

Qian Zhang, Ph.D.

Associate Research Scientist

University of Maryland Center for Environmental Science

Watershed Effectiveness Data Analyst

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Research Interests

To apply scientific principles and statistical approaches to examine nutrient and sediment loads from watersheds and to better understand their drivers and impacts along the land-river-estuary continuum, thereby contributing to sustainability goals related to clean water, resilient ecosystems, and informed watershed management under changing climate and land-use pressures. Specific research areas include:

- Quantifying riverine water-quality loads and trends.
- Improving statistical methods for riverine water-quality load and trend estimation.
- Disentangling natural and anthropogenic controls of riverine water-quality loads and trends.
- Understanding impacts of riverine water-quality loads and trends on receiving waters (e.g., estuaries).

Education

Ph.D. Johns Hopkins University, **Environmental Engineering**, 2011-2016.

Thesis: Quantifying Nutrient and Sediment Export from the Chesapeake Bay Watershed: Retrospective Analyses and Method Improvements (Advisor: Professor William P. Ball)

M.S.E. Johns Hopkins University, **Applied Mathematics and Statistics**, 2013-2014.

M.S.E. Johns Hopkins University, **Environmental Engineering**, 2010-2011.

B.Eng. Nanyang Technological University, Singapore, **Environmental Engineering** (1st Class Honors), 2005-2009.

Appointments

- **Faculty ORISE Fellow (part-time appointment)**, USEPA Office of Research and Development, Washington, D.C., 2024-present.
- **Associate Research Scientist (Watershed Effectiveness Data Analyst)**, University of Maryland Center for Environmental Science / USEPA Chesapeake Bay Program, Annapolis, MD, 2023-present.
- **Assistant Research Scientist (Watershed Effectiveness Data Analyst)**, University of Maryland Center for Environmental Science / USEPA Chesapeake Bay Program, Annapolis, MD, 2016-2023.
- **Research Assistant**, Department of Geography and Environmental Engineering, Johns Hopkins University, Baltimore, MD, 2010-2016.
- **Teaching Assistant**, Department of Geography and Environmental Engineering, Johns Hopkins University, Baltimore, MD, 2011-2012.
- **Engineer**, LBW Consultants LLP, Singapore, 2009-2010.

Skills & Expertise

- **Programming:** R, Matlab, Python

- **Computer:** Microsoft Office, ArcGIS, AutoCAD, HEC-RAS, Adobe Illustrator
- **Environment:** Chesapeake Bay, Hydrology, Contaminant Transport, Physical/Chemical Processes
- **Analytics:** Statistics, Monte Carlo, Data Mining, Machine Learning, Time Series, Modeling

Honors & Awards

- **Panel Moderator**, Chesapeake Community Research Symposium (ChesCRS) Panel on “Big Data to Better Decisions: Leveraging AI and Machine Learning for Chesapeake Bay Research and Management,” 2026
- **Invited Panelist**, Chesapeake Bay Program Scientific and Technical Advisory Committee (STAC) Topical Meeting on “AI and Machine Learning for Chesapeake Bay Science and Management: Opportunities, Constraints, and Next Steps,” 2026
- **Invited Panelist**, bAI Civil AI Mixer, 2026
- **Invited Panelist**, Chesapeake Research Consortium (CRC) Roundtable on “Leveraging Artificial Intelligence to Advance Chesapeake Bay Research and Management,” 2026
- **Contributing author**, Top 10 most-cited articles published in JAWRA in 2024, 2026
- **Lead author**, U.S. Geological Survey MD-DE-DC Water Science Center Best Publication Award, 2025
- **Lead author**, Top 10 most-cited articles published in WIREs Water in 2023, 2025
- **Recipient**, Expanding the Critical Zone Research Network Workshop Travel Grant, 2022
- **Recipient**, National Association of Government Communications (NAGC) Blue Pencil & Gold Screen Award (Award of Excellence, Technical or Statistical Reports), 2022
- **Recipient**, AGU Frontiers in Hydrology Meeting (FIHM) Early Career Travel Grant, 2022
- **Recipient**, Joint Aquatic Sciences Meeting (JASM) Early Career Travel Award, 2022
- **Recipient**, Coastal & Estuarine Research Federation (CERF) Student/Early Career Participation Award, 2021
- **Top Reviewers** in Environment and Ecology by Publons, 2019
- **Top Reviewers** in Environment and Ecology by Publons, 2018
- **Recipient**, Innovyze Excellence in Computational Hydraulics/Hydrology Award by American Academy of Environmental Engineers and Scientists (AAEES) [jointly selected with the Association of Environmental Engineering and Science Professors (AEESP)], 2017
- **Recipient**, Coastal & Estuarine Research Federation (CERF) Student/Early Career Travel Grant, 2017
- **Recipient**, Johns Hopkins Graduate Representatives Organization (GRO) Travel Grant, 2016
- **Research Fellow**, Maryland Water Resources Research Center (MWRRC), 2015
- **Recipient**, Geological Society of America (GSA) Student Travel Grant, 2015
- **Research Fellow**, Maryland Sea Grant Graduate (MDSG), 2013-2014
- **Graduate Student Scholar**, Community Surface Dynamics Modeling System (CSDMS), 2013
- **3rd Place Winner**, Chesapeake Water Environment Association (CWEA) Student Paper Competition, 2012
- **Awardee**, Dean’s List Award, Nanyang Technological University (NTU), Singapore, 2008-2009
- **Awardee**, Dean’s List Award, Nanyang Technological University (NTU), Singapore, 2007-2008
- **Winner**, Singapore National Concrete Canoe Competition (SNCCC), 2008
- **Undergraduate Fellow**, Ministry of Education (MOE), Singapore, 2005-2009

