

Dr. Alan F. Blumberg

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Schaefer School of Engineering & Science

Department: Civil, Environmental and Ocean Engineering

Program: Ocean Engineering

Research Center: Center for Maritime Systems

Research & Education

Research

The main focus of my work is understanding and predicting the physical dynamics of estuarine and coastal ocean circulation and the creation of ocean observing and forecasting systems which are used for environmental studies, surface vessel operations, and for securing the future safety and sustainability of urban coastal regions. My research makes use of numerical models, laboratory experiments and field measurements. Long-term research interests address new perspectives on the evolution of urban-environment interactions to create sustainable and resilient 21st century coastal city regions.

Education

- Post-Doctoral, 1977; Princeton University, Princeton, NJ
- Ph.D., 1976; The Johns Hopkins University, Baltimore, MD
- M.A., 1973; The Johns Hopkins University, Baltimore, MD
- B.S., 1970; Fairleigh Dickinson University, Teaneck, NJ

Experience & Service

General Information

- Media Appearances : InFocus, Charles B. Schaffer, School of Engineering, Stevens Institute of

Technology, Olympic Sailing in 2012. Spring 2005

- The New York Times, Metro Section, Public Lives profile by John Holl, "Watching the Water and Reading the Ripples", p. B4, December 22, 2004

- WCBS 880 News Radio, Our Town Series, Interview with Sean Adams, "Keeping our Waters Clean" , October 27, 2004

Appointments

- Associate Editor, J. of Hydraulic Engineering, ASCE, 1996 to 2006.

- Associate Editor, Estuaries, 2002 to 2006.

- Member, IOOS Modeling and Analysis Steering Team (MAST), 2006 to 2009.

- Member, US Environmental Protection Agency (EPA) Science Advisory Board, 2006 to 2007.

- Member, Ocean Modeling Review Panel, NOAA Science Advisory Board, 2003 to 2005.

- Member, American Meteorological Society Committee, Coastal Environment, 2004 to 2006.

- Member, Technical Advisory Committee for USEPA – Region 2 "Lower Passaic River Restoration Project" , 2006 to 2011.

- Member and Chair, Faculty Council - Stevens Institute of Technology, 2008 to 2010.

- Official Visitor, Intergovernmental Oceanographic Commission/UNESCO, 2011.

- Member, External Advisory Committee, CCNY Earth System Science & Environmental Engineering Program, 2010 to present.

Professional Service

- Director, 2007 to present, Center for Maritime Systems, Stevens Institute of Technology, Hoboken, NJ

- Director, 2005 to 2006, Department of Civil, Environmental and Ocean Engineering, Stevens Institute of Technology, Hoboken, NJ

- Deputy Director, 2003 to 2006, Center for Maritime Systems, Stevens Institute of Technology, Hoboken, NJ

- George Meade Bond Professor of Ocean Engineering, 2002 to present, Department of Civil, Environmental and Ocean Engineering, Stevens Institute of Technology, Hoboken, NJ

- Principal Consultant, 2002 to 2005; HydroQual, Inc., Mahwah, NJ

- Principal Scientist, 1985 to 2002; HydroQual, Inc., Mahwah, NJ

- Executive Vice President, 1999 to 2002; HydroQual, Inc., Mahwah, NJ

- Senior Scientist/Vice President, 1979 to 1985; Dynalysis of Princeton, Inc., Princeton, NJ

- Research Associate, 1977 to 1979; Princeton University, Princeton, NJ

Achievements & Professional Societies

Professional Societies

- American Meteorological Society

- American Geophysical Union

- American Society of Civil Engineering

- Estuarine Research Federation
- Oceanography Society

Honors & Awards

- Denny Medal, Institute of Marine Engineering, Science and Technology, 2007
- Fellow, American Society of Civil Engineers, 2006.
- Karl Emil Hilgard Hydraulic Prize, American Society of Civil Engineers, 2001
- Distinguished Visiting Scientist, Naval Oceanographic Office, 1996-1997

