Helga Schaffrin Huntley

CONTACT INFORMATION

University of Delaware
Marine Science & Policy
306 Robinson Hall
Newark, DE 19716

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RESEARCH INTERESTS

Lagrangian ocean dynamics; state estimation and predictability; sea ice and polar oceanography; geophysical fluid dynamics; mathematical, computational and statistical modeling

EDUCATION

Ph.D., Mathematics
Advisors: Esteban Tabak, David Holland
Topic: Modeling of sea ice dynamics
Courant Institute of Mathematical Sciences, New York University, New York, NY
September 2005

M.S., Mathematics
Courant Institute of Mathematical Sciences, New York University, New York, NY
May 2003

B.S., Mathematics, *summa cum laude*, ΦBK
Undergraduate Thesis Advisor: Frank Connolly
Undergraduate Thesis Topic: Hyperelliptic Riemann surfaces
University of Notre Dame, South Bend, IN
Arts and Letters/Science Honors Program
May 1999

ACADEMIC POSITIONS

Research Assistant Professor, September 2011 – present
Program of Physical Ocean Science & Engineering,
School of Marine Science & Policy, University of Delaware, Newark, DE

Research Associate, September 2007 – August 2011
Program of Physical Ocean Science & Engineering,
School of Marine Science & Policy, University of Delaware, Newark, DE

Acting Assistant Professor, September 2005 – August 2007
Department of Applied Mathematics,
University of Washington, Seattle, WA

Graduate Assistant, August 2000 – July 2005
Department of Mathematics, Courant Institute of Mathematical Sciences,
New York University, New York, NY

Research Assistant, Summer 1997
Department of Astronomy, Ohio State University, Columbus, OH
Advisors: Donald Terndrup, Marc Pinsonneault
Topics: Analysis of stellar rotation rates, modeling of stellar evolution

PUBLICATIONS

D'Asaro, E., A. Shcherbina, J.M. Klymak, J. Molemaker, G. Novelli, C.M. Guigand, A. Haza, B. Haus, E. Ryan, G.A. Jacobs, **H.S. Huntley**, N.J.M. Laxague, S. Chen, F. Judt, J.C. McWilliams, R. Barkan, A.D. Kirwan, Jr., A.C. Poje, T.M. Özgökmen, Ocean convergence and dispersion of flotsam, *PNAS*, *submitted*.

Haza, A., E. D'Asaro, H. Chang, S. Chen, M. Curcic, C. Guigand, **H.S. Huntley**, G. Jacobs, G. Novelli, T.M. Özgökmen, A.C. Poje, E. Ryan, A. Shcherbina, Drogue-loss detection of surface drifters during the Lagrangian Submesoscale Experiment (LASER), *J. Atmos. Oceanic Technol.*, *submitted*.

Chang, H., **H.S. Huntley**, A.D. Kirwan, Jr., B.L. Lipphardt, Jr., Sulman, M.H.M. Transport structures in a 3D periodic flow, *Commun. Nonlinear Sci. Numer. Simul.*, *submitted*.

Huntley, H.S., P. Ryan, Wind effects on flow patterns and net fluxes in density-driven channel flow, *J. Geophys. Res. Oceans*, *in print*.

Kirwan, Jr., A.D., **H.S. Huntley, H.S.**, H. Chang, Emergence of Coherent Clusters in the Ocean, in *Advances in Nonlinear Geosciences*, edited by A. Tsonis, Springer, 213–224, doi: 10.1007/978-3-319-58895-7_12, 2017.

Mariano, A.J., E.H. Ryan, **H.S. Huntley**, L.C. Laurindo, E. Coelho, A. Griffa, T.M. Özgökmen, M. Berta, D. Bogucki, S. Chen, M. Curcic, M. Gough, B.K. Haus, A.C. Haza, P. Hogan, M. Iskandarani, G. Jacobs, A.D. Kirwan, Jr., N. Laxague, B. Lipphardt, Jr., M.G. Magaldi, G. Novelli, A. Reniers, J. Restrepo, C. Smith, A. Valle-Levinson, M. Wei, Statistical properties of the northern Gulf of Mexico surface velocity field as sampled by GLAD drifters, *J. Geophys. Res. Oceans*, **121**, 5193–5216, doi: 10.1002/2015JC011569, 2016.

