

Philip Mark Orton

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RESEARCH INTERESTS

Estuary and coastal ocean physics; storm surges and sea level rise; urban coastal adaptation; turbulent mixing; air-sea interaction and gas exchange; sediment transport; urban and coastal atmospheric science; numerical ocean and atmospheric modeling.

EDUCATION

University of Michigan	physical oceanography	B.S. 1994
University of South Carolina	marine science	M.S. 1996
Columbia University	physical oceanography	Ph.D. 2010
Stevens Institute of Technology	oceanic and atmospheric physics	post-doc 2010-2011

RESEARCH POSITIONS HELD

2014 - current	Research Assistant Professor, Stevens Institute of Technology
2012 - 2013	Research Scientist, Stevens Institute of Technology
2011 - 2012	Postdoctoral Research Scientist, Stevens Institute of Technology
2010 (3 mo)	Postdoctoral Research Scientist, Lamont-Doherty – NSF-RAPID oil spill grant
2004 - 2010	Graduate Research Assistant, Lamont-Doherty Earth Observatory, Columbia U.
1998 - 2003	Research Associate, Oregon Graduate Institute
1997 - 1998	Research Assistant, United States Geological Survey
1995 - 1996	Graduate Research Assistant, University of South Carolina

GRANTS

2015	NOAA-CPO-CSI-RISA, “Supporting Regional Implementation of Integrated Climate Resilience: Consortium for Climate Risk in the Urban Northeast (CCRUN) Phase II” (R. Horton, F. Montalto, W. Solecki lead-PIs; P. Orton and 4 others Co-PIs; \$425k to Stevens, through 9/30/2020)
2014	National Parks Service, “Coastal adaptation impacts on Jamaica Bay water quality, waves and flooding” (P. Orton, Lead-PI, \$700k, through 10/2016)
2014	Continuation of Inundation Hazard Assessment for New York City from Hurricane Storm Surge, Rainfall, and Climate Change (P. Orton, lead PI, A. Blumberg, Co-PI; new funds, \$85k, through 6/2016)
2014	Naval Research Laboratory, “Improved Coastal Flood Forecasts with COAMPS-TC” (J. Pullen, PI; Orton and A. Blumberg, Co-PIs, \$110k)
2014	NASA Interdisciplinary Research in Earth Science, “Vulnerability of the U.S. Atlantic Coast to Hazards Associated with Extreme Winter Storms (Y. Kushnir, PI; P. Orton and five others, Co-PIs; \$1.5M, \$210k to Stevens)
2013	Housing and Urban Development (HUD) Rebuild By Design (K. Orff, PI; P. Orton, co-author and partner; \$200k, \$10k to Orton)

- 2013 NOAA Sea Grant, “Collaborative climate adaptation planning for urban coastal flooding” (Orton, Co-PI; P. Rowe, PI; A. Blumberg, Co-PI; \$150k, \$85k to Stevens)
- 2013 New England Interstate Water Pollution Control Commission, “ (H. Roberts, PI; Orton, J. Miller, Co-PIs; \$80k, \$11k to Stevens)
- 2013 NOAA Coastal and Ocean Climate Applications, “Quantifying the Value and Communicating the Protective Services of Living Shorelines Using Flood Risk Assessment” (Blumberg, PI; Orton, Becker and Sanderson Co-PIs; \$330k)
- 2013 Hudson River Foundation, “Real-Time Observations in the Hudson River during Extreme Events” (Blumberg, PI; Orton Co-PI; \$75k)
- 2013 NY Sea Grant, “Analyzing history to project and manage the future: Simulating the effects of climate on Long Island Sound’s physical environment and living marine resources” (N. Georgas, PI; Orton, Blumberg, Howell, Co-PIs; \$380k)
- 2013 New York City Office of Emergency Management, “Proposed technical study of the effects of sea level rise on coastal flooding in New York City” (Orton, Blumberg, Georgas, Gornitz; \$180k)
- 2012 NYSERDA: “The Hudson River Flood Hazard Decision Support System – Accurate Modeling of Flood Zones for Combined Sea Level Rise, Storm Surge, and Rain” (M. Becker, PI; Orton, Blumberg, Lall, Co-PIs, \$300k)
- 2012 NOAA-COCA: “Building resilience to storm surges and sea level rise: A comparative study of coastal zones in New York City and Boston (M. Madajewicz lead PI; A. Blumberg Co-PI; P. Orton and M. Becker, Co-Is; \$300k, \$55k to Stevens)
- 2011 NASA: “Hurricane Wind and Inundation Risk on the U.S. Northeast and New York City” (T. Hall, PI; Orton, Blumberg, co-authors; \$300k, \$226k to Stevens)
- 2010 NSF, “RAPID: Impact of Gulf Oil Surface Films on Atmosphere-Ocean Exchange” (W. McGillis, PI; P. Orton, co-author, \$124k)
- 2008 NSF GK-12 graduate fellowship for high school teaching (\$40k)
- 2007 Hudson River Foundation graduate fellowship, “Observing and predicting estuarine upper water column turbulence: Bubbles, braids and billows beyond the bottom boundary layer“ (P. Orton, PI; \$16k)
- 2007 NASA summer graduate fellowship, “Physical controls on continental shelf air-sea CO₂ fluxes: Autonomous in situ observations” (P. Orton, PI; \$4k)

