and data collection
- Data management and conversion for submission to Incorporated Research Institutions for Seismology

Academic Technology Specialist, Colorado College, Colorado Springs, CO Fall 2008 - Spring 2010

- Ran and supervised the Computers and Advanced Technologies lab for students and faculty
- Ran ArcGIS 9.2 lab including large format plotters and smartboard visualization system

Selected Skills And Technologies

- Python, JavaScript, and Swift programming
- PostgreSQL / PostGIS
- Docker and Kubernetes orchestration
- Mapping using ArcGIS 9.2 & QGIS
- Terrain generation through UAV surveys
- MacOS, Windows, and Linux server setup, administration, and user management
- 1 to 1 iPad deployment design and administration
- Filemaker Server management
- Wordpress theme design

Education

Colorado College, Colorado Springs, CO

Bachelor of Arts, Geology - 2010

At Colorado College, I focused on geomorphology and geophysical applications. My senior project involved the winter field service and data collection from 38 broadband seismometers in the Bighorn Mountains of Wyoming and the integration of Antelope software into the department computer lab to allow local analysis of data. This evolved into a field assistantship and demobilization of the array.

Gould Academy, Bethel, ME

2006

Recent Personal Projects And Technologies Utilized

Riverflo.ws

Riverflo.ws is a web site designed to help river users have a single location to get information for both recreational and scientific use. It is also designed to be the public interface to the river gage (below).

- Python (Flask, SQLAlchemy, Celery, bokeh)
- Postgres / PostGIS / Patroni / WAL-E with Redis for caching

River Gage (online at riverflo.ws/gage/me-bull-branch/)

I'm working on designing and testing low cost river height gages. The goal is to make river level monitoring reasonable for non-profits and individuals to build and deploy on their own.

- Beaglebone Black
- Maxbotix Ultrasonic sensor for water height detection
- Andicelabs solar charge controller with Voltaic solar panels
- Resin.io for updates and management

American Whitewater iOS Application

I worked with American Whitewater to develop an app to help them communicate current advocacy and allow members to easily access the river database.

- Swift
- Core data
- MapKit

The Whitewater Calendar

With many different organizations running whitewater kayak and rafting related events, it can be hard to find out what's happening nearby. The site is built to run off of a Google Sheet to allow easy updates by many people, thus allowing event organizers to announce events on their own.

- dc.js
- Mapbox / Leaflet
- Google Sheets

Sugarloaf Snow Conditions

A season long visualization of current snow conditions at Sugarloaf Mountain.

- Python (Flask, Celery, BeautifulSoup)
- Kubernetes orchestration
- dc.js and d3
- Postgres / PgHoard with Redis for caching

DYLAN PUGH

Portland, ME • 207.772.2321 ext. 1772 • dpugh@gmri.org

SOFTWARE ENGINEER: OBJECT ORIENTED DESIGN, DEVELOPMENT, AND ANALYSIS

- Well-rounded application developer with experience working on technically rigorous industrial applications in a fast-paced Agile environment
- Strong knowledge of Object Oriented concepts and implementations, including data structures, algorithm design and analysis, code maintenance best practices and efficiency assessment
- Extensive business experience encompassing project management, client relations, marketing, business plan creation, financials and billing, and analytics

SKILLS & PROFICIENCIES

Java | Python | C++ | Linux | AWS Lambda | DynamoDB | CloudFormation | Docker | ZMQ | SQLite | Node.js

PROFESSIONAL EXPERIENCE

Gulf of Maine Research Institute

Web Application Developer, May 2020 – Present

I work to design, build, and maintain a diverse set of tools that make data more accessible. My primary focuses are data ingestion/standardization, ERDDAP management, and transitioning legacy systems to modern architectures (Docker, AWS, Kubernetes).

- Work closely with scientists and data managers to ensure data is available to relevant stakeholders
- Maintain and enhance numerous ERDDAP servers and related services
- Design and deploy backend cloud systems using infrastructure-as-code best practices

Here Engineering

Software Developer, May 2018 – May 2020

Working as part of an Agile team, I developed software solutions for a diverse set of clients. Major projects focused on backend Java development with an emphasis on distributed messaging and consumer-facing APIs.

- Worked closely with architects and product managers on all stages of the development process, including design, implementation, deployment and debugging
- Independently implemented and tested a comprehensive SQL database persistence system
- Led and participated in code reviews and product demos

MAJOR PROJECTS

Industrial Power Transformer Monitoring System

A low-latency monitoring system and data aggregator designed for industrial power transformers. The platform interfaces with sensors, collects, analyzes, and persists performance data, and displays results via a Node.js frontend.

As mission-critical software, the system must operate continuously while conforming to rigorous performance and security standards.

Skills utilized: multi-threading, message queues, database architecture

Hospital Metrics Aggregator & Dashboard System

A data visualization platform that allows users to construct custom dashboards and generate reports. The system uses an AWS backend to aggregate raw data and a Node.js frontend to display customizable charts and graphs.

Skills utilized: Node.js visualization libraries, advanced String interpretation, benchmarking

Home Insurance Quote Orchestrator

A backend infrastructure for home insurance quotes which supports a consumer web interface. Accepts API calls, determines which downstream services to invoke, and compiles a response based on the returned information.

Skills utilized: API design & implementation, MapStruct, modular applications, integration testing

ADDITIONAL EXPERIENCE

Energy Circle, LLC

Digital Marketing Account Manager, February 2016 – July 2016

enter:marketing

Senior Marketing Manager, February 2014 – February 2015

EDUCATION

SOUTHERN MAINE COMMUNITY COLLEGE
Computer Science Career Track, 2016 - 2018
4.0 GPA

COLLEGE OF THE ATLANTIC
BA Human Ecology, 2011
Focus in Sustainable Business

CERTIFICATIONS

AWS Certified Cloud Practitioner, valid 2019 – 2021

AWS Certified Developer - Associate, valid 2019 - 2021