Jacobs, G., **H.S. Huntley**, A.D. Kirwan, Jr., B.L. Lipphardt, Jr., T. Campbell, T. Smith, K. Edwards, B. Bartels, Ocean processes underlying surface clustering, *J. Geophys. Res. Oceans*, **121**, 180–197, doi: 10.1002/2015JC011140, 2016.

Huntley, H.S., B.L. Lipphardt, Jr., G. Jacobs, A.D. Kirwan, Jr., Clusters, deformation, and dilation: Diagnostics for material accumulation regions, *J. Geophys. Res. Oceans*, **120**, 6622–6636, doi: 10.1002/2015JC011036, 2015.

Muscarella, P., M. Carrier, H. Ngodock, S. Smith, B.L. Lipphardt, Jr., A.D. Kirwan, Jr., **H.S. Huntley**, Do assimilated drifter velocities improve Lagrangian predictability in an operational ocean model?, *Mon. Weather Rev.*, **143**, 1822–1832, doi: 10.1175/MWR-D-14-00164.1, 2015.

Coelho, E.F., P. Hogan, G. Jacobs, P. Thoppil, **H.S. Huntley**, B. Haus, B.L. Lipphardt, Jr., A.D. Kirwan, Jr., E. Ryan, M.J. Olascoaga, F.J. Beron-Vera, A.C. Poje, A. Griffa, T.M. Özgökmen, A.J. Mariano, G. Novelli, A.C. Haza, D. Bogucki, S.S. Chen, M. Curcic, M. Iskandarani, F. Judt, N. Laxague, A.J.H.M. Reniers, A. Valle-Levinson, M. Wei, Ocean current estimation using a multi-model ensemble Kalman filter during the Grand LAgrangian Deployment experiment (GLAD), *Ocean Model.*, **87**, 86–106, doi: 10.1016/j.ocemod.2014.11.001, 2015.

Jacobs, G., B. Bartels, D. Bogucki, F.J. Beron-Vera, S. Chen, E.F. Coelho, M. Curcic, A. Griffa, M. Gough, B.K. Haus, A.C. Haza, R.W. Helber, P.J. Hogan, **H.S. Huntley**, M. Iskandarani, F. Judt, A.D. Kirwan, Jr., N. Laxague, A. Valle-Levinson, B.L. Lipphardt, Jr., A.J. Mariano, H.E. Ngodock, G. Novelli, M.J. Olascoaga, T.M. Özgökmen, A.C. Poje, A.J.H.M. Reniers, C.D. Rowley, E.H. Ryan, S.R. Smith, P.L. Spence, P.G. Thoppil, M. Wei, Data assimilation considerations for improved ocean predictability during the Gulf of Mexico Grand Lagrangian Deployment (GLAD), *Ocean Model.*, **83**, 98–117, doi: 10.1016/j.ocemod.2014.09.003, 2014.

Özgökmen, T.M., F.J. Beron-Vera, D. Bogucki, S.S. Chen, C. Dawson, W. Dewar, A. Griffa, B.K. Haus, A.C. Haza, **H. Huntley**, M. Iskandarani, G. Jacobs, B. Jagers, A.D. Kirwan, Jr., N. Laxague, B. Lipphardt, Jr., J. MacMahan, A.J. Mariano, J. Olascoaga, G. Novelli, A.C. Poje, A.J.H.M. Reniers, J.M. Restrepo, B. Rosenheim, E.H. Ryan, C. Smith, A. Soloviev, S. Venkataramani, G.-C. Zha, P. Zhu, Research overview of the Consortium for Advanced Research on Transport of Hydrocarbon in the Environment (CARTHE), *Intl Oil Spill Conf. Proc.*, **2014**(1), 544–560, doi: 10.7901/2169-3358-2014.1.544, 2014.

Poje, A.C., T.M. Özgökmen, B.L. Lipphardt, Jr., B.K. Haus, E.H. Ryan, A.C. Haza, G.A. Jacobs, A.J.H.M. Reniers, M.J. Olascoaga, G. Novelli, A. Griffa, F.J. Beron-Vera, S.S. Chen, E. Coelho, P.J. Hogan, A.D. Kirwan, Jr., **H.S. Huntley**, A.J. Mariano, Submesoscale dispersion in the vicinity of the *Deepwater Horizon* spill, *PNAS*, **111**(35), 12693–12698, doi: 10.1073/pnas.1402452111, 2014.