TEACHING & MENTORING

- 2011 - 2015 Guest lectures for graduate-level courses (e.g. sea level rise, storm surges)
- 2011 - 2015 Lead author of a group science blog with 75000+ hits, <http://SeaAndSkyNY.com>
- 2008 - 2013 Supervised or co-supervised six summer research internships
- 2006 Guest lectures for graduate-level courses (carbon cycle, physical oceanography)
- 2005 - 2006 Teaching assistant, "Dynamics of Climate Variability and Change"

AWARDS

- 2014 - 2015 Buckminster Fuller design challenge award, 2015 ACEC New York PLATINUM AWARD, AIA Architecture collaboration award – all for flood adaptation design
- 2014 Housing and Urban Development Rebuild By Design – winning design team

SYNERGISTIC ACTIVITIES

- 2013 - 2015 Member, NYC Panel on Climate Change (NPCC)
- 2015 Jamaica Bay Science and Resilience Institute, multiple leadership positions
- 2015 New Jersey Wetland Mitigation Council - being added as a new member
- 2015 New Jersey Climate Adaptation Alliance, Science and Technical Advisory Panel
- 2014 Co-hosted (with Alan Blumberg and others) the "Sustainable Coasts in the Urban Northeast" workshop at Stevens
- 2013 Adviser to NYC's Special Initiative on Rebuilding and Resilience after Sandy
- 2012 - 2015 Hurricane Sandy and coastal adaptation media: national, local TV/newsprint (ABC 20/20, MSNBC, NPR, PBS, FOX, NBC, CBS, WNYC)

PEER-REVIEWED PUBLICATIONS

- Orton, P. M., S. A. Talke, D. A. Jay, L. Yin, A. F. Blumberg, N. Georgas, H. Zhao, H. J. Roberts, and K. MacManus (2015), Channel Shallowing as Mitigation of Coastal Flooding, *Journal of Marine Science and Engineering*, 3(3), 654-673, DOI: 10.3390/jmse3030654.
- Blumberg, A., N. Georgas, L. Yin, T. Herrington, and P. Orton (2015), Street scale modeling of storm surge inundation along the New Jersey Hudson River waterfront, *J. Atmos. Oceanic Technol.*, DOI: 10.1175/JTECH-D-14-00213.1.
- Orton, P., S. Vinogradov, N. Georgas, A. Blumberg, N. Lin, V. Gornitz, C. Little, K. Jacob, and R. Horton, 2015. New York City Panel on Climate Change 2015 Report Chapter 4: Dynamic Coastal Flood Modeling. *Annals of the New York Academy of Sciences*, 1336(1), 56-66.
- Wang, J., D. G. MacDonald, P. M. Orton, K. Cole, and J. Lan (2015), The Effect of Discharge, Tides, and Wind on Lift-Off Turbulence, *Estuaries Coasts*, 1-15, DOI: 10.1007/s12237-015-9958-y.
- Georgas, N., Orton, P., Blumberg, A., Cohen, L., Zarrilli, D. and Yin, L, 2014. The Impact of Tidal Phase on Hurricane Sandy's Flooding around New York City and Long Island Sound, *Journal of Extreme Events*, DOI: 10.1142/S2345737614500067.
- Talke, S., P. Orton, and D. Jay, 2014. Increasing Storm Tides at New York City, 1844-2013, *Geophys. Res. Lett.*, 41, DOI: doi:10.1002/2014GL059574.
- Meir, T., Orton, P.M., Pullen, J., Holt, T., Thompson, W.T., Arend, M.F., 2013. Forecasting the New York City urban heat island and sea breeze during extreme heat events. *Weather and Forecasting*. doi: 10.1175/WAF-D-13-00012.1
- Grimmond C.S.B., A. Baklanov, M. Best, R. Betts, J. Feddema, P. Falloon, G. Folberth, R. Frances, T. Holt, T. Jackson, E. Larson, M. Lawrence, M. McCarthy, T. Meir, N. Mirumachi, K. Oleson, P. Orton, and J. Pullen, 2013. Coastal Megacities: Contributions to environmental changes at regional and global scales, *Megacities and the Coast: Risk, Resilience and Transformation* (Pelling, M. & Blackburn, S., Eds.), 100-129.
- Orton, P., N. Georgas, A. Blumberg, and J. Pullen, 2012. Detailed Modeling of Recent Severe Storm Tides in Estuaries of the New York City Region, *J. Geophys. Res.*, 117:C09030, doi:10.1029/2012JC008220.
- Harrison, E., Veron, F. Ho, D., Reid, M., Orton, P. and McGillis, W., 2012. Nonlinear interaction between rain-and wind-induced air-water gas exchange, *J. Geophys. Res.*, 117(C3), C03034.
- Ho, D.T., Schlosser, P. and Orton, P.M., 2011. On factors controlling air-water gas exchange in a large tidal river, *Estuaries and Coasts*, 34:1103-1116, DOI: 10.1007/s12237-011-9396-4.

