

# Erin Elizabeth Hackett

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## Contact Information

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## EDUCATION

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**Ph.D., Physical Oceanography**, 2010, Johns Hopkins University, Department of Earth and Planetary Sciences, Baltimore, MD

**M.C.E., Civil Engineering**, 2007, Johns Hopkins University, Baltimore, MD

**B.S., Physics, *Summa Cum Laude***, 2000, Roanoke College, Salem, VA

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## EMPLOYMENT

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**Associate Professor**, 2018-current

**Coastal Carolina University**, Department of Coastal and Marine Systems Science,  
Conway, SC

**Assistant Professor**, 2013-2018

**Coastal Carolina University**, Department of Coastal and Marine Systems Science,  
Conway, SC

**Assistant Professor**, 2012-2013

**Coastal Carolina University**, Department of Chemistry and Applied Physics, Conway,  
SC

**Scientist**, 2010-2012

**Naval Surface Warfare Center, Carderock Division**, Bethesda, MD

**Research Assistant**, 2004-2010

**Johns Hopkins University**, Department of Earth and Planetary Sciences, Baltimore, MD  
*Dissertation: Flow and Turbulence in the Bottom Boundary Layer of the Coastal Ocean*

**Systems Engineer**, 2000-2004

**Johns Hopkins University Applied Physics Laboratory**, Air Defense Systems  
Department, Columbia, MD

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## **CURRENT RESEARCH INTERESTS**

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Coastal ocean physical processes

Ocean surface waves

Turbulent boundary layers

Radar remote sensing

Electromagnetic wave propagation in the marine environment

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## **TEACHING**

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### **Courses Taught**

Coastal Carolina University: *Essentials of Physics II, Statics, Coastal Marine and Wetland Processes, Temporal and Spatial Analysis, Introduction to Scientific Computing, Fluids Forum*

### **Student Research Supervision**

Coastal Carolina University:

Undergraduates: 25

Graduate Advisees: Nathan Lentini (M.S., 2015), Andrew Kammerer (M.S., 2017), Mathew Stanek (M.S., 2018; current Ph.D.), Ian Matsko (M.S., 2018), Vivian Turner (current Ph.D., co-advised), Douglas Pastore (M.S., 2018; current Ph.D.), Daniel Greenway (M.S., current), Matthew Rodriguez (M.S., current)

Graduate Committee Member: Brittany Hoffnagle (M.S., 2015), Leigha Peterson (current Ph.D.), Krishnamoorthy Krishnan (current Ph.D.), Brady Evans (M.S., 2018)

Johns Hopkins University: 5 undergraduates

### **Internship Supervision**

2011, Naval Surface Warfare Center, Carderock Division

- Science and Engineering Apprentice Program, Mentor

2012, Naval Surface Warfare Center, Carderock Division

- Science and Engineering Apprentice Program, Mentor
- Naval Research Enterprise Intern Program, Mentor

**Mentoring Physical Oceanography Women to Increase Retention (MPOWIR)**

- 2017-current: Mentoring group leader

**Engineering Capstone Project Sponsor**

2011-2012, Naval Surface Warfare Center, Carderock Division

- *Pennsylvania State University*

**Teaching Assistantship**

2005-2006, Johns Hopkins University, Department of Earth and Planetary Sciences:  
*Oceans and Atmospheres, Measurements and Models*

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**GRANTS AWARDED**

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Inversely Determining Atmospheric Refractivity Structure using Electromagnetic Wave Propagation Models and Measurements, *Office of Naval Research*, 2016-2018, \$263,847, PI.

Radar Measurements of Ocean Surface Waves using Proper Orthogonal Decomposition, *Office of Naval Research*, 2015-2016, \$112,000, PI.

Experimental Study on the Influence of Turbulence on Particle Settling Velocities, *II-VI Foundation*, 2014, \$18,585, PI.

Physics-Based Inverse Problem to Deduce Marine Atmospheric Boundary Layer Parameters, *Office of Naval Research*, 2013-2015, \$253,272, PI.

Particle Settling Velocities in Sediment Transport, *II-VI Foundation*, 2013, \$17,790, PI.