Journal Publications

- Zhang, Q.**, R. Hirsch, L. DeCicco, and J. Murphy, 2026. Fifteen years of WRTDS for advancing water-quality science: A review of methodological developments and global applications. *Environmental Science & Technology*, 60:11170-11182, doi: [10.1021/acs.est.5c12895](https://doi.org/10.1021/acs.est.5c12895).
- Zhang, Q.**, R. Hirsch, L. DeCicco, and J. Murphy, 2026. Advancing an adaptable and practical framework to address water quality challenges in a changing world. *Nature Reviews Earth & Environment*, 7:1–3, doi: [10.1038/s43017-025-00753-z](https://doi.org/10.1038/s43017-025-00753-z).
- Brehob, M. M., M. J. Pennino, J. E. Compton, **Q. Zhang**, M. H. Weber, R. A. Hill, S. Markley, B. Pickard, M. Keefer, S. M. Stackpoole, L. A. Knose, G. J. Ruiz-Mercado, C. M. Clark, A. W. Rea, J. N. Carleton, J. Lin, J. O. Bash, K. M. Foley, C. Hogrefe, and R. D. Sabo, 2025. The US EPA’s National Nutrient Inventory: Critical shifts in US nutrient pollution sources from 1987 to 2017. *Environmental Science & Technology*, 59:27836-27852, doi: [10.1021/acs.est.5c08196](https://doi.org/10.1021/acs.est.5c08196).
- Song, Y., **Q. Zhang**, and C. Shen, 2025. Editorial: Eutrophication, algal blooms, and hypoxia in lakes and reservoirs: perspectives on addressing water quality degradation. *Frontiers in Water*, 7:1740416, doi: [10.3389/frwa.2025.1740416](https://doi.org/10.3389/frwa.2025.1740416).
- Pan, Y., Z. Zhang, Z. Cheng, Z. Pan, J. Zhou, M. Hu, **Q. Zhang**, and D. Chen, 2025. Key controls on nutrient retention efficiency in vegetated buffer strips: A global meta-analysis. *Ecological Indicators*, 181:114373, doi: [10.1016/j.ecolind.2025.114373](https://doi.org/10.1016/j.ecolind.2025.114373).
- Tang, X., J. Huang, S. Chen, J. Wu, Z. Zhang, and **Q. Zhang**, 2025. “Integrating self-organizing mapping and causal inference to assess patterns and drivers of surface river water quality in a coastal province of China,” *Journal of Environmental Management*, 393:127191, doi: [10.1016/j.jenvman.2025.127191](https://doi.org/10.1016/j.jenvman.2025.127191).
- Zhang, Q.**, R. Tian, Z. Wei, R. R. Murphy, K. S. Gootman, and P. J. Tango, 2025. “A novel threshold-based indicator for assessing dissolved oxygen criteria attainment deficits, buffers, and trends in Estuarine waters,” *Environmental Research: Water*, 1:025006, doi: [10.1088/3033-4942/adf460](https://doi.org/10.1088/3033-4942/adf460). (* Received U.S. Geological Survey MD-DE-DC Water Science Center Best Publication Award 2025.)
- Minaudo, C., A. Abonyi, C. Alcaraz, J. Diamond, N. J. K. Howden, M. Rode, E. Romero, V. Thieu, F. Worrall, **Q. Zhang**, and X. Benito, 2025. “OLIGOTREND, a global database of multi-decadal chlorophyll a and water quality time series for rivers, lakes, and estuaries,” *Earth System Science Data*, 17:3411-3430, doi: [10.5194/essd-17-3411-2025](https://doi.org/10.5194/essd-17-3411-2025).
- Zhou, J., X. Jiao, H. Wu, Y. Zhang, Z. Pan, Y. Pan, Z. Zhang, Z. Cheng, M. Hu, **Q. Zhang**, and D. Chen, 2025. “Modeling the impact of legacy nitrogen accumulated in agricultural soil-groundwater on water quality improvement,” *Environmental Research Letters*, 20:084008, doi: [10.1088/1748-9326/ade7a3](https://doi.org/10.1088/1748-9326/ade7a3).
- Zhang, Q.**, G. Shenk, I. Bertani, and G. Bhatt, 2025. “METRIC: An interactive framework for integrated visualization and analysis of monitored and expected load reductions for nitrogen, phosphorus, and sediment in the Chesapeake Bay watershed,” *Environmental Modelling & Software*, 188:106379, doi: [10.1016/j.envsoft.2025.106379](https://doi.org/10.1016/j.envsoft.2025.106379).
- Liang, K., Y. Jiang, K. Fuller, M. Cordeiro, X. Zhang, J. Qi, X. Geng, T. Liu, **Q. Zhang**, M. A. Azimi, and F. Meng, 2025. “Large variability of nitrate load estimated from sparse measurements by typical methods in Atlantic Canada,” *Frontiers in Environmental Science*, 13:1557004, doi: [10.3389/fenvs.2025.1557004](https://doi.org/10.3389/fenvs.2025.1557004).
- Zhang, Q.**, R. R. Murphy, R. Tian, and P. J. Tango, 2025. “Geography, trajectories, and controls of coastal water quality: More rapid improvement in the shallow zone of the Chesapeake Bay,” *Environmental Science & Technology*, 59:553-564, doi: [10.1021/acs.est.4c07368](https://doi.org/10.1021/acs.est.4c07368).
- Pan, Z., Y. Zhang, L. Ma, J. Zhou, Y. Wang, K. Wu, **Q. Zhang**, and D. Chen, 2025. “Spatiotemporal variations of cropland phosphorus runoff loss in China,” *Journal of Hydrology*, 648:132419, doi: [10.1016/j.jhydrol.2024.132419](https://doi.org/10.1016/j.jhydrol.2024.132419).

- Tango, P. J., **Q. Zhang**, R. Tian, R. R. Murphy, B. M. Sullivan, M. E. Mallonee, D. Ghosh, A. Goldfischer, and K. S. Gootman, 2025. "Adaptive monitoring for change: Record low hypoxia in Chesapeake Bay in 2023," *Ocean-Land-Atmosphere Research*, 4:0076, doi: 10.34133/olar.0076.
- Zhang, Q.**, R. R. Murphy, R. Tian, K. S. Gootman, and P. J. Tango, 2024. "Dissolved oxygen criteria attainment in Chesapeake Bay: Where has it improved since 1985?" *Science of the Total Environment*, 957:177617, doi: 10.1016/j.scitotenv.2024.177617.
- Dreiss, A., A. R. Azarnivand, A. Hildebrand, S. F. Pourreza Ahmadi, S. S. Ali, V. M. Lucchese, **Q. Zhang**, L. L. Lapham, R. J. Woodland, L. Harris, and J. M. Testa, 2024. "Controls on oxygen variability and depletion in the Patuxent River estuary," *Estuaries and Coasts*, 47:2306-2323, doi: 10.1007/s12237-024-01390-3.
- Webber, J. S., J. Chanat, J. Clune, O. Devereux, N. Hall, R. D. Sabo, and **Q. Zhang**, 2024. "Evaluating water-quality trends in agricultural watersheds prioritized for management-practice implementation," *Journal of the American Water Resources Association*, 60:305-330, doi: 10.1111/1752-1688.13197. (* *Recognized as one of the top 10 most-cited articles published in JAWRA in 2024.*)
- Zhang, Q.**, G. Shenk, I. Bertani, and Bhatt, G., 2024. "Integrating monitoring and modeling information to develop an indicator of watershed progress toward nutrient reduction goals," *Ecological Indicators*, 158C:111357, doi: 10.1016/j.ecolind.2023.111357.
- Cravotta, C. A., T. L. Tasker, P. M. Smyntek, J. D. Blomquist, J. W. Clune, **Q. Zhang**, N. M. Schmadel, and N. K. Schmer, 2024. "Legacy sediment as a potential source of orthophosphate: Preliminary conceptual and geochemical models for the Susquehanna River, Chesapeake Bay watershed, USA," *Science of the Total Environment*, 912:169361, doi: 10.1016/j.scitotenv.2023.169361.
- Zhang, Q.**, J.T. Bostic, and R.D. Sabo, 2024. "Effects of point and nonpoint source controls on total phosphorus load trends across the Chesapeake Bay watershed," *Environmental Research Letters*, 19:014012, doi: 10.1088/1748-9326/ad0d3c.
- Zhang, Q.**, J. D. Blomquist, R. M. Fanelli, J. L. D. Keisman, D. L. Moyer, and M. J. Langland, 2023. "Progress in reducing nutrient and sediment loads to Chesapeake Bay: Three decades of monitoring data and implications for restoring complex ecosystems," *WIREs Water*, 10(5):e1671, doi: 10.1002/wat2.1671. (* *Recognized as one of the top 10 most-cited articles published in WIREs Water in 2023.*)
- Xiang, J., T. Cui, X. Li, **Q. Zhang**, B. Mu, R. Liu, and W. Zhao, 2023. "Evaluating the effectiveness of coastal environmental management policies in China: The case of Bohai Sea," *Journal of Environmental Management*, 338:117812, doi: 10.1016/j.jenvman.2023.117812.
- Zhang, Q.**, T. R. Fisher, C. Buchanan, A. B. Gustafson, R. R. Karrh, R. R. Murphy, J. M. Testa, R. Tian, and P. J. Tango, 2022. "Nutrient limitation of phytoplankton in three tributaries of Chesapeake Bay: Detecting responses following nutrient reductions," *Water Research*, 226:119099, doi: 10.1016/j.watres.2022.119099.
- Zhang, Q.**, J.T. Bostic, R.D. Sabo, 2022. "Regional patterns and drivers of total nitrogen trends in the Chesapeake Bay watershed: Insights from machine learning approaches and management implications," *Water Research*, 218:118443, doi: 10.1016/j.watres.2022.118443.
- Zahrn, A.R., **Q. Zhang**, P. Tango, and E.P. Smith, 2022. "A water quality barometer for Chesapeake Bay: Assessing spatial and temporal patterns using long-term monitoring data," *Ecological Indicators*, 140:109022, doi: 10.1016/j.ecolind.2022.109022.
- Sabo, R.D., B. Sullivan, C. Wu, E. Trentacoste, **Q. Zhang**, G. Shenk, G. Bhatt, and L.C. Linker, 2022. "Major point and nonpoint sources of nutrient pollution to surface water have declined throughout the Chesapeake Bay watershed," *Environmental Research Communications*, 4:045012, doi: 10.1088/2515-7620/ac5db6.
- Murphy, R.R., J. Keisman, J. Harcum, R.R. Karrh, M. Lane, E.S. Perry, and **Q. Zhang**, 2022. "Nutrient improvements in Chesapeake Bay: Direct effect of load reductions and implications for coastal management," *Environmental Science & Technology*, 56(1):260-270, doi: 10.1021/acs.est.1c05388.
- Langendorf, R., V. Lyubchich, J. Testa, and **Q. Zhang**, 2021. "Inferring controls on dissolved oxygen criterion attainment in the Chesapeake Bay," *ACS ES&T Water*, 1:1665-1675, doi: 10.1021/acsestwater.0c00307.

