JIABI DU

Assistant Professor of Marine Science at Texas A&M University at Galveston Address: Bldg. 3029, Room 352, Department of Marine and Coastal Environmental Science, Texas A&M University at Galveston, Galveston, TX 77553 Office: +1 (409) 740-4837 Email: jdu@tamug.edu

EDUCATION

Ph.D. in Physical Oceanography, August 2017, Virginia Institute of Marine Science, College of William and Mary, Williamsburg, VA, USA

Master of Science in Oceanography, July 2012, Nanjing University, Nanjing, China Bachelor of Science in Physical Geography, July 2010, Nanjing University, Nanjing, China

RESEARCH INTERESTS

I am a coastal physical oceanographer and numerical model developer. My research focuses on the transport and exchange of materials between coastal bays, shelf seas, and deep ocean using in situ measurements, remote sensing data, and idealized and realistic numerical models. I am especially interested in how coastal systems respond to and recover from extreme weather events such as hurricanes. Other previous research topics include: flooding during storm events, impact of sealevel rise and climate warming, cross-shelf exchange induced by meso-scale eddies, physical control on coastal hypoxia, transport of fish larvae and pollutants, sediment transport, etc. Google Scholar: https://scholar.google.com/citations?hl=en&user=OavwXk0AAAJ

RESEARCH EXPERIENCE

Assistant Professor (January 2023 - present)

Texas A&M University Galveston Campus, Galveston, TX

Marine Science Senior (January 2022 – December 2022)

Virginia Institute of Marine Science, Gloucester Point, VA

- Developed python-based tools for pre- and post-processing for SCHISM (Semi-implicit Crossscale Hydroscience Integrated System Model)
- Developed an ecosystem model for Lake Superior
- Developed SAV (Submerged Aquatic Vegetation) and water quality models for San Francisco Bay delta
- Developed a particle tracking model coupled with SCHISM hydrodynamic model

Postdoc Investigator (September 2019-December 2021)

Woods Hole Oceanography Institution, Woods Hole, MA

- Examined the variability of shelf-slope connectivity around the Gulf of Maine
- Conducted numerical simulations based on idealized models to reveal the underlying mechanisms of how meso-scale eddies impact the exchange across the shelf-break
- Lagrangian simulation of pathway and retention of buoyant pollutants in the global ocean
- Lagrangian simulation of green crab larvae in the western coast of the U.S.

Postdoc Research Associate (Institutional Fellowship, September 2017-August 2019)

Texas A&M University at Galveston, Galveston, TX

- Developed a 3D unstructured grid model for Texas and Louisiana Coast to understand the response of estuarine dynamics to extreme events
- Examined the hydrodynamic and sedimentary responses in Galveston Bay to Hurricane Harvey

- Examined the spatial and temporal variation of phytoplankton biomass in Chesapeake Bay by combining high-resolution satellite data and long-term monitoring data
- Investigated the circulation and flushing in Mobile Bay using observational data and numerical modeling
- Mentored undergraduate students

Graduate Research Assistant (2012-2017)

Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, VA

- Developed and applied numerical ocean models using parallel computing techniques on highperformance computer clusters, successfully simulating the 3D hydrodynamics in Chesapeake Bay over the past 30 years
- Coupled a robust algorithm with a numerical model allowing faster access to large binary files and reducing the computational time by up to 50%
- Contributed to the design of a relational database system on Microsoft Access to store and analyze watershed information

TEACHING EXPERIENCE

Designed and presented a workshop, "Numerical Ocean Modeling: Learning SCHISM from Zero"

Texas A&M University at Galveston, TX (July 16-17, 2019)

- Gave 6 lectures on the essential concepts of numerical modeling to graduate students and faculty members, and employees from government agencies including the U.S. Army Corps of Engineers and Texas Water Development Board.
- Led hands-on practice to apply the model: all attendants are able to successfully set up a model by themselves after the workshop.

