Jilian Xiong

Curriculum Vitae

School of Oceanography
University of Washington
Seattle, 98105, WA

jxiong7@uw.edu
https://jilian0717.github.io/

Education

Ph.D.	Physical Oceanography, Virginia Institute of Marine Science, William & Mary, Virginia, USA	August 2022
M.S.	Marine Geology, Nanjing University, Nanjing, China	June 2018
B.S.	Marine Science, Nanjing University, Nanjing, China	June 2015

Research Interests

Estuarine and coastal dynamics; Numerical ocean modeling; Physical-biological interactions Lagrangian particle tracking; Harmful algal blooms; Hypoxia; Environmental DNA; Pollutant transport and diffusion; Water quality modeling; Sediment transport

Academic Appointments

Postdoctoral Scholar, School of Oceanography, University of Washington (Sep. 2022 - present).
Advisor: Dr. Parker MacCready

- Developed an eDNA fate and transport model in Hood Canal to assess marine eDNA dispersal and optimized pre-sampling design.
- Analyzed tracer budgets in the Salish Sea to evaluate estuarine exchange flow.
- Conducted intercomparisons of five Lagrangian particle tracking packages in a common ocean circulation model.
- Intercompared ROMS-COBALT, ROMS-ChesECB, and ROMS-LiveOcean in the same domain.
- Improved LiveOcean biogeochemical simulations
- Modified ROMS model code to quantify transport timescales from flexible sources.
- Evaluate ocean alkalinity enhancement efficiency across diverse physical regimes in the Salish Sea.
- Assist with LiveOcean daily forecast and handle model output requests for graduate students and other researchers.

Publications

First-Authored

Xiong, J., MacCready, P., Brasseale, E. A., Allan, E. A., Ramon-Laca, A., Parsons, K., Shaffer, M., Kelly, P. Ocean transport drives environmental DNA dispersal in a nearshore marine environment (in revision *Environmental Science & Technology*).

Xiong, J., MacCready, P., Lesson, A. Impact of estuarine exchange flow on multi-tracer budgets in the Salish Sea (in revision *Journal of Geophysical Research: Oceans*)

Xiong, J., MacCready, P. (2024). Intercomparisons of Tracker v1. 1 and four other ocean particle-tracking software packages in the Regional Ocean Modeling System. *Geoscientific Model Development*, *17*(8), 3341-3356.

Xiong, J., Shen, J., Qin, Q., Tomlinson, M. C., Zhang, Y. J., Cai, X., Ye, F., Cui, L., Mulholland, M. R. (2023). Biophysical interactions control the progression of harmful algal blooms in Chesapeake Bay: a novel Lagrangian particle tracking model with mixotrophic growth and vertical migration. *Limnology and Oceanography Letters, 8*(3), 498-508.

Xiong, J., Shen, J., Wang, Q. (2022). Storm-induced coastward expansion of *Margalefidinium polykrikides* in Chesapeake Bay. *Marine Pollution Bulletin*, 184, 114187.

Xiong, J., Shen, J. (2022). Vertical transport timescale of surface-produced particulate material in the Chesapeake Bay. *Journal of Geophysical Research: Oceans, 127*(2), e2021JC017592.

Xiong, J., Shen, J., Qin, Q. (2021). Exchange flow and material transport along the salinity gradient in a long estuary. *Journal of Geophysical Research: Oceans, 126*(5), e2021JC017185.

Xiong, J., Shen, J., Qin, Q., Du, J. (2021). Water exchange and its relationship with external forcings and residence time in Chesapeake Bay. *Journal of Marine Systems, 215,* 103497.

Xiong, J., You, Z., Li, J., Gao, S., Wang, Q., Wang, Y. P. (2020). Variations of wave parameter statistics as influenced by water depth in coastal and shelf areas. *Coastal Engineering, 159*, 103717.

Xiong, J., Wang, Y. P., Gao, S., Du, J., Yang, Y. (2018). On estimation of coastal wave parameters and wave-induced shear stress. *Limnology and Oceanography: Methods, 16*(9): 594-606.

Xiong, J., Wang, X. H., Wang, Y. P., Chen, J., Shi, B., Gao, J., Yang, Y., Yu, Q., Li, M., Yang, L., Gong, X. (2017). Mechanisms of maintaining high suspended sediment concentration over tide-dominated offshore shoals in the Southern Yellow Sea. *Estuarine, Coastal and Shelf Science*, *191*, 221-233.