Olascoaga, M.J., F.J. Beron-Vera, G. Haller, J. Triñanes, M. Iskandarani, E.F. Coelho, B. Haus, **H.S. Huntley**, G. Jacobs, A.D. Kirwan, Jr., B.L. Lipphardt, Jr., T. Özgökmen, A.J.H.M. Reniers, A. Valle-Levinson, Drifter motion in the Gulf of Mexico constrained by altimetric Lagrangian coherent structures, *Geophys. Res. Lett.*, **40**(23), 6171–6175, doi: 10.1002/2013GL058624, 2013.

Sulman, M.H.M., **H.S. Huntley**, B.L. Lipphardt, Jr., G. Jacobs, P. Hogan, A.D. Kirwan, Jr., Hyperbolicity in temperature and flow fields during the formation of a Loop Current ring, *Nonlin. Processes Geophys.*, **20**(5), 883–892, doi: 10.5194/npg-20-883-2013, 2013.

Sulman, M.H.M., **H.S. Huntley**, B.L. Lipphardt, Jr., A.D. Kirwan, Jr., Leaving flatland: Diagnostics for Lagrangian coherent structures in three-dimensional flows, *Physica D*, **258**, 77–92, doi: 10.1016/j.physd.2013.05.005, 2013.

Sulman, M.H.M., **H.S. Huntley**, B.L. Lipphardt, Jr., A.D. Kirwan, Jr., Out of flatland: Three-dimensional aspects of Lagrangian transport in geophysical fluids, in *Lagrangian Modeling of the Atmosphere*, Geophys. Monogr. Ser., vol. 200, edited by J. Lin et al., AGU, 77–84, doi: 10.1029/2012GM001279, 2013.

Huntley, H.S., B.L. Lipphardt, Jr., A.D. Kirwan, Jr., Surface drift predictions of the *Deepwater Horizon* spill: The Lagrangian perspective, in *Monitoring and Modeling the Deepwater Horizon Oil Spill: A Record-Breaking Enterprise*, Geophys. Monogr. Ser., vol. 195, edited by Y. Liu et al., AGU, 179–195, doi: 10.1029/2011GM001097, 2011.

Chang, Y., D. Hammond, A.C. Haza, P. Hogan, **H.S. Huntley**, A.D. Kirwan, Jr., B.L. Lipphardt, Jr., V. Taillandier, A. Griffa, T.M. Özgökmen, Enhanced estimation of sonobuoy trajectories by velocity reconstruction with near-surface drifters, *Ocean Model.*, **36**, 179–197, doi: 10.1016/j.ocemod.2010.11.002, 2011.

Huntley, H.S., B.L. Lipphardt, Jr., A.D. Kirwan, Jr., Lagrangian predictability assessed in the East China Sea, *Ocean Model.*, **36**, 163–178, doi: 10.1016/j.ocemod.2010.11.001, 2011.

Huntley, H.S., G.J. Hakim, Assimilation of time-averaged observations in a quasi-geostrophic atmospheric jet model, *Climate Dynamics*, **35**, 995–1009, doi: 10.1007/s00382-009-0714-5, 2010.

Huntley, H.S., E.G. Tabak, An optimization approach to modeling sea ice dynamics; Part 2: Finite ice strength effects, *SIAM J. Appl. Math.*, **67**, 561–581, doi: 10.1137/060668651, 2007.

Huntley, H.S., E.G. Tabak, E.H. Suh, An optimization approach to modeling sea ice dynamics; Part 1: Lagrangian framework, *SIAM J. Appl. Math.*, **67**, 543–560, doi: 10.1137/040621156, 2007.

Schaffrin, H., An Optimization Approach to Sea Ice Dynamics, Ph.D. thesis, 2005.

