

## Nirnimesh Kumar

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RESEARCH INTERESTS Coastal physical oceanography; Numerical modeling; Surf zone and shelf processes; Sediment transport; Wave-current interaction; Time-series analysis; HF Radar wave and current measurements.

EDUCATION **University of South Carolina**, Columbia, SC

Ph.D., Marine Science, Aug. 2013

- Thesis Topic: *Measurements and Three-Dimensional Modeling of Hydrodynamic Processes in the Inner Shelf and Surf Zone*
- Advisor: George Voulgaris, Ph.D

M.S., Geological Sciences, May 2010

- Topic: *3-D Modeling of Nearshore Circulation using ROMS-SWAN: Model Upgrades and Evaluation*
- Advisor: George Voulgaris, Ph.D

**Indian Institute of Technology**, Kharagpur, WB

B.Tech., Ocean Engineering and Naval Architecture, May 2007

- Topic: *Numerical Modeling of Tsunami Run-up*
- Advisor: Prasad K. Bhaskaran, Ph.D

RESEARCH EXPERIENCE **Postdoctoral Scholar** August 2013 to present  
Scripps Institution of Oceanography,  
University of California, San Diego  
Supervisor: Falk Feddersen, Ph.D  
**Research Assistant** January 2008 to July 2013  
Division of Earth and Ocean Sciences,  
University of South Carolina, Columbia, SC  
**Research Assistant** January 2005 to May 2007  
Dept. of Ocean Engineering and Naval Architecture,  
IIT Kharagpur

REFEREED JOURNAL PUBLICATIONS

9. Safak, I., List, J. H., Warner, J. C., and **N. Kumar**. Observations and 3D hydrodynamics-based modeling of decadal-scale shoreline change along the Outer Banks, North Carolina (in review), *Coastal Engineering*.
8. **Kumar, N.**, Feddersen, F., Suanda, S., Uchiyama, Y., and J.C., McWilliams, 2015. Mid- to inner-shelf coupled ROMS-SWAN model-data comparison of currents, and temperature: Diurnal and semi-diurnal variability, *Journal of Physical Oceanography*, doi: 10.1175/JPO-D-15-0103.1.
7. **Kumar, N.**, Feddersen, F., Uchiyama, Y., McWilliams J.C. and W. O'Reilly, 2015. Mid-shelf to surf zone coupled ROMS-SWAN model-data comparison of waves, currents, and temperature: Diagnosis of subtidal forcings and response, *Journal of Physical Oceanography*, 45, 1464-1490.
6. Olabarrieta, M., Geyer, R., and **N. Kumar**, 2014. Wave-current interaction in an idealized plane jet, *Journal of Geophysical Research*, 119(12), 8818-8837.

5. **Kumar, N.**, Voulgaris, G., List, J.H., and J.C. Warner, 2013. Alongshore momentum balance analysis on a cusped foreland, *Journal of Geophysical Research*, 118(10), 5280-5295.
4. **Kumar, N.**, Voulgaris, G., Warner, J.C., and M., Olabarrieta, 2012. Implementation of a vortex force formalism in a coupled modeling system for inner-shelf and surf-zone applications. *Ocean Modeling*, Vol. 47, pp.65-95, doi:10.1016/j.ocemod.2012.01.003.
3. Olabarrieta, M., Warner, J.C., and **N. Kumar**, 2011. Wave-current interaction in Willapa Bay, *Journal of Geophysical Research*, Vol. 116, doi:10.1029/2011JC007387.
2. **Kumar, N.**, Voulgaris, G., and J.C. Warner, 2011. Implementation and modification of a three-dimensional radiation stress formulation for surf zone and rip-current applications. *Coastal Engineering*, Vol. 58, pp. 1097-1117, doi: 10.1016/j.coasteng.2011.06.009.
1. Ebenezer, D.D., **Nirnimesh, K.**, Barman, R., Kumar, R., and S.B. Singh, 2007. Analysis of solid elastic cylinders with internal losses using complete sets of functions, *Journal of Sound and Vibration*, Vol. 310, pp. 197-216.

