

Philip Mark Orton

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HIGHLIGHTS

Research specialization in coastal physical oceanography, storm surges, and climate change.

Since 2010, I have published 27 peer-reviewed articles on coastal physical oceanography, storm surge, sea level rise, and climate change impacts and adaptation

Since 2010, I have been PI, lead author, or co-author on 18 funded research proposals worth \$3.9 million to my institution, from 13 diverse federal, state and city agencies

RESEARCH INTERESTS

Estuary and coastal ocean circulation and physics; storm surges and sea level rise; urban coastal adaptation; estuary biogeochemistry; turbulent mixing; air-sea interaction and gas exchange; sediment transport and morphologic change; urban and coastal atmospheric science; numerical ocean, atmosphere and sediment modeling.

PROFESSIONAL PREPARATION

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

TEACHING & MENTORING

2016 - 2018	Taught Intermediate Fluid Dynamics for undergraduate and graduate students
2017 - 2018	Supervised three Ph.D. students to successful qualifier exams
2017	Supervised a successful Master's Degree thesis/defense, Praneeth Gurumurthy
2015 - 2017	Supervising a post-doctoral scientist with three peer-reviewed publications
2008 - 2013	Supervised or co-supervised six summer research internships
2008 - 2009	Taught weekly enviro. science course for high school students (NSF fellowship)
2006 - 2017	21 guest class lectures for Stevens/Columbia courses (e.g. climate, oceanography)
2005 - 2006	Hudson River Snapshot Day field trip guest scientist (for 9 th graders)
2005 - 2006	Teaching assistant, "Dynamics of Climate Variability and Change"

2004 - 2007 Lamont Open House hands-on exhibits related to physical oceanography
1999 Organized and led an informal seminar on Environmental Economics
1994 - 1996 Teaching Assistant, then curriculum developer, University of South Carolina

AWARDS

2010 - present Lead or co-author on 18 funded research proposals worth \$3.9 million from 13 diverse federal, state and city agencies (NSF, USACE, NOAA, NASA, NPS, ONR, Sea Grant, NYSERDA, NYC, NJ-DEP, HRF, NEIWPC, HUD)
2017 Hyperion Innovation Excellence Award for supercomputing applications
2017 Conservation Achievement Award from the NY-NJ Harbor & Estuary Program and the NYSDEC Hudson River Estuary Program for the HRECOS system
2014 - 2015 Flood adaptation design awards – Buckminster Fuller design challenge, 2015 ACEC New York PLATINUM AWARD, ASLA-New York Collaborative Design
2014 Housing and Urban Development Rebuild By Design – winning design team
2000 - 2008 Lead or coauthor on 6 successful grant or fellowship proposals (e.g. NSF, NOAA)

SYNERGISTIC ACTIVITIES

Governmental service/science - NYC Panel on Climate Change (NPCC; (2013-present), appointed by NJ Governor Christie to the New Jersey Wetland Mitigation Council (2017-present), NY/NJ Harbor Estuary Program Science and Technical Advisory Panel (2017-present), New Jersey Climate Adaptation Alliance Science and Technical Advisory Panel (2015-6), Adviser to NYC's Special Initiative on Rebuilding and Resilience after Sandy (2013)

Media coverage - Hurricane Sandy and coastal flood adaptation media: national, local TV/newsprint (ABC 20/20, MSNBC, NPR, PBS, FOX, NBC, CBS, WNYC, New York Times)

Opinion/Editorial – New York Times Op-Eds: *The Next Mayor of New York Needs to Continue to Lead on Climate* (2013); (On question “Should New York Build Sea Gates?”) *Big Projects, Big Problems, So Think Small* (2012); *Sniffing Out the Truth* (2007)

Academic service – Jamaica Bay Science and Resilience Institute, Executive Committee and Science Steering Committee, NY/NJ Harbor Estuary Program Science and Technical Advisory Panel (2017-present)

Peer-review - Reviewer for the National Science Foundation, Environmental Protection Agency, The Water Institute of the Gulf, Sea Grant, Hudson River Foundation, Journal of Physical Oceanography, Nature Climate Change, Journal of Geophysical Research, Geophysical Research Letters, Deep Sea Research, Journal of Atmospheric and Oceanic Technology, Climatic Change, Journal of Marine Science and Engineering, Ocean and Coastal Management, Journal of Waterway, Port, Coastal and Ocean Engineering, Scientific Reports, Bulletin of the American Meteorological Society, Natural Hazards, Estuaries and Coasts

PEER-REVIEWED PUBLICATIONS (underlined cases, as graduate/postdoc adviser)

1. Bakhtyar, R., P. M. Orton, R. Marsooli, and J. K. Miller (2018), Rapid wave modeling of severe historical extratropical cyclones off the Northeastern United States, *Ocean Engin.*, 159, 315–332, doi:10.1016/j.oceaneng.2018.04.037.