- Chang, S.Y., **Q. Zhang**, D.K. Byrnes, N.B. Basu, and K.J. Van Meter, 2021. "Chesapeake legacies: The importance of legacy nitrogen to improving Chesapeake Bay water quality," *Environmental Research Letters*, 16:085002, doi: 10.1088/1748-9326/ac0d7b.
- Preisendanz, H.E., T.L. Veith, **Q. Zhang**, and J. Shortle, 2021. "Temporal inequality of nutrient and sediment transport: a decision-making framework for temporal targeting of load reduction goals," *Environmental Research Letters*, 16:014005, doi: 10.1088/1748-9326/abc997.
- Zhang, Q.**, J. S. Webber, D. L. Moyer, and J. G. Chanut, 2021. "An approach for decomposing river water-quality trends into different flow classes," *Science of the Total Environment*, 755:143562, doi: 10.1016/j.scitotenv.2020.143562.
- Zhang, Q.**, T. R. Fisher, E. M. Trentacoste, C. Buchanan, A. B. Gustafson, R. Karrh, R. R. Murphy, J. Keisman, C. Wu, R. Tian, J. M. Testa, and P. J. Tango, 2021. "Nutrient limitation of phytoplankton in Chesapeake Bay: Development of an empirical approach for water-quality management," *Water Research*, 188C:116407, doi: 10.1016/j.watres.2020.116407.
- Noe, G.B., M.J. Cashman, K. Skalak, A. Gellis, K.G. Hopkins, D. Moyer, J. Webber, A. Benthem, K. Maloney, J. Brakebill, A. Sekellick, M. Langland, **Q. Zhang**, G. Shenk, J. Keisman, and C. Hupp, 2020. "Sediment dynamics and implications for management: State of the science from long-term research in the Chesapeake Bay watershed, USA," *WIREs Water*, 7:e1454, doi: 10.1002/wat2.1454.
- Roubeix V., C. Minaudo, J. Prats, N. Reynaud, **Q. Zhang**, F. Moatar, and P. Danis, 2020. "Adapting the dynamic LakeMab model to simulate seasonal variations of phosphorus concentration in reservoirs: a case study of Lake Bultière (France)," *Limnology*, 21:233-244, doi: 10.1007/s10201-019-00606-x.
- Zhang, Q.**, and R.M. Hirsch, 2019. "River water-quality concentration and flux estimation can be improved by accounting for serial correlation through an autoregressive model," *Water Resources Research*, 55:9705–9723, doi: 10.1029/2019WR025338.
- Testa, J.M., Lyubchich V., and **Q. Zhang**, 2019. "Patterns and trends in Secchi disk depth over three decades in the Chesapeake Bay estuarine complex," *Estuaries and Coasts*, 42(4):927-943, doi: 10.1007/s12237-019-00547-9.
- Zhang, Q.**, J.D. Blomquist, D.L. Moyer, and J.G. Chanut, 2019. "Estimation bias in water-quality constituent concentrations and fluxes: A synthesis for Chesapeake Bay rivers and streams," *Frontiers in Ecology and Evolution*, 7:109, doi: 10.3389/fevo.2019.00109.
- Zhang, Q.**, P.J. Tango, R.R. Murphy, M.K. Forsyth, R. Tian, J. Keisman, and E.M. Trentacoste. 2018. "Chesapeake Bay dissolved oxygen criterion attainment deficit: Three decades of temporal and spatial patterns," *Frontiers in Marine Science*, 5:422, doi: 10.3389/fmars.2018.00422.
- Zhang, Q.**, R.R. Murphy, R. Tian, M.K. Forsyth, E.M. Trentacoste, J. Keisman, and P.J. Tango. 2018. "Chesapeake Bay's water quality condition has been recovering: Insights from a multimetric indicator assessment of thirty years of tidal monitoring data," *Science of the Total Environment*, 637-638:1617-1625, doi: 10.1016/j.scitotenv.2018.05.025.
- Zhang, Q.**, C.J. Harman, and J.W. Kirchner. 2018. "Evaluation of statistical methods for quantifying fractal scaling in water quality time series with irregular sampling," *Hydrology and Earth System Sciences*, 22(2):1175-1192, doi: 10.5194/hess-22-1175-2018.
- Zhang, Q.** and J.D. Blomquist. 2018. "Watershed export of fine sediment, organic carbon, and chlorophyll-a to Chesapeake Bay: Spatial and temporal patterns in 1984–2016," *Science of the Total Environment*, 619–620:1066–1078, doi: 10.1016/j.scitotenv.2017.10.279.
- Zhang, Q.** 2018. "Synthesis of nutrient and sediment export patterns in the Chesapeake Bay watershed: Complex and non-stationary concentration-discharge relationships," *Science of the Total Environment*, 618:1268-1283, doi: 10.1016/j.scitotenv.2017.09.221.