BOOK CHAPTERS  
AND CONFERENCE  
PROCEEDINGS

4. Moulton, M., Elgar, S., Raubenheimer, B., Warner, J., and **Kumar, N.**, 2015. Bathymetric controls on rip currents and alongshore flows. *Proceedings of Coastal Sediments, 11-15 May, 2015, San Diego, CA*
3. Voulgaris, G., **Kumar, N.**, Gurgel, K.W., Warner, J.C., and J.H. List, 2011. 2-D inner shelf current observations from a single VHF WEllen RADar (WERA) station. *Proc. of the IEEE/OES 10th Current, Waves and Turbulence Workshop*, 20-23 March, 2011, Monterey CA, pp. 57-65, ISBN: 978-1-4577-0022-4
2. **Kumar, N.**, Voulgaris, G., and J.C. Warner, 2011. Measurement and three-dimensional modeling of nearshore circulation on a South Carolina beach. *Shore & Beach*, Vol. 79, 2, pp. 9-18.
1. Voulgaris, G., **Kumar, N.**, and J.C. Warner, 2011. A methodology for the prediction of rip-currents using 3-D Numerical, Coupled, Wave-Current Model. In: *Rip Currents: Beach Safety, Physical Oceanography, and Wave Modeling*. S. Leatherman and J. Fletemeyer (Eds). CRC Press. ISBN: 9781439838969

PAPERS IN  
PREPARATION

5. Suanda, S., **Kumar, N.**, DiLorenzo, E., Miller, A., Haas, K., Cai, D., Feddersen, F., and Edwards, C.A. (in prep for *Journal of Physical Oceanography*). Modeling multi-scale interactions on the inner-shelf.
4. **Kumar, N.**, Crosby, S., Cahl, D., and Voulgaris, G. (in prep for *Ocean Modeling*). The Importance of Stokes Drift Estimates for Coastal Circulation Studies: Modeling and HF Radar Applications. (*manuscript available*)
3. **Kumar, N.**, and Feddersen, F. (in prep for *Journal of Physical Oceanography*). Interaction of transient rip currents and a stratified inner-shelf. (*manuscript available*)
2. **Kumar, N.**, Voulgaris, G., Warner, J.C, and J.H. List (in prep for *JGR*). Modeling the dynamics of inner-shelf and surf zone region adjacent to a cusped foreland using coupled wave-current interaction model. (*manuscript available*)
1. Voulgaris, G. and **N. Kumar** (in prep for *Radio Science*). Forward modeling of HF radar Doppler spectrum and validation of wave parameters against field observations.

32. Wu, X., **Kumar, N.**, and Voulgaris, G., 2016, Inner shelf circulation patterns driven by synoptic weather systems on the South Carolina Coast, Ocean Sciences, 2016, New Orleans, Louisiana, Abstract ID: NH51C-1913
31. Feddersen, F., Giddings, S., **Kumar, N.**, and others, 2016, The Cross Surfzone/Inner-shelf Dye Exchange (CSIDE) Experiment Overview: Binational Dye Tracer Releases to Study Pollution Transport and Dilution, Ocean Sciences, 2016, New Orleans, Louisiana, Abstract ID: EC24B-1103
30. **Kumar, N.**, Suanda, S., and Feddersen, F., 2016, Parameterizing the Effects of Finite Crested Wave Breaking in Wave-Averaged Models, Ocean Sciences, 2016, New Orleans, Louisiana, Abstract ID: EC11A-06
29. Cai, D., Haas, K., DiLorenzo, E., Suanda, S., **Kumar, N.**, and others, 2016, Nested Grid Modeling of Circulation on the Inner-shelf, Ocean Sciences, 2016, New Orleans, Louisiana, Abstract ID: EC24B-1106
28. Suanda, S., **Kumar, N.**, and other, 2016, Modeling multi-scale interactions on the inner shelf: the effect of alongshore variability, Ocean Sciences, 2016, New Orleans, Louisiana, Abstract ID: EC21A-03
27. Cahl, D., Voulgaris, G., and **Kumar, N.**, 2016, HF radar Lagrangian trajectory calculations accounting for Stokes drift and the nonlinear Bragg wave phase speed correction term, Ocean Sciences, 2016, New Orleans, Louisiana, Abstract ID: EC44B-1247
26. Grimes, D., Feddersen, F., Giddings, S., and **Kumar, N.**, 2016. Down by the CSIDE: Aerial Hyperspectral and In Situ Measurements of a Nearshore Dye Release, Ocean Sciences, 2016, New Orleans, Louisiana, Abstract ID: EC21A-01
25. Rodriguez, A., Giddings, S., **Kumar, N.**. Assessing the impact of wave forcing on small river plumes (B-37). Coastal and Estuarine Research Federation, 2015, Portland, Oregon.
24. Suanda, S., **Kumar, N.**, and others, 2015. Modeling multi-scale interactions on the inner shelf. Gordon Research Seminar and Conference on Coastal Ocean Modeling, Maine (invited).
23. Gilroy, A., Giddings, S., and **N. Kumar**, 2015. Assessing the impact of wave forcing on small river plumes using the COAWST Modeling System. Gordon Research Seminar and Conference on Coastal Ocean Modeling, Maine.
22. **Kumar, N.**, and Feddersen, F., 2015. Inner-shelf interaction of transient rip currents and stratification: Implications for cross-shelf exchange. Gordon Research Seminar and Conference on Coastal Ocean Modeling, Maine.
21. **Kumar, N.**, and Feddersen, F., 2014. Modeling surf zone-inner shelf exchange: Interaction of rip currents and stratification. American Geophysical Union, Fall Meeting, San Francisco.
20. **Kumar, N.**, and Feddersen, F., 2014. Modeling surf zone-inner shelf exchange: Effect of rip currents and stratification. Young Coastal Scientists and Engineers Conference, University of Delaware, Newark, Delaware.
19. **Kumar, N.**, Feddersen, F., Omand, M., Uchiyama, Y., McWilliams, J.C. and O'Riley, W., 2014. Model-data comparison of surf zone and inner-shelf circulation during HB06. ASLO 2014, Ocean Sciences Meeting, Honolulu, Hawaii.