Selected Publications

Journals

- Philip Orton, Nickitas Georgas, Alan Blumberg, Julie Pullen. (2012). "Detailed Modeling of Recent Severe Storm Tides in Estuaries of the New York City Region", J. Geophys. Res.. doi:10.1029/2012JC008220.
- L. Kuang, A. F. Blumberg, and N. Georgas. (2012). "Assessing the Fidelity of Surface Currents from a Coastal Ocean Model and HF Radar using Drifting Buoys in the Middle Atlantic Bight", Ocean Dynamics. DOI 10.1007/s10236-012-0556-2.
- E. Zaron, M.-A. Pradal, P.D. Miller, A. F. Blumberg, N. Georgas, W. li, and J. M. Cornuelle. (2011). "Bottom Topography Mapping via Nonlinear Data Assimilation", Journal of Atmospheric and Oceanic Technology. 28, 1606 – 1623.
- G. Gopalakrishnan and A. F. Blumberg. (2012). "Assimilation of HF radar-derived surface currents on tidal-timescales", Journal of Operational Oceanography. 5 (1), 75- 85.
- T. DiLiberto, B. A. Colle, N. Georgas and Alan F. Blumberg, and A.A Taylor. "Verification of a Multi-Model Storm Surge Ensemble Around New York City and Long Island During the Cool Season", Weather and Forecasting. doi.org/10.1175/WAF-D-10-05055.1. 26, 922–939.
- G. Gopalakrishnan and A. F. Blumberg. (2011). "Surface currents in Raritan Bay, New Jersey: Importance of HF radar first-order Doppler settings", Journal of Operational Oceanography. 4 (2), 41-53.
- A. Talukder, A. Panangadan, N. Georgas, T. Herrington, and A. F. Blumberg. (2010). "Integrated operational control of unattended distributed coastal sensor web systems with mobile autonomous robots", IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing. 3 (4), 442-450.
- Georgas N., and A. F. Blumberg. "Establishing Confidence in Marine Forecast Systems: The

design and skill assessment of the New York Harbor Observation and Prediction System, version 3 (NYHOPS v3)", Eleventh International Conference in Estuarine and Coastal Modeling (ECM11) November 4-6, 2009 Seattle, Washington. Spalding, M. L., Ph.D., P.E., American Society of Civil Engineers. 660-685.

- Bhushan, S., Blumberg, A. F., and N. Georgas. "Comparison of NYHOPS hydrodynamic model SST predictions with satellite observations in the Hudson River tidal, estuarine, and coastal plume region", Eleventh International Conference in Estuarine and Coastal Modeling (ECM11) November 4-6, 2009 Seattle, Washington. Spalding, M. L., Ph.D., P.E., American Society of Civil Engineers. 11-26.

- A. F. Blumberg. (2009). "Present In the Moment – Operational Oceanography and Emergency Response", *Journal of Operational Oceanography*. 2 (2), 2.

- M. C. Kerman, W. Jiang, A. F. Blumberg, and S. E. Buttrey. (2009). "The Application of a Quantile Regression Metamodel for Salinity Event Detection Confirmation within New York Harbor Oceanographic Data", *Journal of Operational Oceanography*. 2 (1), 49-70.

- G. Gopalakrishnan, A. F. Blumberg, and R. I. Hires. (2008). "Assimilating Data into an Estuarine Coastal and Ocean Circulation Model", *Estuarine and Coastal Modeling, ASCE*. 685 – 703.

- M. C. Kerman, W. Jiang, A. F. Blumberg, and S. E. Buttrey. (2008). "A comparison of robust metamodels for the uncertainty quantification (UQ) of New York Harbor oceanographic data", *Journal of Operational Oceanography*. 1 (2), 1, 2, 4-13.

- R. N. Hoffman, R. M. Ponte, E. Kostelich, A. F. Blumberg, I. Szunyogh, S. Vinogradov and J.M. Henderson. (2008). "A Simulation Study Using a Local Ensemble Transform Kalman Filter for Data Assimilation in New York Harbor", *J. Atmospheric and Oceanic Technology*. 25, 1648-1656.

- A. F. Blumberg and N. Georgas. (2008). "Quantifying Uncertainty in Estuarine and Coastal Ocean Circulation Modeling", *J. Hydraulic Engineering*. 134, 403-415.

- N. Georgas, A. F. Blumberg and T. O. Herrington. (2007). "An Operational Coastal Wave Forecasting Model for New Jersey and Long Island Waters", *Shore and Beach*. 75 (2), 30-35.

- J. Pullen, T. Holt, A. F. Blumberg, and R. D. Bornstein. (2007). "Atmospheric Response to Local Upwelling in the Vicinity of New York/New Jersey Harbor", *J. Applied Meteorology and Climatology*. 46, 1031-1052.