Co-Authored

Leeson, A., Mascrarenas, D., **Xiong, J**., MacCready, P., Horner-Devin, A. R., Brett, M. T. Weak, low-oxygen exchange flow drives hypoxia in Puget Sound's Inlets (in preparation).

Brasseale, E., Adams, N., Allan, E. A., Liu, O., MacCready, P., Moore, S., Parsons, K., Shaffer, M., **Xiong, J**., Kelly R. Marine eDNA production and loss mechanisms (in revision *Journal of Geophysical Research: Oceans*).

Graham, O. J., Al-Haj, A., Arrington, E. C., Arsenault, E. R., Barbosa, C. C., Bice, K., ... **Xiong, J**. & Xue, T. (2023). Better Together: Early Career Aquatic Scientists Forge New Connections at Eco-DAS XV. *Limnology and Oceanography Bulletin*, 119-121.

Qin, Q., Shen, J., Tuckey, T. D., Cai, X., **Xiong, J**. (2022). Using Forward and Backward Particle Tracking Approaches to Analyze Impacts of a Water Intake on Ichthyoplankton Mortality in the Appomattox River. *Journal of Marine Science and Engineering, 10*(9), 1299.

Wang, Q., Lu, Y., Hu, C., Hu, Y., Zhang, M., Jiao, J., **Xiong, J**., Liu, Y., Zhang, Z. (2021). Discrimination of biomass-burning smoke from clouds over the ocean using MODIS measurements. IEEE Transactions on Geoscience and Remote Sensing.

Wang, Q., Zhang, Z., Hao, Z., Liu, B., **Xiong, J**. (2021). Optical classification of coastal water body in China using hyperspectral imagery CHRIS/PROBA. In IOP Conference Series: Earth and Environmental Science (Vol. 668, No. 1, p. 012017). IOP Publishing.

Yang, Y., Gao, S., Wang, Y. P., Jia, J., **Xiong, J**., Zhou, L. (2020). Revisiting the problem of sediment motion threshold. *Continental Shelf Research, 187*, 103960.

Cheng, G., Wang, Y. P., Voulgaris, G., Du, J., Sheng, J., **Xiong, J**., Xing, F. (2020). Sediment exchange between channel and sand ridges in the southern Yellow Sea: The importance of tidal asymmetries. *Continental Shelf Research, 205*, 104169.

Du, J., Shen, J., Park, K., Yu, X., Qin, Q., **Xiong, J**., Chen, Y. (2020). Using observed bacteria concentration and modeled transit time under an analytical framework to estimate overall removal rate of fecal coliform in an estuary. arXiv preprint arXiv:2001.07603.

Tang, J., Wang, Y. P., Zhu, Q., Jia, J., **Xiong, J**., Cheng, P., Wu, H., Chen, D., Wu, H. (2019). Winter storms induced high suspended sediment concentration along the seabed offshore of north Yangtze Estuary. *Estuarine, Coastal and Shelf Science, 228*, 106351.

Mentorship & Advising

- Aurora Leeson (Graduate student, Civil & Environmental Engineering, University of Washington)
  Advised on oxygen budget analysis and model design for bit-reproducible ROMS biogeochemical simulations.
- Jesse Vance (Oceanographer, Ebb Carbon)
  Guided LiveOcean model implementation on their HPC and experiment design of ocean alkalinity enhancement.

Research Experience

Virginia Institute of Marine Science, William & Mary, Virginia, USA (2018-2022).
Advisor: Dr. Jian Shen

- Developed a SCHISM-based Lagrangian particle tracking and biology model to simulate harmful algal blooms (HABs) in Chesapeake Bay. This model was adopted by NOAA NCCOS HAB-FB for a predictive model.
- Modified EFDC model to compute transport timescales for riverine non-conservative materials and surface-produced particulates.
- Built high-resolution ocean models to address rip current safety for the National Park Service and support channel dredging for the U.S. Coast Guard.