Mentors for REU summer program

Texas A&M University at Galveston, TX (June-August 2018)

- Mentored an undergraduate student in observational data collection and proposal writing for the summer program.
- 2 publications result from the two-months' program

Teaching Assistant

Nanjing University, Nanjing, China (2011-2012)

- Taught lab-courses "Field Survey" and "Data Analysis Using Programming Language"
- Gave lectures as a guest lecturer for the undergraduate course "Introduction to Physical Oceanography"

FUNDING APPLICATION EXPERIENCES

- "Microplastics(R)Us Sources and transport pathways of microplastics in a coastal estuary" to U.S. Coastal Research Program (Co-PI, \$287,348, Funded)
- "Impact of Loop-Current Eddies on physical conditions in the Gulf of Mexico 'dead zone'" to Ocean Science Division, National Science Foundation (leading PI, \$555,000, not Funded)

AWARDS

Best student paper of 2018 at VIMS, PhD category (2019) Institutional Postdoc Fellowship, Texas A&M University at Galveston (2017-2019) First Place of Presentation Awards, Chinese Society for Oceanology and Limnology (2015) Outstanding Graduates Awards, Nanjing University (2010) National Inspiration Scholarship, Nanjing University (2007, 2008) Zengxianzi Scholarship, Nanjing University (2007, 2008, 2009)

PUBLICATIONS

- [39] X. Yu, J. Shen, G. Zheng, J. Du (2022). Chlorophyll-a in Chesapeake Bay based on VIIRS satellite data: Spatiotemporal variability and prediction with machine learning. Ocean Modelling, 180, 102119
- [38] J. Du, W. Zhang, Y. Li (2022). Impact of Gulf Stream Warm-core Rings on Slope Water Intrusion into the Gulf of Maine. *Journal of Physical Oceanography*, 52, 1797-1815
- [37] J. Shen, J. Du, L.V. Lucas (2022). Simple relationships between residence time and annual nutrient retention, export, and loading for estuaries. *Limnology and Oceanography*, 67 (4), 918-933
- [36] T. Dellapenna, C. Hoelscher, L. Hill, V. Bartlett, M. Bell, M.E. Al Mukaimi, J. Du, K. Park, A.H. Knap (2021). Hurricane Harvey delivered a massive load of mercury rich sediment to Galveston Bay, Texas, USA. *Estuaries and Coasts*, doi:10.1007/s12237-021-00990-7.
- [35] H. Gancel, R. Carmichael, J. Du, K. Park (2021). Use of settlement patterns and geochemical tagging to test population connectivity of eastern oysters (*Crassostrea virginica*) in a freshwater-influenced estuary. *Marine Ecology Progress Series*, 673, 85-105.
- [34] E. Wugaft, Z.A. Wang, J.H. Churchill, T. Dellapenna, S. Song, J. Du, M.C. Ringham, T. Rivlin, B. Lazar (2021). Particle triggered reactions as an important mechanism of alkalinity and inorganic carbon removal in river plumes. *Geophysical Research Letters*, 48, e2021GL093178.
- [33] J. Du, W.G. Zhang, Y. Li (2021). Variability of deep water in Jordan Basin of the Gulf of Maine: Influence of Gulf Stream warm core rings and the Nova Scotia Current. *Journal of Geophysical Research: Oceans*, 126, 2020JC017136.
- [32] J. Du, K. Park, C. Jensen, T. Dellapenna, W. Zhang, Y. Shi (2021). Massive oyster kill in Galveston Bay caused by prolonged low-salinity exposure after Hurricane Harvey. *Science* of the Total Environment, 774, 145132.
- [31] J. Li, X. Chen, I. Townend, B. Shi, J. Du, J. Gao, X. Chuai, Z. Gong, Y.P. Wang (2021). A comparison study on the sediment flocculation process between a bare tidal flat and a clam aquaculture mudflat: The important role of sediment concentration and biological processes. *Marine Geology*, 434, 106443.
- [30] X. Yu, J. Shen, J. Du (2021). An inverse approach to estimate bacterial loading into an estuary by using field observations and residence time. *Marine Environmental Research*, 166, 105263.
- [29] W. Huang, F. Ye, Y.J. Zhang, K. Park, J. Du, S. Moghimi, E. Myers, S. Pe'eri, J.R. Calzada, H.C. Yu, K. Nunez, Z. Liu (2021). Compounding factors for extreme flooding around Galveston Bay during Hurricane Harvey. *Ocean Modelling*, 158, 101735.
- [28] J. Xiong, J. Shen, Q. Qin, J. Du (2021). Water exchange and its relationships with external forcings and residence time in Chesapeake Bay. *Journal of Marine Systems*, 215, 103497.
- [27] X. Yu, J. Shen, J. Du (2020). A machine-learning-based model for water quality in coastal waters, taking dissolved oxygen and hypoxia in Chesapeake Bay as an example. *Water Resource Research*, 56, e2020WR027227.
- [26] J. Li, Y.P. Wang, J. Du, F. Luo, P. Xin, J. Gao, B. Shi, X. Chen, S. Gao (2020). Effects of *Meretrix meretrix* on sediment thresholds of erosion and deposition on an intertidal flat. *Ecohydrology & Hydrobiology*, 21, 129-141.