18. **Kumar, N.**, Voulgaris, G., Warner, J.C., List, J.H., 2013. Offshore transport around a cusped foreland system due to wind, wave and tidal forcing. Eastern Pacific Ocean Conference, Fallen Leaf lake, CA, 16-19 September, 2013.
17. **Kumar, N.**, Voulgaris, G., Warner, J.C., List, J.H., 2013. Studying Inner Shelf and Surf Zone Circulation at Cape Hatteras Point using Field Observations and COAWST Modeling System. Gordon Research Conference on Coastal Ocean Modeling, Univ. of New England, Biddeford, Maine, June 9 -16, 2013.
16. Warner, J.C., Armstrong, B., He, R., Zambon, J.B., Olabarrieta, M., Voulgaris, G., **Kumar, N.** and Hass, K.A., 2012. Development and applications of a Coupled-Ocean-Atmosphere-Wave-Sediment Transport (COAWST) Modeling System. AGU 2012, San Francisco, Fall Meet. Suppl., Abstract ID OS11B-1642.
15. List, J.H., Thieler, E.R., Warner, J.C., **Kumar, N.** and Safak, I., 2012. A Sediment Budget for Cape Hatteras, North Carolina, U.S.A. AGU 2012, San Francisco, Fall Meet. Suppl., Abstract ID EP33B-0853
14. Olabarrieta, M., Geyer, R., Warner, J.C., and **Kumar, N.**, 2012. Wave-current interaction in an idealized plane jet. ASLO 2012, Ocean Sciences Meeting, Salt Lake City, Utah.
13. Voulgaris, G., **Kumar, N.**, List, J.H., and Warner, J.C., 2012. Measurement of inner-shelf waves and currents using Very High Frequency (VHF) Wellen Radar. ASLO 2012, Ocean Sciences Meeting, Salt Lake City, Utah.
12. **Kumar, N.**, Voulgaris, G., List, J.H., and Warner, J.C., 2012. Cross-shore and alongshore variation of wind and wave driven flows in the inner-shelf and surf zone at the tip of Cape Hatteras, NC. ASLO 2012, Ocean Sciences Meeting, Salt Lake City, Utah.
11. Voulgaris, G., **Kumar, N.**, Gurgel, K.W., Warner, J. C., List, J.H., and Gill, E., 2011. VHF radar measurements of waves and currents in the nearshore regions. Third workshop on Remote Ocean Sensing, NATO Undersea Research Center, La Spezia, Italy, 11th-13th October, 2011.
10. Olabarrieta, M., Geyer, R., Warner, J.C., and **N. Kumar**, 2011. Wave-current interaction in an idealized plane jet. Gordon Research Conference on Coastal Ocean Modeling, Mount Holyoke College, South Hadley, MA. 26th Jun-1st July, 2011.
9. **Kumar, N.**, Voulgaris, G., Warner, J.C., and M., Olabarrieta, 2011. Effect of waves on 3-D current structure in Coupled-Ocean-Atmosphere-Waves-Sediment Transport (COAWST): "Vortex Force" vs. "Radiation Stress". Gordon Research Conference on Coastal Ocean Modeling, Mount Holyoke College, South Hadley, MA. 26th Jun-1st July, 2011.
8. Warner, J.C., Armstrong, B.N., Olabarrieta, M., He, R., Zambon, J.B., Voulgaris, G., **Kumar, N.**, and K A Haas, 2010. Development and Application of a COAWST Modeling System for Nearshore Environments. AGU 2010 Ocean Sciences Meeting, Abstract No PO13B- 01, Portland, OR, USA. (Invited).
7. **Kumar, N.**, Voulgaris, G. and J.C. Warner, 2010. Using Coupled Wave Current Models to Simulate and Predict Rip Currents. AGU 2010 Ocean Sciences Meeting, Abstract No PO15E-12, Portland, OR, USA.
6. Voulgaris, G., **Kumar, N.**, Warner, J.C, Haas, K.A., Uchiyama, Y., and J.C. McWilliams, 2010. Applications of Regional Ocean Modeling System (ROMS)

for Surf Zone Environment. AGU 2010 Ocean Sciences Meeting, Abstract No PO13B-02, Portland, OR, USA.