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**PUBLICATIONS** (\* denotes student author)

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*Peer-Reviewed Journal Publications*

Lawley\*, J., H. Ben-Gida\*, K. Krishnan\*, **E.E. Hackett**, G.A. Kopp, G. Morgan, C.G. Guglielmo, and R. Gurka, 2019, Wake flow features associated with noise reduction in Boobook owl during flapping flight, *Integrative Organismal Biology*, *under review*.

Matsko\*, I.J. and **E.E. Hackett**, 2019, Impact of radar data sampling on the accuracy of atmospheric refractivity inversions over marine surfaces, *Radio Science*, *under review*.

**Hackett, E.E.** and R. Gurka, 2019, Simultaneous measurement of turbulence and particle kinematics using flow imaging techniques, *Journal of Visualized Experiments*, *in press*.

Kammerer\*, A.J. and **E.E. Hackett**, 2019, Group line energy in phase-resolved ocean

surface wave orbital velocity reconstructions from X-band Doppler radar measurements of the sea surface, *Remote Sensing*, 11(1), 71. doi:10.3390/rs11010071.

Penton\*, S.E., and **E.E. Hackett**, 2018, Rough ocean surface effects on evaporative duct atmospheric refractivity inversions using genetic algorithms, *Radio Science*, 53. doi: 10.1029/2017RS006440.

Kammerer\*, A.J. and **E.E. Hackett**, 2017, Use of proper orthogonal decomposition for extraction of ocean surface wave fields from X-band radar measurements of the sea surface, *Remote Sensing*, 9, 881.

Troup\*, M.L., D.B. Fribance, S. Libes, R. Gurka and **E.E. Hackett**, 2017, Physical conditions of coastal hypoxia in Long Bay, South Carolina: 2006-2014, *Estuaries and Coasts*, doi:10.1007/s12237-017-0246-x.

Jacobs C.N.\*, Merchant W.\*, Jendrassak M.\*, Limpasuvan V., Gurka R., and **E.E. Hackett**, 2016, Flow scales of influence on the settling velocities of particles with varying characteristics. *PLoS ONE* 11(8): e0159645. doi:10.1371/journal.pone.0159645.

Saeger\*, J.T., N.G. Grimes\*, H.E. Rickard, and **E.E. Hackett**, 2015, Evaluation of simplified evaporation duct refractivity models for inversion problems, *Radio Science*, 50, doi:10.1002/2014RS005642.

Lentini\*, N.E., and **E.E. Hackett**, 2015, Global sensitivity of parabolic equation radar wave propagation simulation to sea state and atmospheric refractivity structure, *Radio Science*, 50, doi:10.1002/2015RS005742.

**Hackett E.E.**, A.M. Fullerton, C.F. Merrill, and T.C. Fu, 2015, Wave field characterization using dual-polarized pulse-Doppler X-band Radar, *IEEE Transactions on Geosciences and Remote Sensing*, 53, 11, 5926-5942.

**Hackett E. E.**, L. Luznik, A. R. Nayak, J. Katz, and T. R. Osborn, 2011, Field measurement of turbulence at an unstable interface between current and wave bottom boundary layers, *Journal of Geophysical Research*, 116, C02022, doi:10.1029/2010JC006138, 18 pp.

**Hackett E. E.**, L. Luznik, J. Katz, and T. R. Osborn, 2009, Effect of finite spatial resolution on the turbulent energy spectrum measured in the coastal ocean bottom boundary layer, *Journal of Atmospheric and Oceanic Technology*, 26, 12, 2610-2625.

*Peer-Reviewed Conference Proceedings*

Matsko\*, I.J. and **E.E. Hackett**, Impact of data selection on the accuracy of atmospheric refractivity evaporative duct inversions using genetic algorithms, 2018, *Proceedings of the 2018 IEEE International Symposium on Antennas and Propagation and U.S. National Committee URSI Radio Science Meeting*, Boston, MA.

Rickard, H.E., J.T. Saeger\*, and **E.E. Hackett**, Similarity and dissimilarity measures for comparison of propagation patterns, 2015, *Proceedings of the IEEE International Symposium on Antennas and Propagation and North American Radio Science Meeting*, Vancouver, Canada.