- [25] G. Cheng, Y.P. Wang, G. Voulgaris, J. Du, J. Sheng, J. Xiong, J. Gao, Y. Yang (2020). Sediment exchange between channel and sand ridges in the southern Yellow Sea. *Continental Shelf Research*, 205, 104169.
- [24] Y. Chen, Q. He, J. Shen, J. Du (2020). The alteration of lateral circulation under the influence of human activities in a multiple channel system, Changjiang Estuary. *Estuarine, Coastal,* and Shelf Science, 242, 106823.
- [23] Y.J. Zhang, F. Ye, H. Yu, W. Sun, S. Moghimi, E. Myers, K. Nunez, R. Zhang, H.V. Wang, A. Roland, J. Du, Z. Liu (2020). Simulating compound flooding events in a hurricane. *Ocean Dynamics*, 70, 621-640.
- [22] F. Ye, Y.J. Zhang, H. Yu, W. Sun, S. Moghimi, E. Myers, K. Nunez, R. Zhang, H.V. Wang, A. Roland, K. Martins, X. Vertin, J. Du, Z. Liu (2020). Simulating storm surge and compound flooding events with a creek-to-ocean model: Importance of baroclinic effects. *Ocean Modelling*, 145, 101526.
- [21] J. Du, K. Park, X. Yu, Y.J. Zhang, F. Ye (2020). Massive pollutants released to Galveston Bay during Hurricane Harvey: Understanding their retention and pathway using Lagrangian numerical simulations. *Science of the Total Environment*, 704, 135364.
- [20] D. Chen, T. Lang, Y. Pei, J. Du, Y.P. Wang, J. Gao (2019). Hydrodynamics and sediment transport in response to sequential reclamations over subtidal waters near Tianjin Port. *Marine Sciences*, 43, 113-125 (in Chinese with English abstract).
- [19] F. Ye, Y.J. Zhang, R. He, Z. Wang, H.V. Wang, J. Du (2019). Third-order WENO transport scheme for simulating the baroclinic eddying ocean on an unstructured grid. Ocean Modelling, 143, 101466.
- [18] Z. Wang, H. Wang, J. Shen, F. Ye, Y. Zhang, F. Cai, Z. Liu, J. Du (2019). An analytical phytoplankton model and its application in the tidal freshwater James River. *Estuarine*, *Coastal and Shelf Science*, 224, 228-244.
- [17] Y. Shi, J.H. Gao, H. Sheng, J. Du, J.J. Jia, Y.P. Wang, J. Li, F.L. Bai, Y.N. Chen (2019). Cross-front sediment transport induced by quick oscillation of the Yellow Sea Warm Current: Evidence from the sedimentary record. *Geophysical Research Letters*, 6, 226–234.
- [16] J. Du, K. Park, J. Shen, Y.J. Zhang, X. Yu, F. Ye, Z. Wang, N.N. Rabalais (2019). A hydrodynamic model for Galveston Bay and the shelf in the northwestern Gulf of Mexico. *Ocean Science*, 15, 951-966.
- [15] J. Du, K. Park (2019). Estuarine salinity recovery from an extreme precipitation event: Hurricane Harvey in Galveston Bay. *Science of the Total Environment*, 670, 1049-1059.
- [14] J. Du, K. Park, T.M. Dellapenna, J.M. Clay (2019). Dramatic hydrodynamic and sedimentary responses in Galveston Bay and adjacent inner shelf to Hurricane Harvey. *Science of the Total Environment*, 653, 554-564.
- [13] J. Du, B. Shi, J. Li, Y.P. Wang (2019). Muddy coast off Jiangsu, China: physical, ecological, and anthropogenic processes. In *Sediment Dynamics of Chinese Muddy Coasts and Estuaries* (X. Wang, ed.), Academic Press, pp. 25-49.
- [12] F. Ye, Y.J. Zhang, H.V. Wang, M.A.M. Friedrichs, I.D. Irby, E. Alteljevich, A. Valle-Levinson, Z. Wang, H. Huang, J. Shen, J. Du (2018). A 3D unstructured-grid model for Chesapeake Bay: Importance of bathymetry. *Ocean Modelling*, 127, 16-39.
- [11] J. Du, K. Park, J. Shen, B. Dzwonkowski, X. Yu, B. Yoon (2018). Role of baroclinic processes on flushing characteristics in a highly stratified estuarine system, Mobile Bay, Alabama. *Journal of Geophysical Research: Oceans*, 123, 4518-4537.
- [10] J. Xiong, Y.P. Wang, S. Gao, J. Du, Y. Yang, J. Tang (2018). Estimation of near-bed wave orbital velocities and wave-related shear stresses using in situ measurements. *Limnology & Oceanography: Methods*, 16, 594-606.