2. Marsooli, R., P.M. Orton, J. Fitzpatrick, and H. Smith (2018), Residence time of a highly urbanized estuary: Jamaica Bay, New York, *Journal of Marine Science and Engineering*, 6(44), doi:10.3390/jmse6020044
3. Orton, P., F. Conticello, F. Cioffi, T. Hall, N. Georgas, U. Lall, A. Blumberg, and K. MacManus (2018), Hazard assessment from storm tides, rainfall and sea level rise on a tidal river estuary, 1-29, doi:10.1007/s11069-018-3251-x.
4. Hu, K., Chen, Q., Wang, H., Hartig, E. K., & Orton, P. M. (2018). Numerical modeling of salt marsh morphological change induced by Hurricane Sandy. *Coastal Engin.*, 132: 63–81.
5. Marsooli, R., Orton, P.M., Mellor, G., Georgas, N. and Blumberg, A.F., 2017. A Coupled Circulation-Wave Model for Numerical Simulation of Storm Tides and Waves, *J. Atmos. Oceanic Tech.*, doi:10.1175/JTECH-D-17-0005.1.
6. Kemp, A. C., T. D. Hill, C. H. Vane, N. Cahill, P. M. Orton, S. A. Talke, A. C. Parnell, K. Sanborn, and E. K. Hartig (2017), Relative sea-level trends in New York City during the past 1500 years, *The Holocene*, doi:10.1177/0959683616683263.
7. Marsooli, R., P.M. Orton, and G. Mellor, 2017. Modeling wave attenuation by salt marshes in Jamaica Bay, New York, using a new rapid wave model, *J. Geophys. Res.*, 122, doi:10.1002/2016JC012546.
8. Gornitz V., R. Horton D.A. Bader, P.M. Orton, C. Rosenzweig, 2017. Coping with Higher Sea Levels and Increased Coastal Flooding in New York City. In: Leal Filho W., Keenan J. (eds) *Climate Change Adaptation in North America. Climate Change Management*. Springer, Cham. DOI: 10.1007/978-3-319-53742-9_13.
9. Orton, P. M., T. M. Hall, S. Talke, A. F. Blumberg, N. Georgas, and S. Vinogradov, 2016. A Validated Tropical-Extratropical Flood Hazard Assessment for New York Harbor, *J. Geophys. Res.*, 121. doi: 10.1002/2016JC01167.
10. Close, S. L., F. Montalto, P. Orton, A. Antoine, D. Peters, H. Jones, A. Parris, and A. Blumberg, 2016. Achieving sustainability goals for urban coasts in the US Northeast: research needs and challenges, *Local Environ.*, doi:10.1080/13549839.2016.1233526.
11. Georgas, N., L. Yin, Y. Jiang, Y. Wang, P. Howell, V. Saba, J. Schulte, P. Orton, and B. Wen, 2016. An Open-Access, Multi-Decadal, Three-Dimensional, Hydrodynamic Hindcast Dataset for the Long Island Sound and New York/New Jersey Harbor Estuaries, *J. Marine Sci. Engin.*, 4(48), DOI: 10.3390/jmse4030048.
12. Marsooli, R., P.M. Orton, N. Georgas, and A. F. Blumberg, 2016. Three-Dimensional Hydrodynamic Modeling of Coastal Flood Mitigation by Wetlands, *Coast. Eng.*, 111, 83-94.
13. Brandon, C. M., J. D. Woodruff, P. M. Orton, and J. P. Donnelly, 2016. Evidence for Elevated Coastal Vulnerability Following Large-Scale Historical Oyster Bed Harvesting, *Earth Surf. Proc. Landforms*, DOI: 10.1002/esp.3931.
14. 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, *J. Marine Sci. Engin.*, 3(3), 654-673, DOI: 10.3390/jmse3030654.
15. 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.
16. 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. *Ann. New York Acad. Sciences*, 1336(1), 56-66.

17. 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.
18. 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, *J. Extreme Events*, DOI: 10.1142/S2345737614500067.
19. 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.
20. 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
21. 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.
22. 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.
23. 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.
24. 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.
25. 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.
26. 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.
27. 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.
28. 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.
29. 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.
30. 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.
31. 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.

32. 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.
33. 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.
34. 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.
35. 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.
36. 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.
37. 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.