Segreto, J.M.\*, A.J. Kirchhefer, **E.E. Hackett**, C.G. Guglielmo, G.A. Kopp, and R. Gurka, 2015, Experimental study of the unsteady aerodynamics during flapping flight of birds: European Starling, Western Sandpiper and American Robin, *Proceedings of the 10<sup>th</sup> Pacific Symposium on Flow Visualization and Image Processing*, 15-18 June 2015, Naples, Italy.

**Hackett, E.E.**, C.F. Merrill, and J. Geiser, 2014, The application of proper orthogonal decomposition to complex wave fields, *Proceedings of the 30<sup>th</sup> Symposium on Naval Hydrodynamics*, 2-7 November 2014, Hobart, Australia.

Fu, T.C., P.M. Bardet, **E.E. Hackett**, and A. Kowalski, 2012, On the break-up of a turbulent liquid wall sheet, *Proceedings of the 18<sup>th</sup> Australasian Fluid Mechanics Conference*, 3-7 December 2012, Launceston, Australia.

**Hackett, E.E.**, J.B. Carneal, D.W. Pfitsch, A.M. Fullerton, D.C. Walker, T.C. Fu, D.C. Wyatt, T.T. O'Shea, K.A. Brucker, and D.G. Dommermuth, 2012, An experimental and numerical study on the break-up of a turbulent liquid wall sheet, *Proceedings of the 29<sup>th</sup> Symposium on Naval Hydrodynamics*, August 26-31, Gothenburg, Sweden.

**Hackett E. E.**, A. M. Fullerton, C. F. Merrill, and T. C. Fu, 2011, Measurements of surface waves using low-grazing angle high-resolution pulse-Doppler radar, *Proceedings of the 30<sup>th</sup> International Conference on Ocean, Offshore, and Artic Engineering*, June 19-24<sup>th</sup>, Rotterdam, The Netherlands.

Story W. R., **Hackett E. E.**, and T. C. Fu, 2011, Radar measurement of ocean waves, *Proceedings of the 30<sup>th</sup> International Conference on Ocean, Offshore, and Artic Engineering*, June 19-24<sup>th</sup>, Rotterdam, The Netherlands.

Fu T. C., A. M. Fullerton, **Hackett E. E.**, and C. F. Merrill, 2011, Shipboard measurement of ocean waves, *Proceedings of the 30<sup>th</sup> International Conference on Ocean, Offshore, and Artic Engineering*, June 19-24<sup>th</sup>, Rotterdam, The Netherlands.

Pastore\*, D., R. Peterson, D. Fribance, R. Viso, and **E.E. Hackett**, 2018, Hydrodynamic drivers of dissolved oxygen variability within a highly developed tidal creek in Myrtle Beach, South Carolina, AGU Fall Meeting, Washington, D.C.

Lambert\*, W.B., M.J. Stanek\*, R. Gurka, and **E.E. Hackett**, 2018, Leading-edge vortices over swept-back wings, APS Fluid Dynamics Division Conference, Atlanta, GA.

Greenway\*, D.P., T. Haack, and **E.E. Hackett**, 2018, Preliminary study on the use of ensemble weather prediction data for inversely determining atmospheric refractivity in surface ducting conditions, URSI National Radio Science Meeting 2018, Boulder, CO.

Fribance, D.B., R. Gurka, **E.E. Hackett**, K. Harrington\*, and M.L. Troup\*, 2017, Long-term dissolved oxygen trends in Long Bay, SC, Southeastern Estuarine Research Society (SEERS) Spring Meeting 2017, Myrtle Beach, SC.

Penton\* S.E. and **E.E. Hackett**, 2017, Rough ocean surface effects on genetic algorithm inversions for estimating evaporation duct refractivity profiles, URSI National Radio Science Meeting 2017, Boulder, CO.

Kammerer\*, A.J., G. Faruhason, and **E.E. Hackett**, 2016, Proper orthogonal decomposition applied to numerically modeled and measured ocean surface wave fields remotely sensed by marine radar, AGU Ocean Sciences Meeting 2016, New Orleans, LA.