Nanjing University, Nanjing, China (2015-2018).
Advisor: Dr. Ya Ping Wang

- Proposed an empirical equation to estimate significant wave height from shallow to deep waters using high-frequency pressure and velocity data.
- Assessed wave orbital velocity estimation algorithms across instrumental measurements at varying depths.
- Created MATLAB scripts to filter turbulence effects from near-bottom high-frequency velocity measurements when calculating wave orbital velocity.
- Identified mechanisms sustaining high background suspended sediment concentrations in the southern Yellow Sea, China

Presentations

Oral Presentations

Lesson, A., Mascarenas, D., **Xiong, J**., MacCready, P., Horner-Devine, A., Brett, M. "Weak, low-oxygen exchange flow drives hypoxia in Puget Sound's inlets". Puget Sound Institute workshop, Feb. 2025.

Xiong, J., MacCready, P., Brasseale, E. A., Allan, E. A., Ramon-Laca, A., Parsons, K., Shaffer, M., Kelly, P. "Ocean transport dominates the dispersal of environmental DNA in a nearshore marine environment". AGU, Dec. 2024.

MacCready, P., **Xiong, J**., Lesson, A. "Impact of estuarine exchange flow on multi-tracer budgets in the Salish Sea". Physics of Estuaries and Coastal Seas (PECS), Sep. 2024.

Brasseale, E., Adams, N. G., Allan, E., Jacobson, E. K., Kelly, R. P., Liu, O. R., Moor, S., Schaffer, M., **Xiong, J**., Parsons, K. "Marine eDNA production and loss mechanisms" Eastern Pacific Ocean Conference (EPOC), Sep. 2024.

Xiong, J., MacCready, P., Lesson, A. "Impact of estuarine exchange flow on multi-tracer budgets in the Salish Sea". WHOI COFDAL Seminar, Aug. 2024.

Brasseale, E., Adams, N. G., Allan, E., Jacobson, E. K., Kelly, R. P., Liu, O. R., Moor, S., Schaffer, M., **Xiong, J**., Parsons, K. "Effect of time-variation in environmental DNA (eDNA) shedding on distribution of detectable eDNA in a hydrodynamic model". Ocean Science Meeting, Feb. 2024

Xiong, J., Shen, J., Qin, Q., Tomlinson, M. C., Zhang, Y. J., Cai, X., Ye, F., Cui, L., Mulholland, M. R. "Biophysical interactions control the progression of harmful algal blooms in the lower Chesapeake Bay". UW Physical Oceanography seminar, Nov. 2022.

Xiong, J., Shen, J., Qin, Q., Tomlinson, M. C., Zhang, Y. J., Cai, X., Ye, F., Cui, L., Mulholland, M. R. "Biophysical interactions control the progression of harmful algal blooms: a novel Lagrangian particle tracking model with mixotrophic growth and vertical migration". Chesapeake Community Research Symposium, Jun. 2022.

Xiong, J., Shen, J., Qin, Q. "Vertical transport timescale of surface produced particulate material in the Chesapeake Bay". Ocean Science Meeting, Mar. 2022.

Xiong, J., Shen, J., Qin, Q., Tomlinson, M. C., Zhang, Y. J., Cai, X., Ye, F., Cui, L., Mulholland, M. R. "Developing an individual-based model for *Margalefidinum Polykrikoides* blooms in the lower Chesapeake Bay via coupled hydrodynamic model, algal behaviors, and satellite data". Physical Department Seminar of VIMS, Feb. 2022.

Xiong, J., Shen, J., Qin, Q., Du., J. "Long-term water exchange and material transport in Chesapeake Bay". CERF, Nov. 2021.

Xiong, J., Shen, J., Qin, Q., "Bathymetry controls on water reflux and material transport in Chesapeake Bay". Physical Department Seminar of VIMS, Mar. 2021.

Xiong, J., Shen, J. "Transport pathway and timescale of dissolved and particulate materials from diverse sources in Chesapeake Bay". Chesapeake Community Research Symposium, Jun. 2020.

Xiong, J., Shen, J. "A study of water exchange and material transport in Chesapeake Bay". Physical Department Seminar of VIMS, Mar. 2020.

Xiong, J., Shen, J. Qin, Q., Du, J. "Effects of discharge and wind on exchange flow and residence time in Chesapeake Bay". CERF, Nov. 2019.

Xiong, J., Wang, X. H., Wang Y. P, Chen, J., Shi, B., Gao, J., Yang, Y., Yu, Q., Li, M., Yang, L., Gong, X. "Mechanisms of high SSC and its influence on turbulence dissipation in the Southern Yellow Sea". 14th Annual Meeting Asia Oceania Geosciences Society, Aug. 2017.

