

MALCOLM E. SCULLY
Applied Ocean Physics and Engineering
Woods Hole Oceanographic Institution
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ACADEMIC POSITIONS

Associate Scientist Jan 2013—present
Woods Hole Oceanographic Institution, Department of Applied Physics and Engineering
Assistant Professor 2008—2013
Old Dominion University, Center for Coastal and Physical Oceanography.
Postdoctoral Scholar 2005—2008
Woods Hole Oceanographic Institution, Department of Applied Physics and Engineering

EDUCATION

Ph.D., Marine Science 2001—2005
College of William and Mary, School of Marine Science
M.S., Marine Science 1998—2001
College of William and Mary, School of Marine Science
B.A., Environmental Science 1989—1993
University of Virginia, Department of Environment Science.

RESEARCH INTERESTS

The dynamics of coastal and estuarine circulation, including the interactions between density stratification and turbulence mixing, and how these interactions impact the transport and fate of sediment and biologically relevant constituents.

HONORS

2011 State Council of Higher Education for Virginia (SCHEV) Raising Star Award
Nominee
2011 Old Dominion University Early Career Distinguished Research Award
2010 NSF Faculty Early Career Development (CAREER) Award
2009 Cronin Award for Early Achievement, Coastal and Estuarine Research
Foundation.
2005 Matthew Fontaine Maury Fellowship for Outstanding Interdisciplinary Research,
William & Mary, VIMS/SMS

PEER REVIEWED PUBLICATIONS

Scully, M.E., A., W. Fisher, S.E. Suttles, L.P. Sanford, and W.C. Boicourt, *in review*.
Langmuir Circulation in Chesapeake Bay Part 1: Characterization and
Modulation, *Journal of Physical Oceanography*.

- Scully, M.E., G.P. Gerbi, A.W. Fisher, S.E. Suttles, L.P. Sanford, and W.C. Boicourt, *in review*. Langmuir Circulation in Chesapeake Bay Part 2: Turbulence Dynamics. *Journal of Physical Oceanography*
- Bever, A.J., M.A.M. Friedrichs, C.T. Friedrichs, M.E. Scully, and L.L.W. Lanerolle, 2013. Combining observations and numerical model results to improve estimates of hypoxic volume within the Chesapeake Bay, USA. *Journal of Geophysical Research*, doi:10.1002/jgrc.20331.
- Lavery, A.C., W.R. Geyer, and M.E. Scully, 2013. Broadband acoustic quantification of stratified turbulence. *Journal of the Acoustical Society of America*, 134, 40-54.
- Scully, M.E., 2013. Physical controls on hypoxia in Chesapeake Bay: A numerical modeling study. *Journal of Geophysical Research*, 118, 1-18, doi:10.1002/jgrc.20138.
- Scully, M.E., and W.R. Geyer, 2012. The role of advection, straining and mixing on the tidal variability of estuarine stratification, 42, 855-868, doi: 10.1175/JPO-D-10-05010.1.
- Scully, M.E., W.R. Geyer, and J.H. Trowbridge, 2011. The influence of stratification and non-local turbulent production on estuarine turbulence: An assessment of turbulence closure with field observations. *Journal of Physical Oceanography*, 41, 166-185.
- Geyer, W.R., A. Lavery, M.E. Scully and J.H. Trowbridge, 2010. Mixing by shear instability at high Reynolds number. *Geophysical Research Letters*, 37, L22607, doi:10.1029/2010GL045272.
- Scully, M.E., 2010. Wind modulation of dissolved oxygen in Chesapeake Bay, *Estuaries and Coasts*, 33, 1164-1175.
- Scully, M.E., 2010. The importance of climate variability to wind-driven modulation of hypoxia in Chesapeake Bay. *Journal of Physical Oceanography*, 40, 1435-1440.
- Ralston, D.K., W.R. Geyer, J.A. Lerczak, and M.E. Scully, 2010. Turbulent mixing in a strongly forced estuary. *Journal of Geophysical Research*, 115, C12024, doi:10.1029/2009JC006061.
- Scully, M.E., W.R. Geyer and J.A. Lerczak, 2009. The influence of lateral advection on the residual circulation: A numerical modeling study of the Hudson River estuary. *Journal of Physical Oceanography*, 39, 107-124.
- Geyer, W.R., M.E. Scully, and D.K. Ralston, 2008. Quantifying vertical mixing in estuaries. *Environmental Fluid Mechanics*, 8, 495-509, doi: 10.1007/s10652-008-9107-2.

