

## JIABI DU

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### **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 Geological Oceanography, July 2012, Nanjing University, Nanjing, China

**Bachelor of Science** in Physical Geography, July 2010, Nanjing University, Nanjing, China

### **RESEARCH INTERESTS**

Continental, coastal, and estuarine dynamics

Numerical ocean modeling

Water quality modeling

Sediment transport

Ecosystem modeling

Biogeochemical processes

Fishery larvae transport

Climate change

Sea level rise

Hypoxia

### **RESEARCH EXPERIENCE**

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#### **Postdoc Investigator (September 2019-present)**

Applied Ocean Physics and Engineering, Woods Hole Oceanography Institution, Woods Hole, MA

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

Texas A&M University at Galveston, Galveston, TX

- Developing a 3D unstructured grid model for Texas and Louisiana Coast to understand the response of estuarine dynamics to extreme events
- Examining the hydrodynamics and sedimentary responses in Galveston Bay to hurricane Harvey
- Examining the spatial and temporal variation of phytoplankton biomass in Chesapeake Bay by combining high-resolution satellite data and long-term monitoring data
- Investigating the circulation and flushing in Mobile Bay using observational data and numerical modeling
- Mentoring undergraduate students

#### **Research Assistant (2012-2017)**

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

- Developed and applied numerical ocean models using parallel computing techniques on high-performance 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

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### **Sole lecturer for 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 faculties from the university, and employees from government agencies including US Army Corpse Engineering and Texas Water Development Board.
- Lead hands-on practice to use 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-July, 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

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- "Impact of Loop-Current Eddies on physical conditions in the Gulf of Mexico 'dead zone'" to Ocean Science Division, National Science Foundation (leading PI, \$536, 520, pending)
- "Optimizing oyster reef restoration in Galveston Bay through high resolution 3D modeling and mapping of suitable substrate for restoration sites" to National Fish and Wildlife Foundation (CO-PI, \$1, 300, 000, pending)
- "Potential impact of large infrastructure on hydrodynamics, sedimentation, water quality and ecosystem in Galveston Bay" to Texas A&M University (leading PI, \$10, 000, awarded)

## AWARDS

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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

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- [27] X. Yu, J. Shen, **J. Du**. 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* (In press).
- [26] J. Li, Y. P. Wang, **J. Du**, F. Luo, P. Xin, J. Gao, B. Shi, X. Chen, S. Gao. Effects of Meretrix meretrix on sediment thresholds of erosion and deposition on an intertidal flat. *Ecohydrology & Hydrobiolog* (In press).
- [25] G. Cheng, Y. P. Wang, G. Voulgaris, **J. Du**, J. Sheng, J. Xiong, J. Gao, Y. Yang (2020). Sediment exchange between channel- and tidal flats system in the southern Yellow Sea. *Continental Shelf Research*, 205, 104169

- [24] Y. Chen, Q. He, J. Shen, **J. Du** (2020). The transition of lateral circulation under the influence of human activities in the North Passage of 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). Tidal dynamics and Sediment Transport in Response to Sequential Reclamations over Subtidal Waters near Tianjin Port. *Marine Sciences*, 43, 113-125.
- [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.
- [12] **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.), pp25-49.
- [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).
- [2] X. Yu, **J. Du**, J. Gao, Y. Yang, J. Ran, F. Li, Y. Liu, Y. Cheng (2012). 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.
- [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).

#### SUBMITTED

- H. Gancel, R. Carmichael, **J. Du**, K. Park. Use of settlement patterns and geochemical tagging to test population connectivity of eastern oysters (*Crassostrea virginica*) in a freshwater-influenced estuary.
- Y. Shi, J. Gao, H. Sheng, **J. Du**, J. Jia, Y. Wang, Y. Yang, J. Li, F. Bai, Y. Chen. Effect of Yellow Sea Warm Current on the evolution of multi-sourced mud patches in the North Yellow Sea.
- J. Li, X. Chen, I. Townend, B. Shi, J. Gao, **J. Du**, X. Chuai, Y. P. Wang. A comparison study on the cohesive sediment flocculation process between a bare tidal flat and a clam aquaculture mudflat: important role of sediment concentration and biological processes.

#### IN PREPARATION

- J. Du**, W.G. Zhang, Y. Li. Gulf of Maine bottom water properties controlled by intrusion of Gulf Stream slope water.
- J. Du**, K. Park, C. Jensen, T. M. Dellapenna, Y. Shi. Extreme weather events contributes to the worldwide loss of oyster reef.
- J. Du**, K. Park. Storm flushing impacts the overall water renewal in coastal systems in northern Gulf of Mexico.
- J. Du**, J. Shen, C. Friedrichs, K. Park, Y. P. Wang, S. Gao. Basin-wide tidal asymmetry in China Seas and its implication on sediment transport and coastal morphology: synthesis of observational data and numerical simulations.
- J. Du**, K. Park, B. Dzwonkowski, J. Shen, X. Yu, J. Coogan, S. L. Dykstra. Estuarine circulation in a shallow but stratified estuary: Different responses to river discharge between deep ship channel and shoals.

J. Shen, **J. Du**, L. V. Lucas. Relationships between residence time and annual nutrient retention, export, and loading for estuaries.

## PRESENTATIONS

[18] “Dramatic Physical and Sedimentary Responses to Hurricane Harvey, the Wettest Tropical Storm in US History: An Interdisciplinary Study Using Observational and Numerical Approaches”, Department Seminar at 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”, Physical Science Department Seminar in 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 long-term monitoring data and numerical modeling”, Seminar Series, Texas A&M University at Galveston, 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”, Physical Science Department Seminar in 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, February 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

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### SKILLS / STRENGTHS

- Experienced in numerical simulation and well trained in both structured grid model (ROMS, Delft3D, EFDC), and unstructured grid models (SCHISM)
- Experienced in programming using various types of programming languages (Python, R, C/C++, Fortran, Matlab, Perl)
- Professional qualities: self-motivated, productive, responsible, excellent at time management, adept at learning new skills and employing creative thinking

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### PROFESSIONAL ACTIVITIES

#### PROPOSAL REVIEW

Reviewed 1 proposal for NOAA’s National Centers for Coastal Ocean Science’s 2018 Coastal Hypoxia Research Program (CHRP)

#### JOURNAL REVIEW

Reviewed 58 manuscripts for over 20 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*