- [9] J. Du, J. Shen, K. Park, Y.P. Wang, X. Yu (2018). Worsened physical condition due to climate change contributes to the increasing hypoxia in Chesapeake Bay. *Science of the Total Environment*, 630, 707-717.
- [8] J. Du, J. Shen, Y.J. Zhang, F. Ye, Z. Liu, Z. Wang, Y.P. Wang, X. Yu, M. Sisson, H.V. Wang (2018). Tidal response to sea-level rise in different types of estuaries: the importance of length, bathymetry, and geometry. *Geophysical Research Letters*, 45, 227-235.
- [7] J. Du, J. Shen (2017). Transport of riverine material from multiple rivers in the Chesapeake Bay: Important control of estuarine circulation on the material distribution. *Journal of Geophysical Research: Biogeosciences*, 122(11), 2998-3103.
- [6] J. Du, J. Shen, D.M. Bilkovic, C.H. Hershner, M. Sisson (2017). A numerical modeling approach to predict the effect of a storm surge barrier on hydrodynamics and long-term transport processes in a partially mixed estuary. *Estuaries and Coasts*, 40(2), 387-403.
- [5] J. Du, J. Shen (2016). Water residence time in Chesapeake Bay for 1980–2012. Journal of Marine Systems, 164, 101-111.
- [4] J. Du, J. Shen (2015). Decoupling the influence of biological and physical processes on the dissolved oxygen in the Chesapeake Bay. *Journal of Geophysical Research: Oceans*, 120(1), 78-93.
- [3] J. Du, Y. Wang (2014). Evolution simulation of radial sand ridges in the southern Yellow Sea. *Journal of Nanjing University: Natural Sciences*, 50(5), 636-645 (in Chinese with English abstract).
- [2] X. Yu, J. Du, J. Gao, Y. Yang, J. Ran, F. Li, Y. Liu, Y. Cheng (201). The influence of hydrodynamic characteristics on the distribution of chlorophyll concentration in the maximum turbidity of the Yalu Estuary. *Acta Oceanologica Sinica*, 34(2), 101-113 (in Chinese with English abstract).
- [1] J. Du, Y. Pei, J. Gao, X. Yu, F. Wang, C. Fan, H. Wang, Y. Wang (2012). The suspended sediment transport associated with low flow patterns in shallow waters: a case study from the Tianjin subtidal area. *Acta Oceanologica Sinica*, 34(1), 136-144 (in Chinese with English abstract).

PhD Dissertation

J. Du (2017). Impact of climate variation and human adaptation on the physical transport processes and water exchange in Chesapeake Bay. College of William and Mary.

PRESENTATIONS

[20] "Variability of deep water in Gulf of Maine: influence of Gulf Stream, warm-core rings, and Nova Scotia Current", Woods Hole Oceanographic Institution, January 22, 2021

[19] "Why bottom water in Gulf of Maine is persistently warmer in winter than in summer?", Ocean Science Meeting (poster), San Diego, CA, February 18, 2020

[18] "Dramatic Physical and Sedimentary Responses to Hurricane Harvey, the Wettest Tropical Storm in US History: An Interdisciplinary Study Using Observational and Numerical Approaches", Woods Hole Oceanographic Institution, December 18, 2019