Invited Talks

Xiong. J., MacCready, P. "Introduction of LiveOcean models". UW MG&G seminar, Oct. 2024.

Xiong, J., Shen, J., Qin, Q., Tomlinson, M. C., Zhang, Y. J., Cai, X., Ye, F., Cui, L., Mulholland, M. R. "Biophysical interactions control the progression of harmful algal blooms in the lower Chesapeake Bay". Gordon Research Seminar, Jun. 2023.

Ecological Dissertations in the Aquatic Sciences 2023 March in Honolulu, Hawaii (invited participant)

Poster Presentations

Hinson, K., Ward, N., St-Laurent, P., Pagès, R., **Xiong, J**., Friedrichs, M.A.M., Hauri, C., MacCready, P. Yang, Z. "Experimentally Supported Representations of Modeled Ocean Alkalinity Enhancement". AGU, Dec. 2024.

Yin, D., Ganju, N., Harris, C., Radieeinasab, A., Ralston, D., Warner, J., **Xiong, J**. "A numerical modeling framework for the simulation of estuary saltwater intrusion and coastal flooding over the Albemarle-Pamlico Sound Estuarine System". AGU, Dec. 2024.

Mullholland, M. R., Echevarria, M. A., Vega, E. P., Bernhardt, P. W., Zhu, Y., Macias-Tapia, A., Tomlinson, M. C., Curtis, K., Hofmann, E. E., Clayton, S., **Xiong, J**., Qin, Q., Shen, J. "Summertime heat waves in the lower Chesapeake Bay and their effects on blooms of the harmful algae *Margalefidinium polykrikoides*". Ocean Science Meeting, Feb. 2024.

Xiong, J., MacCready, P., Brasseale, E. A., Allan, E. A., Ramon-Laca, A., Parsons, K., Shaffer, M., Kelly, P. "Transport dynamics of environmental DNA from a known point source of marine mammals". CERF, Nov. 2023.

Xiong, J., MacCready, P. "Intercomparisons of five ocean particle tracking software packages". Gordon Research Conference – Coastal Ocean Dynamics, Jun. 2023.

Xiong, J., Shen, J. "Origins and transport pathway of deep channel material in Chesapeake Bay". Ocean Science Meeting, Feb. 2020.

Xiong, J., Wang, Y.P. "Estimation of combined wave and current shear stress over the offshore shoal in the Southern Yellow Sea". 2nd Workshop on Sediment Dynamics of Muddy Coasts and Estuaries, Oct. 2015.

Skills

- Proficient in numerical simulation using both unstructured (SCHISM) and structured (ROMS, EFDC) grid models.
- Experienced in programming with Python, MATLAB, and Fortran.
- Skilled in high-performance computing (HPC) and Linux environments.

Academic & Professional Service

Journal Review

Continental Shelf Research
EGUsphere
Estuarine, Coastal and Shelf Science
Frontiers in Marine Science
Journal of Geophysical Research: Oceans
Marine Ecology Progress Series
Marine Geology
Marine Pollution Bulletin
Nature Communications
Ocean and Coastal Research
Progress in Oceanography
Scientific Report

Proposal Review

Woods Hole Oceanographic Institution Sea Grant.

Conferences

CERF2021 and 2023 student poster and oral presentation judge
Moderator for three sessions at Ocean Science Meeting, 2024

Awards & Honors

- Best Ph.D. Student Paper Award at VIMS (2023)
- Dean's Fellowship at VIMS (2020-2021)
- VIMS Commonwealth Coastal Research Fellowship (2020-2021)
- Norfolk Southern Fellowship at VIMS (2019-2020)
- William J. Hargis, Jr. Fellowship at VIMS (2019-2020)
- Zeigler Fellowship at VIMS (2018-2020)
- Outstanding Graduate Thesis Award of Jiangsu Province, China (2019)
- CERF 2021 Participation Award (2021)
- Student Travel Grant, VIMS (2019, 2021, 2022)
- First-class Yingcai Scholarship, Nanjing University (2017)
- National Inspiration Scholarship, Nanjing University (2012, 2013, 2014)
- People's Scholarship, 1st Class, Nanjing University (2014)
- Second-class Guanghua Educational Scholarship, Nanjing University (2012)