5. **Kumar, N.**, Voulgaris, G. and J.C. Warner, 2010. Predicting Rip Currents Using a 3-D Numerical, Coupled Wave-Current Model. 1st International Rip Current Symposium, Florida International University, February 17-19, 2010, Miami FL.
4. Voulgaris, G. and **N. Kumar**, 2009. Surfzone hydrodynamic measurements and modeling: Towards a rip-current potential hazard prediction tool. Nortek User Symposium, May 13-15, 2009, St. Augustine, FL.
3. **Kumar, N.**, Voulgaris, G. and J.C. Warner, 2008. Impact of Synoptic Meteorological Variations on Nearshore Hydrodynamics. Eos Trans. AGU, 89 (53), Fall Meet. Suppl., Abstract OS13D-1206.
2. **Kumar, N.** and G. Voulgaris, 2008. Surf zone response to weather fronts along the South Carolina coast. SECOM, May 12, 2008, Columbia, SC.
1. **Kumar, N.**, 2008. Analysis, modeling and forecasting of Nearshore Circulation. Graduate Day Presentation, University of South Carolina.

PRIZES/HONORS	<ul style="list-style-type: none"> <li>• <i>Best Poster</i> for Gordon Research Conference Coastal Ocean Modeling, Univ. of New Biddeford, Maine</li> <li>• <i>Best Oral Presentation</i> for Young Coastal Scientists and Engineers Conference, Univ. of Delaware</li> <li>• <i>Early career travel award</i> for Ocean Sciences, 2014, Scripps Institution of Oceanography</li> <li>• <i>Outstanding publication award</i> in the Marine Science Program, Univ. of South Carolina</li> <li>• Department and graduate school travel awards for attending and presenting in conferences</li> <li>• American Shore and Beach Preservation Association (ASBPA) <i>student educational award</i></li> <li>• Nominated for best M.S. thesis award in the Dept. of Earth and Ocean Sciences</li> <li>• Institute Silver Medal award for <i>best academic performance</i> in the Dept. of Ocean Engg. and Naval Architecture, IIT Kharagpur, India</li> </ul>	<p>June 2015</p> <p>July 2014</p> <p>Jan. 2014</p> <p>April 2013</p> <p>2008-2013</p> <p>Oct. 2010</p> <p>Oct. 2010</p> <p>Aug. 2007</p>
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SERVICE	<p>Reviewer for: Coastal Engineering, Ocean Modeling, Continental Shelf Research, Progress in Oceanography, Journal of Geophysical Research, Journal of Physical Oceanography, Coastal Engineering Journal, Frontiers-Marine Sciences</p>	<p>May 2010 – Present</p>
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TEACHING EXPERIENCE	<p>Curator and Teaching Assistant</p> <p>MSCI 314 - Physical Oceanography Marine Science Program, University of South Carolina, Columbia</p> <p>Teaching Assistant</p> <p>MSCI 101 - The Ocean Environment Marine Science Program, University of South Carolina, Columbia</p> <p>Teaching Assistant</p>	<p>Springs 2010-2013</p> <p>Fall 2007</p> <p>Fall 2007</p>
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MSCI 210 - Oceans and Society  
Marine Science Program,  
University of South Carolina, Columbia

SKILLS

Model Development

Developed wave-current interaction module for the COAWST Modeling System

Numerical Models

Regional Ocean Modeling System (ROMS)

Simulating WAVes Nearshore (SWAN)

Community Sediment Transport Modeling System (CSTMS)

funwaveC

Programming

MATLAB, C, FORTRAN, PYTHON, MPI Compliant Programming

FIELD

EXPERIENCE

- Calibrated, deployed and recovered acoustic instruments (ADCPs, ADVs, ABS and Aquadopps) in coastal and estuarine environments.
- Installed and maintained three WERA High Frequency Radar systems.
- Installed and maintained real-time remote data collection systems for oceanographic instruments located off two South Carolina piers.
- Installed Mobile Cart Instrument Platforms and conducted dye releases for the CSIDE experiment.