- Zhang, Q.** and W.P. Ball. 2017. “Improving Riverine Constituent Concentration and Flux Estimation by Accounting for Antecedent Discharge Conditions,” *Journal of Hydrology*, 547:387–402, doi: [10.1016/j.jhydrol.2016.12.052](https://doi.org/10.1016/j.jhydrol.2016.12.052).
- Zhang, Q.**, C.J. Harman, and W.P. Ball. 2016. “An Improved Method for Interpretation of Riverine Concentration-Discharge Relationships Indicates Long-Term Shifts in Reservoir Sediment Trapping,” *Geophysical Research Letters*, 43:10215–10224, doi: [10.1002/2016GL069945](https://doi.org/10.1002/2016GL069945).
- Zhang, Q.**, R.M. Hirsch, and W.P. Ball. 2016. “Long-Term Changes in Sediment and Nutrient Delivery from Conowingo Dam to Chesapeake Bay: Effects of Reservoir Filling,” *Environmental Science & Technology*, 50(4):1877-1886, doi: [10.1021/acs.est.5b04073](https://doi.org/10.1021/acs.est.5b04073).
- Zhang, Q.**, W.P. Ball., and D.L. Moyer. 2016. “Decadal-scale Export of Nitrogen, Phosphorus, and Sediment from the Susquehanna River Basin, USA: Analysis and Synthesis of Temporal and Spatial Patterns,” *Science of the Total Environment*, 563-564:1016-1029, doi: [10.1016/j.scitotenv.2016.03.104](https://doi.org/10.1016/j.scitotenv.2016.03.104).
- Zhang, Q.**, D.C. Brady, W.R. Boynton, and W.P. Ball. 2015. “Long-term Trends of Nutrients and Sediment from the Non-tidal Chesapeake Watershed: An Assessment of Progress by River and Season,” *Journal of the American Water Resources Association*, 51(6):1534-1555, doi: [10.1111/1752-1688.12327](https://doi.org/10.1111/1752-1688.12327).
- Zhang, Q.**, D.C. Brady, and W.P. Ball, 2013. “Long-term Seasonal Trends of Nitrogen, Phosphorus, and Suspended Sediment Load from the Non-tidal Susquehanna River Basin to Chesapeake Bay,” *Science of the Total Environment*, 452-453:208-221, doi: [10.1016/j.scitotenv.2013.02.012](https://doi.org/10.1016/j.scitotenv.2013.02.012).

Manuscripts (in Review)

- “Managing the unmanageable: Understanding the competing effects of salinity and nutrient loading on estuarine water quality,” under review.
- “Machine-learning Attribution and Prediction of Nitrogen and Phosphorus Trends across the Contiguous United States,” in preparation.

Book Chapters

- Zhang, Q., S. Cozzi, C. Palinkas, and M. Giani, 2020. “Recent Status and Long-Term Trends in Freshwater Discharge and Nutrient Inputs,” In: *Coastal Ecosystems in Transition: A Comparative Analysis of the Northern Adriatic and Chesapeake Bay*, T. C. Malone, A. Malej and J. Faganeli (Editors), doi: [10.1002/9781119543626.ch2](https://doi.org/10.1002/9781119543626.ch2). American Geophysical Union / John Wiley and Sons, Inc.

Reports

- Sullivan, B., K. Gootman, A. Gunnerson, G. Duran, E. Smith, R. Karrh, C. Johnson, C. Mason, E. Perry, G. Bhatt, J. Keisman, J. Webber, J. Harcum, M. Lane, O. Devereux, **Q. Zhang**, R. Murphy, T. Butler, V. Van Note, and Z. Wei, 2026. “Maryland Lower Eastern Shore Tributary Summary: A summary of trends in tidal water quality and associated factors, 1985-2023,” Chesapeake Bay Program, Annapolis, MD.
- Zhang, Q.**, M. Baker, I. Bertani, B. Dennison, L. Linker, K. Maloney, R. Sabo, C. Shen, G. Shen, K. V. Meter, and M. Cole, 2025. Leveraging artificial intelligence and machine learning to advance Chesapeake Bay research and management: A review of status, challenges, and opportunities. STAC Publication Number 25-005. Chesapeake Bay Scientific and Technical Advisory Committee, Edgewater, MD, p. 45. https://www.chesapeake.org/stac/wp-content/uploads/2025/11/FINAL_Leveraging-AI-and-ML_25-005-1.pdf.
- Sullivan, B.M., K. Gootman, A. Gunnerson, S. Betts, C. Johnson, C.A. Mason, E. Perry, G. Bhatt, J.L. Keisman, J.S. Webber, J. Harcum, M.F. Lane, O. Devereux, **Q. Zhang**, R. Murphy, R. Karrh, T. Butler, V. Van Note, and Z. Wei, 2024. “Rappahannock tributary summary: A summary of trends in tidal water quality and

- associated factors, 1985-2022,” Chesapeake Bay Program, Annapolis, MD.
<https://pubs.usgs.gov/publication/70259743>.
- Sullivan, B., K. Gootman, A. Gunnerson, C. Johnson, C. Mason, E. Perry, G. Bhatt, J. Keisman, J. Webber, J. Harcum, M. Lane, O. Devereux, **Q. Zhang**, R. Murphy, R. Karrh, T. Butler, V. Van Note, and Z. Wei, 2023. “James Tributary Summary: A summary of trends in tidal water quality and associated factors, 1985-2021,” Chesapeake Bay Program, Annapolis, MD. <https://pubs.usgs.gov/publication/70249906>.
- Webber, J.S., J.W. Clune, A.M. Soroka, M.J. Cashman, O.H. Devereux, R.M. Fanelli, K.E. Faunce, K.G. Hopkins, J.L. Keisman, R.E. Langendorf, C.A. Mason, R.R. Murphy, M.R. Nardi, R.D. Sabo, G.W. Shenk, P.J. Tango, J.M. Testa, and Q. Zhang, 2022. “Summarizing Scientific Findings for Common Stakeholder Questions to Inform Nutrient and Sediment Management Activities in the Chesapeake Bay Watershed”, <https://www.usgs.gov/centers/chesapeake-bay-activities/science/summarizing-scientific-findings-common-stakeholder>.
- Clune, J. W., P. D. Capel, M. P. Miller, D. A. Burns, A. J. Sekellick, P. R. Claggett, R. H. Coupe, R. M. Fanelli, A. M. Garcia, J. P. Raffensperger, S. Terziotti, G. Bhatt, J. D. Blomquist, K. G. Hopkins, J. L. Keisman, L. C. Linker, G. W. Shenk, R. A. Smith, A. M. Soroka, J. S. Webber, D. M. Wolock and **Q. Zhang**, 2021. Nitrogen in the Chesapeake Bay watershed—A century of change, 1950–2050, *U.S. Geological Survey Circular 1486*. U.S. Geological Survey, New Cumberland, PA, doi: 10.3133/cir1486.
- Bastille, K., S. Hardison, S. Lucey, C. Schillaci, J. Walden, P. Fratantoni, J. Caracappa, G. DePiper, B. Vogt, C. Pellerin, R. Vogel, **Q. Zhang**, K. Hyde, Z. Chen, L. Colburn, C. Weng, S. Gaichas, L. Smith, A. Beet, R. Gamble, V. Saba, M. Wuenschel, G. Roskar, C. Orphanides, G. Saba, H. Walsh, K. Friedland, T. White, G. Shield, A. Gangopadhyay, A. Silva, D. Lyons and R. Morse, 2021. Technical Documentation, State of the Ecosystem 2021. Northeast Fisheries Science Center. <https://repository.library.noaa.gov/view/noaa/29277>.
- Hyer, K. E., S. W. Phillips, S. W. Ator, D. L. Moyer, J. S. Webber, R. Felter, J. L. Keisman, L. A. McDonnell, R. Murphy, E. M. Trentacoste, **Q. Zhang**, W. C. Dennison, S. Swanson, B. Walsh, J. Hawkey, and D. Taillie, 2021. “Nutrient trends and drivers in the Chesapeake Bay Watershed,” *U.S. Geological Survey Fact Sheet 2020–3069*. U.S. Geological Survey, Baltimore, MD, p. 4. doi: 10.3133/fs20203069.
- Keisman, J., R. R. Murphy, O. H. Devereux, J. Harcum, R. Karrh, M. Lane, E. Perry, J. Webber, Z. Wei, **Q. Zhang**, and M. Petenbrink, 2020. “Potomac Tributary Report: A summary of trends in tidal water quality and associated factors, 1985-2018,” Chesapeake Bay Program, Annapolis, MD.
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- Keisman, J., C. Friedrichs, R. Batiuk, J. Blomquist, J. Cornwell, C. Gallegos, S. Lyubchich, K. Moore, R. Murphy, R. Orth, L. Sanford, P. Tango, J. Testa, M. Trice, and **Q. Zhang**, 2019. “Understanding and explaining 30 years of water clarity trends in the Chesapeake Bay’s tidal waters,” *Chesapeake Bay Program STAC Publication Number 19-004*, Edgewater, MD, p. 25.
http://www.chesapeake.org/pubs/411_Keisman2019.pdf.