- Scully, M.E., and C.T. Friedrichs, 2007. Sediment pumping by tidal asymmetry in a partially-mixed estuary. *Journal of Geophysical Research*, 112, C07028, doi: 10.1029/2006JC003784.
- Scully, M.E., and C.T. Friedrichs, 2007. The importance of tidal and lateral asymmetries in stratification to residual estuarine circulation in partially-mixed estuaries. *Journal of Physical Oceanography*, 37, 1496-1511.
- Friedrichs, C.T., and M.E. Scully, 2007. Modeling deposition by wave-supported gravity flows on the Po River subaqueous delta from seasonal floods to prograding clinoforms. *Continental Shelf Research*, 27, 322-337.
- Hill, P.S., J.M. Fox, J.S. Crockett, K.J. Curran, D.E. Drake, C.T. Friedrichs, W.R. Geyer, T.G. Milligan, A.S. Ogston, P. Puig, M.E. Scully, P.A. Traykovski and R.A. Wheatcroft, 2007. Sediment delivery to the seabed on the Eel River continental margin. In: C.A. Nittrouer, J.A. Austin, M.E. Field, J.H. Kravitz, J.P.M. Syvitski, and P.L. Wiberg (eds.) *Continental Margin Sedimentation: From Sediment Transport to Sequence Stratigraphy*, IAP Special Publication 37, Blackwell Publishing, Oxford, pp. 49-100.
- Scully, M.E., C.T. Friedrichs, and J.M. Brubaker, 2005. Control of estuarine stratification and mixing by wind-induced straining of the estuarine density field. *Estuaries*, 28, 321-326.
- Scully, M.E., and C.T. Friedrichs, 2003. The influence of asymmetries in overlying stratification on near bed turbulence and sediment suspension in a partially mixed estuary. *Ocean Dynamics*, 53: 208-219.
- Scully, M.E., C.T. Friedrichs, and L.D. Wright, 2003. Numerical modeling results of gravity-driven sediment transport and deposition on an energetic shelf: Eel River, Northern California. *Journal of Geophysical Research*, 108 (C4): 17-1--17-14.
- Wright, L.D., C.T. Friedrichs, and M.E. Scully, 2002. Pulsational gravity-driven sediment transport on two energetic shelves. *Continental Shelf Research*, 22, 2443-2460.
- Scully, M.E., C.T. Friedrichs, and L.D. Wright, 2002. Application of an analytical model of critically stratified gravity-driven sediment transport and deposition to observations from the Eel River continental shelf, Northern California. *Continental Shelf Research*, 22, 1951-1974.
- Wright, L.D., C.T. Friedrichs, S.C. Kim, and M.E. Scully, 2001. The effects of ambient currents and waves on gravity-driven sediment transport on continental shelves. *Marine Geology*, 175, 25-45.

CONFERENCE PROCEEDINGS:

Scully, M.E., C.T. Friedrichs, and J.M. Brubaker, 2004. Control of estuarine stratification and mixing by wind-induced straining of the estuarine density field. 12th International Biennial Conference, Merida, Mexico, 17-20 September, 4 p.

Friedrichs, C.T., L.H. Brasseur, M.E. Scully, and S.E. Suttles, 2003. Use of backscatter from acoustic Doppler current profiler to infer eddy diffusivity of sediment and bottom stress. Proceedings, Coastal Sediments 2003, Sponsored by the American Society of Civil Engineers, 14 p.

Scully, M.E., and C.T. Friedrichs, 2002. The influence of asymmetries in stratification on sediment transport in a partially mixed estuary. Proceedings, Physics of Estuaries and Coastal Seas, 11th International Biennial Conference, Sponsored by the GKSS Research Center, Hamburg, Germany, 17-20 September, p. 216-219.

Friedrichs, C.T., M.E. Scully, and G.M. Battisto, 2000. Sediment transport associated with tidal asymmetry in stratification, mixing and resuspension in the York River estuary. Proceedings, Physics of Estuaries and Coastal Seas, 10th International Biennial Conference, Sponsored by Old Dominion University and the Virginia Institute of Marine Science, Norfolk, VA, 7-11 October, p. 214-216.

OTHER PUBLICATIONS:

Scully, M.E., 2009. The importance of decadal-scale climate variability to wind-driven modulation of hypoxia in Chesapeake Bay. Nature Precedings:
<http://hdl.handle.net/10101/npre.2009.3308.1>

Friedrichs, C.T., M.E. Scully, and L.D. Wright. Upscaling simple models for energetic shelf sediment transport, Final technical report. Prepared for Office of Naval Research Coastal Geosciences Program, VIMS Technical Report CHSD-2005-01 15p.

INVITED PRESENTATIONS:

Scully, M.E. Langmuir Circulation in Chesapeake Bay. University of Massachusetts Dartmouth, SMAST Seminar. 30 April 2014.

Scully, M.E. Physical Controls on the Inter-Annual Variability of Hypoxia in Chesapeake Bay. Texas A&M University, Department of Oceanography, College Station, TX. 11 November 2013.