- Orton, P.M., McGillis, W.R., and Zappa, C.J., 2011. An autonomous self-orienting catamaran for measuring air-water fluxes and forcing. In: *Gas Transfer at Water Surfaces*, edited by S. Komori et al., Kyoto University Press.
- Orton, P. M., Zappa, C.J., and McGillis, W.R., 2010. Tidal and atmospheric influences on near-surface turbulence in an estuary, *J. Geophys. Res.*, 115, C12029, doi:10.1029/2010JC006312.
- Orton, P.M., McGillis, W.R., and Zappa, C.J., 2010. Sea breeze forcing of estuary turbulence and CO₂ exchange. *Geophys. Res. Lett.*, 37, L13603, doi:10.1029/2010GL043159.
- Hickey, B. M., R. M. Kudela, J. D. Nash, K. W. Bruland, W. T. Peterson, P. MacCready, E. J. Lessard, D. A. Jay, N. S. Banas, A. M. Baptista, E. P. Dever, P. M. Kosro, L. K. Kilcher, A. R. Horner-Devine, E. D. Zaron, R. M. McCabe, J. O. Peterson, P. M. Orton, J. Pan, and M. C. Lohan, 2010. River Influences on Shelf Ecosystems: Introduction and Synthesis, *J. Geophys. Res.*, doi:10.1029/2009JC005452.
- Horner-Devine, A., Jay, D.A., Orton, P.M., and Spahn, E., 2009. A conceptual model of the strongly tidal Columbia River plume. *Journal of Marine Systems*, 78(3): 460–475, doi:10.1016/j.jmarsys.2008.11.025.
- Jay, D.A., Pan, J., Orton, P.M., and Horner-Devine, A., 2009. Asymmetry of tidal plume fronts in an eastern boundary current regime. *Journal of Marine Systems*, 78(3): 442-459, doi:10.1016/j.jmarsys.2008.11.015.
- Orton, P.M. and Visbeck, M., 2009. Variability of internally generated turbulence in an estuary, from 100 days of continuous observations. *Continental Shelf Research*, doi:10.1016/j.csr.2007.07.008.
- Pan, J., Jay, D. A., and Orton, P. M., 2007. Analyses of internal solitary waves generated at the Columbia River plume front using SAR imagery, *J. Geophys. Res.*, 112, C07014, doi:10.1029/2006JC003688.
- Jay, D. A., Orton, P. M., Chisholm, T., Wilson, D.J., and Fain, A.M.V. 2007. Particle trapping in stratified estuaries: Consequences of mass conservation. *Estuaries and Coasts* 30(6), 1095-1105, doi: 10.1007/BF02841399.
- Jay, D. A., Orton, P. M., Chisholm, T., Wilson, D.J., and Fain, A.M.V. 2007. Particle trapping in stratified estuaries: Application to observations. *Estuaries and Coasts* 30(6), 1106-1125, doi: 10.1007/BF02841400.
- Orton, P. M., and Jay, D. A., 2005. Observations at the tidal plume front of a high-volume river outflow, *Geophys. Res. Lett.*, 32, L11605, doi:10.1029/2005GL022372.
- Emmett, R.L, Brodeur, R.D. and Orton, P.M. 2004. The vertical distribution of juvenile salmon (*Oncorhynchus* spp.) and associated fishes in the Columbia River plume. *Fisheries Oceanography* 13:6, 392-402, doi: 10.1111/j.1365-2419.2004.00294.x.
- Fain, A.M.V., Jay, D. A., Wilson, D. J., Orton, P. M., and Baptista, A. M. 2001. Seasonal, monthly and tidal patterns of particulate matter dynamics in the Columbia River estuary, *Estuaries* 24: 770-786, doi: 10.2307/1352884.
- Orton, P.M. and Kineke, G.C. 2001. Comparing calculated and observed vertical suspended sediment distributions from a Hudson River Estuary turbidity maximum. *Estuarine, Coastal and Shelf Science*, 52(3), 401-410, doi: 10.1006/ecss.2000.0747.