Troup\*, M.L., D.B. Fribance, S.M. Libes, R. Gurka, and **E.E. Hackett**, 2016, Physical conditions during hypoxic events in Long Bay, South Carolina: 2006-2014, AGU Ocean Sciences Meeting 2016, New Orleans, LA.

Mears\*, N.P., **E.E. Hackett**, and R. Gurka, 2016, An experimental study on physical factors affecting dispersion and dilution of the Main Street stormwater outfall pipe in North Myrtle Beach, South Carolina, AGU Ocean Sciences Meeting 2016, New Orleans, LA.

**Hackett E. E.**, A.J. Kammerer\*, C. F. Merrill, A. M. Fullerton, and T. C. Fu, 2015, Spatiotemporal modulation and analysis of high-resolution backscatter and Doppler X-band radar measurements of ocean surface waves in low sea states, Sensing the Ocean with Marine Radar 3, Seattle, WA.

Lentini\*, N.E., and **E.E. Hackett**, 2015, Global sensitivity of radar wave propagation power to environmental variables for a parabolic equation numerical simulation in maritime regions, IEEE International Symposium on Antennas and Propagation and North American Radio Science Meeting, Vancouver, Canada.

Segreto\* J., A. Kirchhefer, **E.E. Hackett**, C.G. Guglielmo, G.A. Kopp, and R. Gurka, 2015, Flow features at the near wake of freely flying Starling, Sandpiper, and Red Robin, SICB 2015 Annual Meeting, West Palm Beach, FL.

Fribance, D.B. and **E.E. Hackett**, 2015, Variability of the Turbulent Kinetic Energy Dissipation Rate in Winyah Bay, SC, SEERS Conference, Jacksonville, FL.

Lentini\* N., and **E.E. Hackett**, 2014, Sensitivity of radar wave propagation power to the marine atmospheric boundary layer, AGU Fall Meeting 2014, San Francisco, CA.

Jacobs\* C.N., M. Jendrassak\*, R. Gurka, and **E.E. Hackett**, 2014, Effects of turbulence on settling velocities of synthetic and natural particles, AGU Fall Meeting 2014, San Francisco, CA.

**Hackett E.E.** and C.F. Merrill, 2014, Proper orthogonal decomposition of ocean surface waves, AGU Ocean Sciences Meeting 2014, Honolulu, HI.

Bao, S., T. Yan, L. Pietrafesa, P. Gayes, R. Nichols, **E. Hackett**, and R. Gurka, 2014, High-resolution modeling of near-shore wave breaking during strong storms, 94<sup>th</sup> Annual American Meteorological Society Meeting, Atlanta, GA.

Grimes\*, N.G. and **E.E. Hackett**, 2014, Examining constants in the Paulus-Jeske evaporation duct model, 2014 US National Committee of URSI National Radio Science Meeting (USNC-URSI NRSM), Boulder, CO.

**Hackett E.E.**, A. M. Fullerton, C.F. Merrill, and T.C. Fu, 2012, Comparison of Doppler- and radar cross section-based wave height spectra in low sea states, AGU Ocean Sciences Meeting 2012, Salt Lake City, UT.

**Hackett E. E.**, A. M. Fullerton, C. F. Merrill, and T. C. Fu, 2011, Measurement of surface waves in low sea states using coherent radar, Sensing the Ocean with Marine Radar 2011, Lerici, Italy.

Nayak, A. R., **E. E. Hackett**, L. Luznik, J. Katz, and T. R. Osborn, Turbulence statistics in the coastal ocean bottom boundary layer, AGU Fall Meeting 2010, San Francisco, CA.

**Hackett, E. E.**, L. Luznik, A.R. Nayak, J. Katz, and T. R. Osborn, High resolution flow and turbulence measurements in the inner part of the coastal ocean bottom boundary layer, AGU Ocean Sciences Meeting 2010, Portland, OR.