Dissertation

- Zhang, Q.** 2016. Quantifying Nutrient and Sediment Export from the Chesapeake Bay Watershed: Retrospective Analyses and Method Improvements. *Johns Hopkins University Doctoral Dissertations*, Baltimore, MD. <https://jscholarship.library.jhu.edu/handle/1774.2/40327>. (PDF attached)

Data Publications

- Zhang, Q.** 2022. “Nutrient limitation of phytoplankton in three tributaries of Chesapeake Bay: Detecting responses following nutrient reductions,” *Mendeley Data*, doi: 10.17632/bzzthwgpj.2.
- Zhang, Q.** 2020. “Data for: Nutrient limitation of phytoplankton in Chesapeake Bay: Development of an empirical approach for water-quality management,” *Mendeley Data*, doi: 10.17632/8wt3wh2mwr.3.
- Webber, J.S, and **Q. Zhang**. 2020. Chesapeake Bay Nontidal Network 1985-2018: Daily High-Flow and Low-

Flow Concentration and Load Estimates (ver. 1.1, November 2021). *U.S. Geological Survey data release*, doi: 10.5066/P9LBJEY1.

Zhang, Q., C.J. Harman, and W.P. Ball. 2016. “Data associated with An Improved Method for Interpretation of Riverine Concentration-Discharge Relationships Indicates Long-Term Shifts in Reservoir Sediment Trapping,” *Johns Hopkins University Data Archive*, doi: 10.7281/T18G8HM0.

Zhang, Q. and W.P. Ball. 2016. “Data associated with Decadal-scale export of nitrogen, phosphorus, and sediment from the Susquehanna River basin, USA: Analysis and synthesis of temporal and spatial patterns,” *Johns Hopkins University Data Archive*, doi: 10.7281/T1QN64NW.

Zhang, Q. and W.P. Ball. 2014. “Data associated with Long-term seasonal trends of nutrients and sediment from the nontidal Chesapeake Bay Watershed,” *Johns Hopkins University Data Archive*, doi: 10.7281/T1VD6WC7.

Zhang, Q. and W.P. Ball. 2014. “Data associated with Long-term seasonal trends of nitrogen, phosphorus, and suspended sediment load from the non-tidal Susquehanna River Basin to Chesapeake Bay,” *Johns Hopkins University Data Archive*, doi: 10.7281/T1KW5CX5.

App Products

Monitored and Expected Total Reduction Indicator for the Chesapeake (METRIC)
Chesapeake Bay Water Quality Standards Attainment Deficit
Chesapeake Bay Water Quality Standards Attainment Indicator

Media Reports

National nutrient study shows progress in reducing effects of nutrient pollution by USGS Water News

卫星遥感发现渤海近岸海域海水透明度显著改善 by Xinhua News Agency

Hogan’s environment agency was underfunded and underperformed, experts say by Capital News Service

'Windows of opportunity' crucial for cutting Chesapeake nutrient, sediment loads by The Penn State News

Findings in Chesapeake Bay watershed help guide management of excess sediment by Advanced Science News

Chinese Delegation Visit by The Chesapeake Research Consortium

Experts warn of ‘dead zone’ in Chesapeake Bay from pollution by The Associated Press

Chesapeake Bay water quality inches toward a new record by The Chesapeake Bay Program

Experts say Chesapeake Bay water quality is the best since monitoring began by The Daily Press

Chesapeake Bay water quality highest since testing began by The NBC12

Chesapeake Bay water quality reaches all-time high since 1985 by The Calvert Recorder

Bay Water Quality Hits All-time High As Funding Cuts Loom by The Chesapeake Bay Magazine

Conowingo battle: sides look for alternative as fight drags on by Delmarva Now / Salisbury Daily Times

Frustration builds against Conowingo Dam after season of releases, progress in 2019? by Delmarva Now / Salisbury Daily Times

A dam could derail the Chesapeake Bay cleanup by The Washington Post

The Chesapeake Bay hasn’t been this healthy in 33 years, scientists say by The Washington Post

First Move: Industry Eyes Permitting Program Changes • Safety Board Recommendations • Chesapeake Bay Cleanup by The Bloomberg BNA

A Bay in a box: How scientific findings could help a computer model keep the Chesapeake Bay on its pollution diet by The Chesapeake Quarterly

Modeling studies provide new insights on dam's influence on water quality in Chesapeake Bay by Maryland Sea Grant

Qian Zhang wins national award for research on Chesapeake Bay by University of Maryland Center for Environmental Science (UMCES)

Qian Zhang received an award from the AAEES by Johns Hopkins University

2017 Innovyze Excellence in Computational Hydraulics/Hydrology Award by American Academy of Environmental Engineers and Scientists (AAEES)

Editorial and Committee Services

Associate Editor, AGU Earth's Future ([URL](#))

Associate Editor, Journal of Hydrology ([URL](#))

Associate Editor, Frontiers in Water (Environmental Water Quality) ([URL](#))

Review Editor, Frontiers in Environmental Science (Freshwater Science) ([URL](#))

Member, Advisory Panel, Environmental Research Letters ([URL](#))

Member, Topical Advisory Panel Member & Reviewer Board, Water ([URL](#))

Member, Water Quality Technical Committee, AGU Hydrology Section ([URL](#))

Member, Outstanding Student Presentation Award Committee, AGU Hydrology Section ([URL](#))

Member, Maryland Sea Grant Academic Advisory Board

Member, California Sea Grant Biophysical Science Panel

Conference Sessions

Lead convener, session “Advancing Chesapeake Bay Water-quality Science and Management: II. Novel analysis and scientific communication approaches to inform management” at *Chesapeake Community Research Symposium*, Annapolis, MD, June 1-3, 2026.

Co-convener, session “Water Quality and Watersheds: From Scientific Innovations to Actions” at *American Geophysical Union (AGU) Annual Meeting*, New Orleans, LA, December 15-19, 2025.

Co-convener, session “Advancements in Watershed Modeling to Support Water Management” at *American Geophysical Union (AGU) Annual Meeting*, New Orleans, LA, December 15-19, 2025.

Lead convener, session “Water-quality patterns and trends II: Novel analysis and communication approaches” at *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, Richmond, VA, November 9-13, 2025.

Lead convener, session “Water-quality patterns and trends I: Innovative monitoring techniques” at *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, Richmond, VA, November 9-13, 2025.

Lead convener, session “Water quality patterns, trends, and drivers along land-river-estuary continuums: insights gained from large-scale monitoring and geospatial datasets” at *Society for Freshwater Science (SFS) Annual Meeting*, Puerto Rico, May 18-22, 2025.

Lead convener, session “From the Mountains to the Estuary: Water Quality Patterns, Trends, and Drivers in the Chesapeake Bay and Its Watershed” at *American Geophysical Union (AGU) Annual Meeting*, Washington, D.C., December 9-13, 2024.

Co-convener, session “Advancements in Watershed Modeling to Support Water Management” at *American Geophysical Union (AGU) Annual Meeting*, Washington, D.C., December 9-13, 2024.