[17] "Dramatic estuarine responses to hurricane Harvey, the wettest tropical storm in US history an interdisciplinary study using observational and numerical approaches", Virginia Institute of Marine Science (VIMS), Gloucester, VA, November 14, 2019 [16] "Dramatic estuarine response to hurricane Harvey, the wettest tropical storm in US history: observational and numerical approaches", 2019 WHOI Postdoctoral Symposium, October 10, 2019

[15] "Hydrodynamic and sedimentary responses to a category 4 hurricane, Harvey", 1st Young Scientist Symposium at Hohai University (invited), Nanjing, Jiangsu, China, December 21, 2018

[14] "Hydrodynamic and sedimentary responses to a category 4 hurricane, Harvey", Nanjing University (invited), Nanjing, Jiangsu, China, December 20, 2018

[13] "Dramatic estuarine response to Hurricane Harvey in Galveston Bay: observational and numerical approaches", Gulf Estuarine Research Society Meeting, Galveston, TX, November 9, 2018

[12] "A cross-scale numerical model for the Northwestern Gulf of Mexico", Physics of Estuaries and Coastal Seas Meeting (Poster), Galveston, TX, October 17, 2018

[11] "Modelling the dramatic estuarine responses in Galveston Bay to Hurricane Harvey", Hurricane Harvey Research Symposium, Port Aransas, TX, August 23, 2018

[10] "Understand the physical and biological controls on hypoxia in Chesapeake Bay: using longterm monitoring data and numerical modeling", Texas A&M University at Galveston, Galveston, TX, February 8, 2018.

[9] "Tidal asymmetry and its relation with sediment transport in Bohai, Yellow, East, and South China Sea", CERF Conference (Poster), Providence, RI, November 8, 2017

[8] "Water Residence time in the Chesapeake Bay from 1980-2012", VIMS, Gloucester, VA, August 11, 2016

[7] "A Numerical Modeling Approach to Predict the Effect of a Storm Surge Barrier on Hydrodynamics and Long-Term Transport Processes in a Partially Mixed Estuary", Chesapeake Modeling Symposium, Williamsburg, VA, June 1, 2016

[6] "Decoupling the influence of biological and physical processes on the dissolved oxygen in the Chesapeake Bay", Ocean Science Meeting, New Orleans, LA, Febulary 24, 2016

[5] "The importance of physical transport on water quality in the Chesapeake Bay", Zhuhai Symposium invited by Sun Yat-sen University, Zhuhai, China, December 20, 2015

[4] "Long-term vertical transport process in the Chesapeake Bay and its impact on dissolved oxygen", CERF Conference (Poster), Portland, OR, November 10, 2015

[3] "Numerical simulation of the vertical transport processes in the Chesapeake Bay for the past 3 decades", Annual Meeting of Chinese Society for Oceanology and Limnology, Changsha, China, April 19, 2015

[2] "Decoupling of physical and biological processes to assess the influence of long-term hydrodynamic variations on the change of hypoxia levels in the Chesapeake Bay", Physical Science Department Seminar in VIMS, Gloucester, VA, June 12, 2014

[1] "Decoupling of physical and biological processes to assess the influence of long-term hydrodynamic variations on the change of hypoxia levels in the Chesapeake Bay", Chesapeake Modeling Symposium, Annapolis, MD, May 28, 2014

PROFESSIONAL ACTIVIES

PROPOSAL REVIEW

Reviewed proposals for National Science Foundation Coastal Hypoxia Research Program (CHRP), NOAA's National Centers for Coastal Ocean Science North Carolina Sea Grant Maryland Sea Grant

JOURNAL REVIEW

Reviewed manuscripts for journals including *Earth Science Review*, *Geophysical Research Letters*, Science of the Total Environment, Journal of Geophysical Research: Oceans, Ocean Engineering, Marine Pollution Bulletin, Journal of Marine Systems, Marine Geology, Estuarine, Coastal and Shelf Science, Water Resources Research, Water, Marine Ecology Progress Series, International Journal of Sediment Research, Continental Shelf Research, Ocean Sciences, Journal of Asian Earth Science, Journal of Waterway, Port, Coastal and Ocean Engineering, Estuaries and Coasts

EDITORIAL ACTIVITIES

Guest Editor for journal *Water* since 04/01/2021 Guest editor for a special issue "Salt water intrusion in coastal areas" in journal *Water*