- D. G. Heimbuch, D. J. Dunning, Q. E. Ross and A. F. Blumberg. (2007). "Assessing Potential Effects of Entrainment and Impingement on Fish Stocks of the New York–New Jersey Harbor Estuary and Long Island Sound", *Transactions of the American Fisheries Society*. (DOI: 10.1577/T06090.1). 136: 492–508.

- D. J. Dunning, Quentin E. Ross, A. F. Blumberg and D. G. Heimbuch. (2006). "Transport of Striped Bass Larvae Out of the Hudson River Estuary", In: Hudson River Fishes and their Environment, Waldman, J., K. Limburg, and D. Strayer, Eds. American Fisheries Society, Bethesda, Maryland. 273-288.
- A. F. Blumberg and F. L. Hellweger. (2006). "Hydrodynamics of the Hudson River Estuary", In: Hudson River Fishes and their Environment, Waldman, J., K. Limburg, and D. Strayer, Eds. American Fisheries Society, Bethesda, Maryland. 9 - 28.
- Fan, S., A F. Blumberg, M. S. Bruno, D. Kruger, and B. Fullerton. (2006). "The Skill of an Urban Ocean Forecast System", Estuarine and Coastal Modeling, ASCE. 603-618.
- M. S. Bruno, A. F. Blumberg and T. O. Herrington. (2006). "The Urban Ocean Observatory - Coastal Ocean Observations and Forecasting in the New York Bight", Journal of Marine Science and Environment. C4, 1 - 9.
- A.K.M.Q. Ahsan and A.F. Blumberg, A. J. Thuman, and T. W. Gallagher. (2005). "Geomorphological and Meteorological Control of Estuarine Processes – Modeling Analyses using a High Resolution 3D Hydrodynamic Model", J. Hydraulic Engineering. 131, 259-272.
- M. S. Bruno, A. F. Blumberg. (2004). "An Urban Ocean Observatory – Real-time Assessments and Forecasts of The New York Harbor Marine Environment", Sea Technology. 45, 27-32.
- F. L. Hellweger, A. F. Blumberg, P. Schlosser, and D. T. Ho. (2004). "Mixing in the Hudson Estuary: The Role of Estuarine Circulation and Tidal Trapping", Estuaries. 27 527-538.
- N. Georgas and A. F. Blumberg. (2004). "The Influence of Centrifugal and Coriolis Forces on the Circulation in a Curving Estuary", Estuarine and Coastal Modeling, ASCE. 541- 558.
- Ahsan, Q. A. F. Blumberg, H. Li, W. Schroeder and C. Szczechowski. (2002). "Forecasting the Environment of the Littoral Waters in the Northern Gulf of Mexico", Estuarine and Coastal Modeling, ASCE. 966–981.
- Ahsan, Q., C. N. Barron, J. Blaha A. F. Blumberg, P. J. Fitzpatrick, D. Herndon, H. J. Herring, Y. L. Hsu, T. R. Keen, H. Li, Y. Li, R. C. Patchen, C. Szczechowski, R. Willems and P. Wilz. (2002). "Northern Gulf of Mexico Littoral Initiative Modeling Program", Estuarine and Coastal Modeling, ASCE. 949- 965.
- Lewis, J. K., A. F. Blumberg, B. N. Kim. (1999). "Spatial Decorrelation Scales in Coastal Regions: A Precursor to More Accurate Data Assimilation", Estuarine and Coastal Modeling, American Society of Civil Engineers. 1150-1166.
- Lewis, J.K., Y.L. Hus and A.F. Blumberg. (1994). "Boundary Forcing and a Dual-Mode Calculation Scheme for Coastal Tidal Models Using Step-Wise Bathymetry", Estuarine and Coastal

Modeling, ASCE. 422-431.