Nayak, A. R., **E. E. Hackett**, L. Luznik, J. Katz, and T. R. Osborn, Wave-current interaction in the coastal ocean bottom boundary layer, AGU Ocean Sciences Meeting 2010, Portland, OR.

**Hackett, E. E.**, L. Luznik, A. R. Nayak, J. Katz, and T. R. Osborn, Inner part of the coastal bottom boundary layer, CEA FM/Burgers Research Symposium on Environmental and Applied Fluid Dynamics, May 2009, Baltimore, MD.

**Hackett, E. E.**, L. Luznik, A. Nayak, J. Katz, and T. R. Osborn, Near-bed turbulence in the bottom boundary layer of the coastal ocean, EGU General Assembly 2009, Vienna, Austria.

**Hackett, E. E.**, L. Luznik, J. Katz, and T. R. Osborn, Waves and turbulence in the bottom boundary layer of the coastal ocean, Pattullo Conference, May 2008, Charleston, SC.

**Hackett, E. E.**, L. Luznik, J. Katz, and T. R. Osborn, Effect of spatial averaging on spectral characteristics in the frequency domain of *in-situ* velocity data, AGU Ocean Sciences Meeting 2008, Orlando, FL.

Luznik, L., **E. E. Hackett**, J. Katz, and T. R. Osborn, Direct estimation of the Reynolds stresses from PIV data, AGU Ocean Sciences Meeting 2008, Orlando, FL.

Luznik, L., W. A. M. Nimmo Smith, **E. Hackett**, J. Katz, and T. R. Osborn, Influence of wave strains on the TKE production rate in the outer part of the bottom boundary layer, AGU Fall Meeting 2006, San Francisco, CA.

Gurka, R., L. Luznik, **E. Hackett**, J. Katz, and T. Osborn, Characteristics of turbulence in the bottom boundary layer of the coastal ocean, APS 58<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics 2005, Chicago, IL.

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## INVITED SEMINARS

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**Johns Hopkins University**, *EPS 50<sup>th</sup> Anniversary Symposium*, “Electromagnetic Wave Propagation in the Marine Atmospheric Boundary Layer,” June 12-13 2018.

**Roanoke College**, *MCSP Department Seminar*, “Applied Physics and the U.S. Navy,” April 15, 2016.

**Naval Surface Warfare Center, Carderock Division**, *Hydro-Colloquium*, “Flow and Turbulence in the Coastal Ocean Bottom Boundary Layer,” February 22, 2011.

**St. Anthony Falls Laboratory, University of Minnesota**  
“Flow and Turbulence in a Combined Wave-Current Coastal Ocean Bottom Boundary Layer,” February 3, 2010.



**Department of Aerospace and Mechanical Engineering, University of Notre Dame**  
“Flow and Turbulence in a Combined Wave-Current Coastal Ocean Bottom Boundary Layer,” January 26, 2010.

**Horn Point Laboratory, University of Maryland, UMCES Horn Point Laboratory**  
*Weekly Seminar*, “Characterization of Near-bed Turbulence in the Coastal Ocean Measured using Particle Image Velocimetry,” March 25, 2009.

**Woods Hole Oceanographic Institution, AOPE Department Seminar**, “Characterization of Near-bed Turbulence in the Coastal Ocean Measured using Particle Image Velocimetry,” February 4, 2009.

**Center for Coastal Physical Oceanography, Old Dominion University, CCPO**  
*Seminar*, “Characterization of Near-bed Turbulence in the Coastal Ocean Measured Using Particle Image Velocimetry,” October 20, 2008.

**Roanoke College, MCSP Conversations**, “The Blue Planet: Exploring Earth’s Oceans,” November 2, 2006.

**Roanoke College, MCSP Conversations**, “Flow Measurements on the Atlantic Continental Shelf using PIV,” November 3, 2006.

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## HONORS

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### *Graduate Honors*

National Defense Science and Engineering Graduate Fellow

### *Undergraduate Honors*

Sigma Pi Sigma Honors Physics Society, Senior Scholar, Honors in Physics

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## PROFESSIONAL AFFILIATIONS

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American Geophysical Union

U.S. National Committee of the International Union of Radio Science, Commission F

American Physical Society