SELECTED LIST OF MEDIA

NBC News New York during Hurricane Irene, August 25, 2011:

<https://www.youtube.com/watch?v=6BHRaOoLXfU>

CBS News New York during Hurricane Sandy's approach:

<https://www.youtube.com/watch?v=q2807DgXkZw>

FOX News New York during Hurricane Sandy:

<https://www.youtube.com/watch?v=0HgOEhj20q0&t=1s>

<https://www.youtube.com/watch?v=whoITLviO5E>

<https://www.youtube.com/watch?v=0HgOEhj20q0&t=1s>

MSNBC during Sandy: <https://www.youtube.com/watch?v=j7gb4MhE8NA>

ABC 20/20 on October 30th, 2012: <https://www.youtube.com/watch?v=s7Ao6ZUnwXM>

PBS Newshour, December 17, 2012 <https://www.youtube.com/watch?v=C54kALD6rEs&t=4s>

NPR Science Friday (radio), November 1, 2013:

<https://www.sciencefriday.com/segments/hurricane-sandy-recovery-one-year-later/>

NBC New York, October 13, 2014

https://www.nbcnewyork.com/on-air/as-seen-on/NYC-2050_-Weather-in-the-Future_New-York-279081951.html

NBC New York, November 4, 2014 <https://www.youtube.com/watch?v=aY3ECni9ZmI>

WNYC several times:

February 25, 2013 <http://www.wnyc.org/story/271288-tricked-topography-how-staten-island-neighborhood-became-so-dangerous-during-sandy/>

December 6, 2013 <https://www.wnyc.org/story/fed-flood-maps-left-ny-unprepared-sandy-and-fema-knew-it/>

July 29, 2015 <https://www.wnyc.org/story/fight-over-citys-flood-zones-will-matter-years-come/>

August 7, 2015 <https://www.wnyc.org/story/army-corps-proposes-great-wall-staten-island-ward-hurricanes/>

February 9, 2016 <https://www.wnyc.org/story/flooding-continues-rockaways/>

October 17, 2016 <https://www.wnyc.org/story/fema-incorporate-climate-change-new-flood-maps/>

OP-EDs

- Orton, P.M., NY Times Room-For-Debate editorial, *The Next Mayor of New York Needs to Continue to Lead on Climate* (2013)
- Orton, P.M., NY Times Room-For-Debate editorial, *Should New York Build Sea Gates? Big Projects, Big Problems, So Think Small* (2012)
- O'Mullan, G., Orton, P., McGillis, W., Sambrotto, R., and Mailloux, B., Sniffing out the Truth, *New York Times Sunday Edition*, Opinions Section, January 21, 2007.
- Orton, P.M., Energy crisis much broader than perceived, *The Oregonian*, Editorial Section, January 29, 2001.

OTHER PUBLICATIONS

- Kopp, R.E., A. Broccoli, B. Horton, D. Kreeger, R. Leichenko, J.A. Miller, J.K. Miller, P. Orton, A. Parris, D. Robinson, C.P. Weaver, M. Campo, M. Kaplan, M. Buchanan, J. Herb, L. Auermuller and C. Andrews. 2016. Assessing New Jersey's Exposure to Sea-Level Rise and Coastal Storms: Report of the New Jersey Climate Adaptation Alliance Science and Technical Advisory Panel. Prepared for the New Jersey Climate Adaptation Alliance. New Brunswick, New Jersey.
- Swanson, L, Dorsch, M., Giampieri, M., Orton, P., Parris, A., and Sanderson, E., 2016. Chapter 4: Biophysical Systems of Jamaica Bay. In E. Sanderson, W. Solecki, J. Waldman, A. Parris (Eds.), *Prospects for Resilience: Insights from New York City's Jamaica Bay*. Island Press, Washington DC.
- Sanderson, E., P. Orton, J. Fischbach, D. Knopman, H. Roberts and W. Solecki (in press) Computational modelling of the Jamaica Bay System, In (Eds.) E. Sanderson, W. Solecki, J. Waldman and A. Parris, *Prospects for Resilience: Insights from New York City's Jamaica Bay*, Island Press, Washington D.C.
- Higinbotham, J.R., Moisan, J. and Orton, P. 2009. Solar Powered Autonomous Surface Vehicle Development and Operation. *Sea Technology* 50(7).
- Schwing, F.B., Orton, P.M., Jay, D.A., Batchelder, H. and Rosenfeld, L.K. 1999. Conference explores El Nino's relationship to the Northeast Pacific. *EOS: Transactions, American Geophysical Union*, 80(11):122.