Co-convener, session “Advances and contemporary issues in water quality modelling” at *International Congress on Environmental Modelling and Software*, East Lansing, MI, June 23-27, 2024.

- Lead convener**, session “Water-quality patterns and trends in the Chesapeake Bay and its watershed: II. Novel analysis and scientific communication approaches to inform management” at *Chesapeake Community Research Symposium*, Annapolis, MD, June 10-12, 2024.
- Co-convener**, session “Advancements in Watershed Modeling to Support Water Management” at *American Geophysical Union (AGU) Annual Meeting*, San Francisco, CA, December 11-15, 2023.
- Lead convener**, session “Developing new insights from environmental data through innovative analysis approaches” at *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, Portland, OR, November 12-16, 2023.
- Co-convener**, session “Advancements in Watershed Modeling to Support Water Management” at *American Geophysical Union (AGU) Fall Meeting*, Chicago, IL, December 12-16, 2022.
- Lead convener**, session “Water-quality patterns and trends in the Chesapeake Bay and its watershed: Integrated monitoring, modeling, and science communication approaches to advance science and inform management” at *Chesapeake Community Research Symposium*, Annapolis, MD, June 6-8, 2022.
- Lead convener**, session “Advancements in Watershed Modeling to Support Water Management” at *American Geophysical Union (AGU) Fall Meeting*, virtual conference, December 13-17, 2021.
- Lead convener**, session “Developing new insights from environmental data through innovative analysis approaches” at *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, virtual conference, November 1-11, 2021.
- Lead convener**, workshop “Use R to Manipulate and Visualize Environmental Data” at *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, virtual conference, November 1-11, 2021.
- Co-convener**, session “Advancements in Watershed Modeling to Support Water Resources Management” at *American Geophysical Union (AGU) Fall Meeting*, virtual conference, December 1-17, 2020.
- Lead convener**, session “Water-quality patterns and trends in the Chesapeake Bay and its watershed: Integrated monitoring and modeling approaches to advance science and inform management” at *Chesapeake Community Research Symposium*, virtual conference, June 8-10, 2020.
- Co-convener**, session “Linking Social and Ecological Needs to Build Floodplain Resilience” at *American Geophysical Union (AGU) Fall Meeting*, San Francisco, CA, December 9-13, 2019.
- Lead convener**, session “Innovative approaches for estuarine/watershed data analysis, mining, and visualization” at *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, Mobile, AL, November 3-7, 2019.
- Co-convener**, session “Aquatic Ecosystem Responses to Human Disturbances and Management: A Comparative Discussion of Inland and Coastal Ecosystems and Their Contributing Watersheds” at *American Geophysical Union (AGU) Fall Meeting*, Washington, D.C., December 10-14, 2018.
- Co-convener**, session “Modeling and Assessment of Complex Watershed-River-Estuary Systems: Chesapeake Bay as a Case Study of Ecosystem Restoration and Management” at *American Water Resources Association (AWRA) Annual Conference*, Baltimore, MD, November 4-8, 2018.
- Co-convener**, session “Chesapeake Bay Water Quality Standards Criteria Assessment for Dissolved Oxygen, Water Clarity, and Chlorophyll-a: Method Development and Implementation for Ecosystem Management” at *American Water Resources Association (AWRA) Annual Conference*, Baltimore, MD, November 4-8, 2018.
- Co-convener**, session “Explaining conditions and trends: Integrated monitoring and modeling approaches to describe water-quality change in the watershed and estuary” at *Chesapeake Research and Modeling Symposium*, Annapolis, MD, June 12-14, 2018.

Conference Presentations

- Zhang, Q.** 2026. “Leveraging AI and Machine Learning to Advance Chesapeake Bay Research and Management,” invited presentation at *MSSANZ WQ SIG ML/AI Webinar*, virtual, May 13, 2026.

- Zhang, Q.** and R.D. Sabo. 2026. “National Nutrient Trends in U.S. Watersheds: Linking Monitoring Data, Agriculture, and Watershed Drivers,” presentation at *Chesapeake Bay Program Modeling Workgroup Conference Call*, virtual, April 28, 2026.
- Zhang, Q.** and R.D. Sabo. 2026. “National Nutrient Trends in U.S. Watersheds: Linking Monitoring Data, Agriculture, and Watershed Drivers,” presentation at *EPA Agriculture Forum*, virtual, April 16, 2026.
- Zhang, Q.** 2026. “Progress in reducing nutrient loads to Chesapeake Bay: A synthesis of three decades of monitoring and research,” invited presentation at *Texas Tech University CE5102 Seminar*, virtual, March 9, 2026.
- Kaylyn, G., and **Q. Zhang**. 2026. “Connecting Modeling and Monitoring at the Watershed Level: An Introduction to the METRIC Tool,” oral presentation at *Chesapeake Bay Program Webinar*, virtual, February 9, 2026.
- Zhang, Q.** 2026. “Tracking Nitrogen along the Land-River-Estuary Continuum: Lessons from the Chesapeake Bay,” presentation at *International Forum on Agriculture Green Development*, Sanya, China, January 19-24, 2026.
- Zhang, Q.** and R.D. Sabo. 2025. “Leveraging Machine Learning to Uncover Nutrient Trends and Drivers across the Contiguous United States,” poster presentation at *American Geophysical Union (AGU) Annual Meeting*, New Orleans, LA, December 15-19, 2025.
- Zhang, Q.**, I. Bertani, and G. Bhatt. 2025. “Integrating monitoring and modeling information to evaluate watershed progress toward nutrient reduction goals,” oral presentation at *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, Richmond, VA, November 9-13, 2025.
- Guo, D., A. Lintern, **Q. Zhang**, S. Liu, C. Duvert, C. Minaudo, R. Dupas, C. Bhagavathi Parambu, P. Hairsine1, K. Zhang, and U. Bende-Michl. 2025. “Tracking river water quality over time: insights from national- and basin-scale studies in Australia,” oral presentation at *Asia Oceania Geosciences Society (AOGS) 2025 Annual Conference*, Singapore., July 27-August 1, 2025.
- Zhang, Q.** 2025. “Data and Tools for Water-quality on the Delmarva,” oral presentation at *Understanding Nutrient Dynamics and Water Quality on Delmarva Science Workshop*, Easton, MD, June 23, 2025.
- Zhang, Q.**, J. Bostic, and R.D. Sabo. 2025. “Regional patterns and drivers of nutrient trends across the Chesapeake Bay watershed: Machine-learning insights and management implications,” oral presentation at *Society for Freshwater Science (SFS) Annual Meeting*, Puerto Rico, May 22, 2025.
- Zhang, Q.**, G. Shenk, I. Bertani, and G. Bhatt. 2025. “An interactive framework for integrated visualization and analysis of monitored and model-expected load reductions for nitrogen, phosphorus, and sediment,” oral presentation at *Society for Freshwater Science (SFS) Annual Meeting*, Puerto Rico, May 22, 2025.
- Sabo, R., M. Pennino, J. Compton, C. Clark, M. Brehob, R. Hill, M. Weber, S. Markley, G. Ruiz-Mercado, J. Carleton, S. Alford, M. Reynolds, A. Rea, H. Paulsen, D. Kopp, C. Nowakowski, A. Handler, R. Brooks, and **Q. Zhang**. 2025. “Enhancing Nutrient Reduction Efforts with the National Nutrient Inventory,” oral presentation at *EPA Tools & Resources Training Webinar*, April 3, 2025.
- Zhang, Q.** 2025. “Dissolved oxygen criteria attainment in Chesapeake Bay,” oral presentation at *Maryland Department of Environment (MDE) Watershed Protection, Restoration, and Planning Program Seminars*, virtual, April 3, 2025.
- Zhang, Q.** 2025. “Dissolved oxygen criteria attainment in Chesapeake Bay: Where has it improved since 1985?” oral presentation at *Chesapeake Bay Program Modeling Integrated Trends Analysis Team (ITAT) Meeting*, virtual, March 26, 2025.
- Zhang, Q.**, R.R. Murphy, R. Tian, and P.J. Tango. 2024. “Geography, trajectories, and controls of coastal water quality: More rapid improvement in the shallow zone of the Chesapeake Bay,” poster presentation at *American Geophysical Union (AGU) Annual Meeting*, Washington, D.C., December 9-13, 2024.
- Van Meter, K.J., S.Y. Chang, **Q. Zhang**, and N.B. Basu. 2024. “Dams, nutrients, and water quality: Modeling the effects of reservoirs on nitrogen delivery to the Chesapeake Bay,” oral presentation at *American Geophysical Union (AGU) Annual Meeting*, Washington, D.C., December 9-13, 2024.