Research Field Experience

Submesoscale Processes and Lagrangian Analysis on the Shelf (SPLASH)
Gulf of Mexico, April – May 2017
Chief Scientists: J. Molemaker (U. of California, L. A.), A. Shcherbina (U. of Washington)
Shore Support: Adaptive deployment decision input, real-time model and observational data analysis

Lagrangian Submesoscale Experiment (LASER)
Gulf of Mexico, January – February 2016
Chief Scientists: E. D'Asaro (U. of Washington), T. Özgökmen (U. of Miami), G. Novelli (U. of Miami)
Participation: Drifter deployments, real-time model and observational data analysis, log QC

Nares Strait Instrument Retrieval
Arctic, August 2012
Chief Scientists: H. Melling (Inst. of Ocean Sciences), A. Münchow (U. of Delaware)
Shore Support: Updating blog posts

Grand Lagrangian Deployment (GLAD)
Gulf of Mexico, July – August 2012
Chief Scientists: B. Haus (U. of Miami), T. Özgökmen (U. of Miami)
Shore Support: Deployment planning assistance, real-time model and observational data analysis

Canadian Archipelago Throughflow Study (CATS)
Nares Strait, Arctic, July – August 2003
Chief Scientists: A. Münchow (U. of Delaware), K. Falkner (Oregon State U.), H. Melling (Inst. of Ocean Sciences), R. MacDonald (Inst. of Ocean Sciences)
Participation: Data collection (ADCP, Seabeam, CTD), mooring deployment

Recently Awarded Grants

"Consortium for Advanced Research on Transport of Hydrocarbon in the Environment (CARTHE II)", PI for the UD component, with 40 other investigators at 27 institutions, GoMRI, $749,727 (UD component), January 2015 – December 2017.

"Consortium for Advanced Research on Transport of Hydrocarbon in the Environment (CARTHE)", Co-PI with 28 other investigators at twelve institutions, GoMRI, $643,991 (UD component), October 2011 – December 2015.

"Dynamical systems theory in 4D geophysical fluid dynamics", Co-PI with twelve other investigators at eight institutions, ONR (MURI), $1,470,684, October 2010 – March 2017.

"Dynamics and Forcing of Nares Strait from 2003 to 2009: Tidal to Interannual Variability to the West of Greenland", Co-PI with A. Münchow, NSF, $684,344, August 2010 – July 2014.

"Lagrangian transport signatures in models and observations", Co-PI with A.D. Kirwan, Jr., and B.L. Lipphardt, Jr., ONR, ∼$300,000, January 2010 – September 2012.

Teaching Experience

Graduate Level:
M.S. committee member for Michalea King (UD, spring 2015 – spring 2016)
M.S. advisor for Sigourney Stelma (UD, fall 2012 – spring 2015)
Ph.D. committee member for Patricia Ryan (UD, winter 2012 – present)
M.S. committee member for Lauren Brown (UD, winter 2008 – spring 2011)
Applied Linear Algebra and Introductory Numerical Analysis (UW, fall 2006)

Undergraduate Level:
Climate and Life (UD, spring 2016)
Beginning Scientific Computing (UW, spring 2006, winter 2007)
Introduction to Continuous Mathematical Modeling (UW, fall 2005)
Calculus I (NYU, fall 2003)
Calculus II (NYU, spring 2003)
Mathematical Thinking (NYU, fall 2001)
Calculus I Recitation (NYU, fall 2002)
Honors Calculus I Recitation – proof-based (NYU, spring 2001)

Recent Presentations

Dispersion vs. Clustering: Evolution of Drifter Distributions at the Ocean Surface (poster)
Gulf of Mexico Oil Spill & Ecosystem Science Conference, New Orleans, LA, February 2017.

Clustering Behavior of LASER Drifters, Observed and Modeled
CARTHE Project Meeting, Miami, FL, November 2016.

CARTHE Data Management
CARTHE Site Visit, Miami, FL, November 2016.

Evolution of Clusters at the Ocean Surface in Models and Observations
SIAM Conference on Mathematics of Planet Earth, Philadelphia, PA, September 2016.

Big Data Challenges: What to Do to Be Compliant
CARTHE Project Meeting, Miami, FL, May 2016.

Seasonality of the Surface Circulation in the Northeastern Gulf of Mexico: Insights from Two Large-Scale Drifter Deployments
Ocean Sciences Meeting, New Orleans, LA, February 2016.