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- Signell, R.P., H.L. Jenter and A.F. Blumberg. (1994). "Modeling the Seasonal Circulation in Massachusetts Bay", Estuarine and Coastal Modeling, ASCE. 578-590.
- Kjerfve, B., H. E. Seim, and A.F. Blumberg. (1992). "Modelling of the Residual Circulation in Broken Bay and the Lower Hawkesbury River, NSW", Australian Journal of Marine and Freshwater Research. 43, 1339-1357.
- Slordal, L.H., E.A. Martinsen and A.F. Blumberg. (1992). "3D Hydrodynamic Model Validation Through Simulations of Dynamic Processes", Estuarine and Coastal Modeling, ASCE. 525-537.
- Galperin, B., A.F. Blumberg and R.H. Weisberg. (1992). "The Importance of Density Driven Circulation in Well Mixed Estuaries: The Tampa Bay Experience", Estuarine and Coastal Modeling, ASCE. 332-341.
- Blumberg, A.F., L.J. Dodge and W.M. Leo. (1989). "CSO Induced Circulation in Marine Tributaries", Estuarine and Coastal Modeling, ASCE. 142-153.
- A.F. Blumberg. (1977). "On the Dynamic Balance of the Chesapeake Bay Waters", Chesapeake Science. 18, 319-232.
- A.F. Blumberg. (1970). "Electro-Optics: A Brief Survey", Spectra - The Student Journal of the College of Science and Engineering. Fairleigh Dickinson University. 6 (2), 8-10, 12, 33.
- D. G. Heimbuch, D. J. Dunning, Quentin E. Ross, and A. F. Blumberg. (2005). "Effect of Entrainment and Impingement on Fish Stocks of the New York-New Jersey Harbor Estuary and Long Island Sound", Estuaries, 131 259-272.
- Vinogradova, N., S.Vinogradov, D.Nechaev, V.Kamenkovich, A.F.Blumberg, Q.Ahsan, and H.Li. (2005). "Evaluation of the Northern Gulf of Mexico Littoral Initiative Model based on the observed temperature and salinity in the Mississippi Bight", Marine Technology Society Journal, 39 (2), 25- 38.
- G. L. Mellor and A. F. Blumberg. (2004). "Wave Breaking and Ocean Surface Layer Thermal Response", Journal of Physical Oceanography, 34 693-698.
- A. F. Blumberg, S. O' Neil and B.N. Kim. (2003). "Environmental Impacts of a Desalination Facility Proposed for Tampa, Florida", Journal of Marine Environmental Engineering, 7 25-45.
- A.K.M.Q. Ahsan and A.F. Blumberg. (1999). "A Three-Dimensional Hydrothermal Model of

Onondaga Lake, New York", *Journal of Hydraulic Engineering*, 125 912-923.

- A.F. Blumberg, L.A. Khan and J. P. St. John. (1999). "Three-Dimensional Hydrodynamic Simulations of the New York Harbor, Long Island Sound and the New York Bight", *Journal of Hydraulic Engineering*, 125 799-816.
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- I. Shulman, J.K. Lewis, A.F. Blumberg and B. N. Kim. (1998). "Optimized Boundary Conditions and Data Assimilation with Application to the M2 Tide in the Yellow Sea", *Journal of Atmospheric and Oceanic Technology*, 15 1066-1071.
- A.F. Blumberg and D.W. Pritchard.. (1997). "Estimates of the Transport through the East River, New York", *Journal of Geophysical Research*, 5685-5703.
- A.F. Blumberg, Z.G. Ji and C.K. Ziegler. (1996). "Modeling Outfall Plume Behavior Using a Far Field Circulation Model", *Journal of Hydraulic Engineering*, 610-616.
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- A.F. Blumberg, R.P. Signell and H.L. Jenter. (1993). "Modeling Transport Processes in the Coastal Ocean", *Journal of Marine Environmental Engineering*, 1 (31-52), 1689-1705.
- A.F. Blumberg, B. Galperin and D.J. O'Connor. (1992). "Modeling the Vertical Structure of Open Channel Flows", *Journal of Hydraulic Engineering*, 118 1119-1134.
- L.H. Kantha, A.F. Blumberg and G.L. Mellor. (1990). "Computing Phase Speeds at Open Boundaries", *Journal of Hydraulic Engineering*, 116 592-597.
- A.F. Blumberg and L.H. Kantha. (1985). "Open Boundary Condition for Circulation Models", *Journal of Hydraulic Engineering, ASCE*, 111 237-255.
- A.F. Blumberg and G.L. Mellor. (1985). "A Simulation of the Circulation in the Gulf of Mexico", *Israel Journal of Earth Sciences*, 34 122-144.
- A.F. Blumberg and G.L. Mellor. (1983). "Diagnostic and Prognostic Numerical Circulation Studies of the South Atlantic Bight", *Journal of Geophysical Research*, 88 4579-4592.
- L.H. Kantha, G.L. Mellor and A.F. Blumberg. (1982). "A Diagnostic Calculation of the General Circulation in the South Atlantic Bight", *Journal of Physical Oceanography*, 12 805-819.