- Sabo, R.D., I. Bertani, O.H. Devereux, L.C. Linker, and **Q. Zhang**. 2024. “Decrease the nitrogen surplus, save the Bay? Declines in nonpoint source pollution in one of the world’s largest estuaries,” poster presentation at *American Geophysical Union (AGU) Annual Meeting*, Washington, D.C., December 9-13, 2024.
- Byun, J.S., E.A. Davidson, **Q. Zhang**, T. Zou, and X. Zhang. 2024. “Enhancing water quality in the Chesapeake Bay watershed through effective nutrient management and BMP implementation in agriculture,” poster presentation at *American Geophysical Union (AGU) Annual Meeting*, Washington, D.C., December 9-13, 2024.
- Zhang, Q.** 2024. “The Chesapeake Bay TMDL Indicator and METRIC App,” oral presentation at *USGS Chesapeake Bay Studies Lunch & Learn Seminar Series*, virtual, November 21, 2024.
- Zhang, Q.** 2024. “Chesapeake Bay Water Quality Standards Attainment Indicator and Apps,” oral presentation at *Chesapeake Assessment Scenario Tool (CAST) Webinar*, virtual, November 20, 2024.
- Zhang, Q.**, J. Bostic, and R.D. Sabo. 2024. “Regional patterns and drivers of total nitrogen and total phosphorus trends in the Chesapeake Bay watershed: Insights from machine learning approaches and management implications,” oral presentation at *Chesapeake Community Research Symposium*, Annapolis, MD, June 10-12, 2024.
- Chang, S.Y., **Q. Zhang**, N.B. Basu, and K.J. Van Meter. 2024. “Past trajectories and future horizons of water quality in the Chesapeake Bay reservoir system,” oral presentation at *Chesapeake Community Research Symposium*, Annapolis, MD, June 10-12, 2024.
- Shenk, G., **Q. Zhang**, I. Bertani, and G. Bhatt. 2024. “The Chesapeake Bay TMDL indicator: Integrating monitoring and modeling information to assess progress toward nutrient reduction goals,” oral presentation at *Chesapeake Community Research Symposium*, Annapolis, MD, June 10-12, 2024.
- Zhang, Q.**, J. Bostic, and R.D. Sabo. 2024. “Regional patterns and drivers of total phosphorus trends in the Chesapeake Bay watershed: Effects of point source and nonpoint source controls,” (virtual) oral presentation at *HydroML Symposium*, Richland, WA, May 29-31, 2024.
- Guo, D., **Q. Zhang**, C. Minaudo, S. Liu, R. Dupas, K. Zhang, U. Bende-Michl, C. Duvert, and A. Lintern. 2024. “Australia’s water quality trends over two decades,” poster presentation at *European Geosciences Union (EGU) General Assembly*, Vienna, Austria, April 14-19, 2024.
- Bhatt, G., L. Linker, G. Shenk, **Q. Zhang**, and R. Tian. 2024. “The problem and consequences of Conowingo Reservoir infill on the Chesapeake Bay water quality,” poster presentation at *2024 National Conference on Ecosystem Restoration (NCER)*, Albuquerque, NM, April 14-19, 2024.
- Zhang, Q.** 2024. “Progress in reducing nutrient loads to Chesapeake Bay: A synthesis of three decades of monitoring data and research,” invited keynote presentation at *Pennsylvania State University’s Interdisciplinary Environmental Research Symposium (PIERS)*, State College, PA, April 5-6, 2024.
- Zhang, Q.**, and G. Shenk. 2024. “Chesapeake Bay Total Maximum Daily Load Indicator Webinar,” oral presentation at *Chesapeake Bay Program Webinar*, virtual, February 6, 2024.
- Zhang, Q.**, J. Bostic, and R.D. Sabo. 2023. “Regional patterns and drivers of total phosphorus trends in the Chesapeake Bay watershed: Effects of point source and nonpoint source controls,” oral presentation at *American Geophysical Union (AGU) Annual Meeting*, San Francisco, CA, December 11-15, 2023.
- Zhang, Q.**, T. Fisher, C. Buchanan, A. Gustafson, R. Karrh, R. Murphy, J. Testa, R. Tian, and P. Tango. 2023. “Nutrient limitation of phytoplankton in three tributaries of Chesapeake Bay: Detecting ecosystem recovery following nutrient reductions,” oral presentation at *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, Portland, OR, November 12-16, 2023.
- Clune, J.W., P.D. Capel, M.P. Miller, D.A. Burns, A.J. Sekellick, P.R. Claggett, R.M. Fanelli, J.P. Raffensperger, G. Bhatt, G.W. Shenk, **Q. Zhang**, and L.C. Linker. 2023. “Nitrogen in the Chesapeake Bay Watershed: A Century of Change, 1950 – 2050,” oral presentation at *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, Portland, OR, November 12-16, 2023.