Anisotropy and Inhomogeneity in Clustering and Dispersion
CARTHE Project Meeting, Miami, FL, October 2015.

Life Cycle of a Cluster
Lagrangian Analysis and Prediction of Coastal and Ocean Dynamics Meeting, Winter Harbor, ME, July 2015.

One- and Two-Dimensional Dispersion Quantification from Drifter Triads (poster)
Gulf of Mexico Oil Spill & Ecosystem Science Conference, Houston, TX, February 2015.

Identification of Clustering Regions in the 3D Ocean
Ocean3D+1 Project Meeting, Miami, FL, November 2014.

Clustering, Deformation, and Dilation: Diagnostics for Material Accumulation Regions
Physical Ocean Science and Engineering Seminar, University of Delaware, October 2014.

Oil Spills, Airplanes, Rubber Duckies: The Challenges of Predicting Motion in the Ocean
Science Cafe, Newark, DE, July 2014.

Geographic Dispersion Patterns in GLAD Trajectories
CARTHE Project Meeting, Miami, FL, October 2013.

Lagrangian Coherent Structures in Observations and Models
Gulf of Mexico Oil Spill & Ecosystem Science Conference, New Orleans, LA, January 2013.

Are Representative Finite Lyapunov Exponents Observable?
Lagrangian Analysis and Prediction of Coastal and Ocean Dynamics Meeting, Miami Beach, FL, June 2012.

Transport Analysis for Oil Spill Prediction: Lagrangian Coherent Structures for Modeling and Observations
CARTHE Project Meeting, Miami, FL, April 2012.

Ocean3D+1: Recent Results on Rings in the Gulf of Mexico
Ocean3D+1 Project Meeting, Wilmington, DE, January 2012.

Leaky Eddies: Finding, Tracking, and Analyzing Rings in the Gulf of Mexico
International Congress of Industrial and Applied Math., Vancouver, Canada, July 2011.

Oil Transport Predictions: A Case Study of the Deepwater Horizon Spill
School of Marine Science and Policy, University of Delaware, June 2011.

Selected Awards and Fellowships

Alan Berman Research Publication Award (with co-authors)
Naval Research Laboratory, March 2017

Poster Prize (as co-author)
SIAM Conference on Mathematics of Planet Earth, October 2016

Trabant Award for Women's Equity (as board member of the Women's Caucus)
President's Diversity Initiative, University of Delaware, May 2013

Boeing Award for Excellence in Teaching
Dept. of Applied Mathematics, University of Washington, January 2007

VIGRE Postdoctoral Fellowship
Dept. of Applied Mathematics, University of Washington, September 2005 – August 2007

Dean's Dissertation Fellowship
Graduate School for Arts and Sciences, New York University, September 2004 – May 2005

Bella Manel Prize for excellence and promise in graduate mathematics by a woman
Courant Institute, New York University, May 2004

Service Experience

Consortium for Advanced Research on Transport of Hydrocarbon in the Environment
Data Manager, February 2015 – present
Coordinate long-term storage of data at the Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), member of the GRIIDC advisory council

Faculty Senate Commission on Sexual Harassment and Assault, University of Delaware
Member, December 2014 – December 2015
Review of current, proposed, and best-practice policies; design and analysis of survey of undergraduates

Women's Caucus, University of Delaware
Board Member, April 2011 – June 2017
Publications Subcommittee Chair, December 2012 – June 2015

MathCounts (competition for middle school students)
Proofreader for school handbook and competitions, 1997 – present (except 1998 & 2000)

Deep Roots, Inc. (charity giving scholarships to youth in developing countries)
Board Member-at-Large, March 2010 – July 2013
Chair, Board of Directors, May 2004 – March 2010
Vice-Chair, Board of Directors, October 2002 – May 2004
Co-founder and -director, Zambia program, August 2000 – October 2002

UNICEF, Windhoek, Namibia
Intern, Early Childhood Development Division, Summer 2001
Capacity building for national preschool network

Development Aid from People to People, Monze, Zambia
Development Instructor, Child Aid Project, January 2000 – July 2000
Anti-AIDS education, small-scale business training, developed and implemented an orphan-support program

Miscellaneous

Languages: English, German, some French

Membership in Professional Societies: American Geophysical Union, Society for Industrial and Applied Mathematics