- C.L. Kerr and A.F. Blumberg. (1979). "An Analysis of a Local Second-Moment Conserving Quasi-Lagrangian Scheme for Solving the Advection Equation", *Journal of Computational Physics*, 32 1-9.

- A. F. Blumberg. (1978). "Closure to Numerical Tidal Model of Chesapeake Bay", *Journal of the Hydraulics Division, ASCE*, 104 1103-1103.

- A. F. Blumberg. (1977). "Numerical Model of Estuarine Circulation", *Journal of the Hydraulics Division, ASCE*, 103 295-310.

- A. F. Blumberg. (1977). "Numerical Tidal Model of Chesapeake Bay", *Journal of the Hydraulics Division, ASCE*, 103 1-10.

- A.F.Blumberg, D. J. Dunning, H. Li, R.C. Geyer and D. Heimbuch. (2004). "A Particle-Tracking Model for Predicting Entrainment at Power Plants on the Hudson River", *Estuaries*. 27, 515-526 .

- A. F. Blumberg. (2002). "Donald W. Pritchard Award", *Estuarine Research Federation Newsletter*. 28 (1), 1 & 14.

- R. P. Signell, H. L. Jenter and A. F. Blumberg. (2000). "Predicting the Physical Effects of Relocating Boston' s Sewage Outfall", *Estuarine Coastal and Shelf Science*, 50 59-72.

- A.F. Blumberg and B. N. Kim. (2000). "Flow Balances in St. Andrew Bay Revealed through Hydrodynamic Simulations", *Estuaries*, 23 21-33.

- J. K. Lewis, I. Shulman and A.F. Blumberg. (1998). "Assimilation of Doppler Radar Current Data into Numerical Ocean Models", *Continental Shelf Research*, 18 541-559.

- D.M. Goodrich and A.F. Blumberg. (1991). "The Fortnightly Mean Circulation of Chesapeake Bay", *Estuarine, Coastal and Shelf Science*, 32 1-12.

- A.F. Blumberg and D.M. Di Toro. (1990). "Effects of Climate Warming on Dissolved Oxygen Concentrations in Lake Erie", *Transactions of American Fisheries Society*, 119 210-223.

- A.F. Blumberg and D.M. Goodrich. (1990). "Modelling Wind-Induced Destratification in Chesapeake Bay", *Estuaries*, 13 236-249.

- Wang, J.D., A.F. Blumberg, H.L. Butler and P. Hamilton. (1990). "Transport Prediction in Partially Stratified Tidal Waters", *Journal of Hydraulic Engineering*, 116 380-396.

- A.F. Blumberg and G.L. Mellor. (1987). "A Description of a Three-Dimensional Coastal Ocean Circulation Model", In: *Three-Dimensional Coastal Ocean Models*, N. Heaps, Ed., 1-16, American Geophys. Union.

- A.F. Blumberg and L.Y. Oey. (1985). "Models of Circulation and Mixing in Estuaries and Coastal Oceans", *Advances in Geophysics*, 28A 525-547.
- Mellor, G.L. and A.F. Blumberg. (1985). "Modeling Vertical and Horizontal Viscosity and the Sigma Coordinate System", *Monthly Weather Review*, 113 1379-1383.
- L.H. Kantha, G.L. Mellor and A.F. Blumberg. (1981). "Diagnostic Calculations of the Circulation in the Middle and South Atlantic Bights", *Ocean Modeling*, 37 5-8.
- A.F. Blumberg and G.L. Mellor. (1980). "A Coastal Ocean Numerical Model", *Mathematical Modeling of Estuarine Physics, Proceedings of an International Symposium, Hamburg, August 24 to 26, 1978*, J. Sundermann and K.P. Holz, Eds., Springer-Verlag, Berlin, 203-219.
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Books

- V. H. Dale, Kling, C.L., Meyer, J.L., Sanders, J., Stallworth, H., Armitage, Th., Wangsness, D., Bianchi, Th., Blumberg, A., Boynton, W., Conley, D.J., Crumpton, W., David, M., Gilbert, D., Howarth, R.W., Lowrance, R., Mankin, K., Opaluch, J., Paerl, H., (2010). *Hypoxia in the Northern Gulf of Mexico*, Springer Series on Environmental Management. ISBN: 978-0-387-89685-4. 300.