Scully, M.E. Using Circulation Models to Understand the Role of Physical Processes in Controlling Inter-annual Variations of Hypoxia in Chesapeake Bay. Chesapeake Bay Program, Dissolved Oxygen Assessment in the Chesapeake Bay Community Seminar, Annapolis, MD. 8 May 2013.

- Scully, M.E. Physical Controls on Hypoxia in Chesapeake Bay. University of Connecticut, Marine Science Program Seminar, Avery Point, CT. 22 March 2013.
- Scully, M.E. Parameterizing Mixing in Estuaries: How well do we really understand estuarine mixing? University of Delaware, Physical Ocean Science and Engineering (POSE) Program Seminar, 31 August 2012.
- Scully, M.E. A Simple Model for Oxygen Dynamics in Chesapeake Bay. Community Surface Dynamics Modeling System (CSDMS), Boulder, CO. 29 October 2011.
- Scully, M.E. Physical Controls on Hypoxia in Chesapeake Bay. Virginia Institute of Marine Sciences Institute Seminar, Gloucester, VA. 21 October 2011.
- Scully, M.E. Physical Controls on Hypoxia in Chesapeake Bay. Woods Hole Oceanographic Institution, Coastal Ocean Fluid Dynamics Laboratory Seminar, 19 August 2011.
- Scully, M.E. Estuarine Turbulence Modeling. Chesapeake Community Modeling Program, Hydrodynamic Modeling Workshop, Smithsonian Environmental Research Center, Edgewater, MD, 10 June 2011.
- Scully, M.E. The Physical Modulation of Seasonal Hypoxia in Chesapeake Bay. University of North Carolina at Chapel Hill, Marine Science Department, Seminar, 23 March, 2011.
- Scully, M.E. Wind-driven Modulation of Hypoxia in Chesapeake Bay. Chesapeake Bay Program Modeling Quarterly Review, Annapolis, MD, 1 April 2010.
- Scully, M.E. Wind-driven Modulation of Hypoxia in Chesapeake Bay. Rutgers University, Institute of Marine and Coastal Studies, IMCS Seminar, 19 October 2009.
- Scully, M.E. The Dynamics and Structure of a Coastal Plain Estuary Revisited: The Importance of Tidal Nonlinearities to the Subtidal Estuarine Momentum Balance. Gordon Research Conference, Coastal Ocean Circulation, Colby-Sawyer College, New London, NH, 11 June, 2009.
- Scully, M.E. Wind-driven Modulation of Dissolved Oxygen in Chesapeake Bay. University of Maryland Center for Environmental Science, Horn Point Laboratory, Seminar, 20 May 2009.
- Scully, M.E. Wind-driven Modulation of Dissolved Oxygen in Chesapeake Bay. Woods Hole Oceanographic Institution, Coastal Ocean Fluid Dynamics Laboratory Seminar, 12 December 2008.
- Scully, M.E. Physical Modulation of Dissolved Oxygen in Chesapeake Bay. Virginia Institute for Marine Science, Physical Sciences, Department Seminar, 4 December 2008.

TEACHING EXPERIENCE:

Old Dominion University, Department of Ocean, Earth and Atmospheric Science

CLASSES TAUGHT:

- OEAS 306—Oceanography, Spring 2009-2012
- OEAS 441—Ocean and Earth Sciences Field Study I, Fall 2009-2011
- OEAS 442—Ocean and Earth Sciences Field Study II, Spring 2010-2012
- OEAS 604—Physical Oceanography, Fall 2009-2011
- OEAS 651—Introduction to the Physics of Estuaries, Fall 2008
- OEAS 895—Implications of Estuarine Mixing, Spring 2008.

MENTORING

GRADUATE STUDENTS:

Michael Fine, M.S. Graduated December 2011

STUDENT COMMITTEE SERVICE:

- Mahmoud Kamel, 2009-2011, M.S.
- Diego Narvaez, 2009-2011, Ph.D.
- Kevin Conner, 2011, M.E.
- Robert Walker, 2010, M.E.

UNDERGRADUATE RESEARCH MENTORING:

- 2011, Matthew Weiss
- 2009-present, W. Bryce Corlett
- 2009-present, Jennifer Thomas

CURRENT RESEARCH FUNDING

Collaborative Research: Circulation and Mixing in a Coastally Trapped River Plume. National Science Foundation. (\$313,803), August 2013 – July 2016.

Bottom Stress and the Generation of Vertical Vorticity. National Science Foundation. (\$745,626), June 2014 – May 2017.

CAREER: Physical Modulation of Dissolved Oxygen in Chesapeake Bay. National Science Foundation. (\$743,676), May 2010 – April 2016.

Transitioning an Estuarine Hypoxia Model to Operations via a COMT in the Chesapeake Bay. NOAA-IOOS via SURA sub-contract. (\$110,386), August 2013 – July 2015.