- Zhang, Q.** 2023. “Improvement of riverine concentration and loading estimation with the consideration of flow anomalies,” oral presentation at *U.S. Geological Survey Great Lakes / Chesapeake Bay Joint Meeting*, Catonsville, MD, October 26, 2023.
- Bertani, I., **Q. Zhang**, and M. Evans. 2023. “Introduction to AI within Watershed Management,” oral presentation at *Chesapeake Bay Program Modeling Quarterly Review Meeting*, Annapolis, MD, October 17-18, 2023.
- Tango, P., and **Q. Zhang**. 2023. “Adaptive Monitoring for Adaptive Management,” invited oral presentation at *California Stormwater Quality Association (CASQA) Monitoring and Science Subcommittee Meeting*, virtual, October 16, 2023.
- Bertani, I., **Q. Zhang**, and M. Evans. 2023. “Introduction to AI within Watershed Management,” oral presentation at *Chesapeake Bay Program's Scientific and Technical Advisory Committee (STAC) Quarterly Meeting*, Baltimore, MD, September 12-13, 2023.
- Zhang, Q.** 2023. “Progress in reducing nutrient loads to Chesapeake Bay: A synthesis of three decades of monitoring data and research,” invited seminar, Nanjing University, Nanjing, China, July 19, 2023.
- Zhang, Q.** 2023. “Progress in reducing nutrient loads to Chesapeake Bay: A synthesis of three decades of monitoring data and research,” invited seminar, Nanjing Institute of Geography & Limnology, Nanjing, China, July 19, 2023.
- Guo, D., C. Minaudo, **Q. Zhang**, R. Dupas, S. Liu, K. Zhang., U. Bende-Michl, C. Duver, and A. Lintern. 2023. “Australia’s water quality trends over two decades,” oral presentation at *25th International Congress on Modelling and Simulation*, Darwin, NT, Australia, July 9-14, 2023.
- Duarte, A.C., M. Rodríguez-Blanco, and **Q. Zhang**. 2023. “Sensing the hydrology and water quality in a small agro-forestry basin,” oral presentation at *Agriculture 4.0: Current reality, potentialities and policy proposals*, virtual, July 14, 2023.
- Zhang, Q.** 2023. “Progress in reducing nutrient loads to Chesapeake Bay: A synthesis of three decades of monitoring data and research,” invited seminar, School of Earth System Science, Tianjin University, Tianjin, China, July 7, 2023.
- Zhang, Q.** 2023. “Progress in reducing nutrient loads to Chesapeake Bay: A synthesis of three decades of monitoring data and research,” invited seminar, College of Environmental Science and Engineering, Nankai University, Tianjin, China, July 7, 2023.
- Zhang, Q.** 2023. “Progress in reducing nutrient loads to Chesapeake Bay: A synthesis of three decades of monitoring data and research,” invited seminar, School of Atmosphere Sciences, Sun Yat-Sen University, virtual, July 4, 2023.
- Zhang, Q.** 2023. “Progress in reducing nutrient loads to Chesapeake Bay: A synthesis of three decades of monitoring data and research,” invited seminar, College of Environmental and Resource Sciences, Zhejiang University, Hangzhou, China, June 27, 2023.
- Zhang, Q.** 2023. “Progress in reducing nutrient loads to Chesapeake Bay: A synthesis of three decades of monitoring data and research,” invited seminar, College of the Environment and Ecology, Xiamen University, Xiamen, China, June 24, 2023.
- Zhang, Q.**, J. Blomquist, R.M. Fanelli, J. Keisman, D. Moyer, and M. Langland. 2023. “Progress in reducing nutrient loads to Chesapeake Bay: A synthesis of three decades of monitoring data and research,” oral presentation at the *International Association for Great Lakes Research (IAGLR) Annual Conference*, Toronto, Canada, May 8-12, 2023.
- Shenk, G. and **Q. Zhang**. 2023. “Integrated watershed-wide indicator of the TMDL-required reduction of nitrogen and phosphorus,” oral presentation at *Chesapeake Bay Program Modeling Quarterly Review Meeting*, Annapolis, MD, April 4-5, 2023.
- Zhang, Q.** 2023. “Progress in reducing nutrient and sediment loads to Chesapeake Bay: Three decades of monitoring data and implications for restoring complex ecosystems,” invited oral presentation at *UMCES Horn Point Seminars*, Cambridge, MD, March 29, 2023.

- Webber, J., J. Chanut, J. Clune, O. Devereux, N. Hall, R. Sabo, and **Q. Zhang**. 2023. "Evaluating water-quality trends in watersheds prioritized for management-practice implementation," oral presentation at *Chesapeake Bay Program's Scientific and Technical Advisory Committee (STAC) Workshop: Using Local Monitoring Results to Inform the Chesapeake Bay Program's Watershed Model*, Fairfax, VA, March 7-8, 2023.
- Zhang, Q.**, J. Blomquist, R.M. Fanelli, J. Keisman, D. Moyer, and M. Langland. 2022. "Progress in reducing nutrient and sediment loads to Chesapeake Bay: Three decades of monitoring data and implications for restoring complex ecosystems," poster presentation at *American Geophysical Union (AGU) Fall Meeting*, Chicago, IL, December 12-16, 2022.
- Zhang, Q.**, T. Fisher, C. Buchanan, A. Gustafson, R. Karrh, R. Murphy, J. Testa, R. Tian, and P. Tango. 2022. "Nutrient limitation of phytoplankton in three tributaries of Chesapeake Bay: Detecting ecosystem recovery following nutrient reductions," poster presentation at *American Geophysical Union (AGU) Fall Meeting*, Chicago, IL, December 12-16, 2022.
- Chang, S.Y., **Q. Zhang**, N.B. Basu, and K.J. Van Meter. 2022. "Dams, nutrients, and water quality: A study of time-explicit reservoir ecological functions in the Chesapeake Bay Watershed," oral presentation at *American Geophysical Union (AGU) Fall Meeting*, Chicago, IL, December 12-16, 2022.
- Zhang, Q.** 2022. "Progress in reducing nutrient and sediment loads to Chesapeake Bay: Three decades of monitoring data and implications for restoring complex ecosystems," invited presentation at *4th International Conference on Resources and Environmental Research*, virtual conference, December 2-4, 2022.
- Zhang, Q.**, J. Bostic, and R.D. Sabo. 2022. "Regional patterns and drivers of total nitrogen trends in the Chesapeake Bay watershed: Insights from machine learning approaches and management implications," oral presentation at *Frontiers in Hydrology Meeting (FIHM)*, San Juan, Puerto Rico, June 19-24, 2022.
- Zhang, Q.**, J. Blomquist, R.M. Fanelli, J. Keisman, D. Moyer, and M. Langland. 2022. "Progress in reducing nutrient and sediment loads to Chesapeake Bay: Three decades of monitoring data and implications for restoring complex ecosystems," poster presentation at *Frontiers in Hydrology Meeting (FIHM)*, San Juan, Puerto Rico, June 19-24, 2022.
- Zhang, Q.**, T. Fisher, C. Buchanan, A. Gustafson, R. Karrh, R. Murphy, J. Testa, R. Tian, and P. Tango. 2022. "Nutrient limitation of phytoplankton in three tidal tributaries of Chesapeake Bay: A machine learning approach for detecting ecosystem recovery following nutrient reductions," oral presentation at *Chesapeake Community Research Symposium*, Annapolis, MD, June 8-10, 2022.
- Chang, S.Y., **Q. Zhang**, D.K. Byrnes, N.B. Basu, and K.J. Van Meter. 2022. "Chesapeake legacies: The importance of legacy nitrogen to improving Chesapeake Bay water quality," oral presentation at *Chesapeake Community Research Symposium*, Annapolis, MD, June 8-10, 2022.
- Murphy, R., J. Keisman, J. Harcum, R. Karrh, M. Lane, E. Perry, and **Q. Zhang**. 2022. "Nutrient improvements in Chesapeake Bay: Direct effect of load reductions and implications for coastal management," oral presentation at *Chesapeake Community Research Symposium*, Annapolis, MD, June 8-10, 2022.
- Zhang, Q.**, J. Bostic, and R.D. Sabo. 2022. "Regional patterns and drivers of total nitrogen trends in the Chesapeake Bay watershed: Insights from machine learning approaches and management implications," oral presentation at *European Geosciences Union (EGU) General Assembly*, virtual conference, May 23-27, 2022.
- Zhang, Q.**, J. Bostic, and R.D. Sabo. 2022. "Regional patterns and drivers of total nitrogen trends in the Chesapeake Bay watershed: Insights from machine learning approaches and management implications," poster presentation at *HydroML Symposium*, State College, PA, May 18-20, 2022.
- Zhang, Q.**, T. Fisher, C. Buchanan, A. Gustafson, R. Karrh, R. Murphy, R. Tian, J. Testa, J. Keisman, and P. Tango. 2022. "Nutrient Limitation of Phytoplankton in Three Tidal Tributaries to Chesapeake Bay: Detecting Ecosystem Recovery Following Nutrient Reductions," oral presentation at *Joint Aquatic Sciences Meeting (JASM)*, Grand Rapids, MI, May 14-20, 2022.
- Chang, S.Y., **Q. Zhang**, D.K. Byrnes, N.B. Basu, and K.J. Van Meter. 2022. "Chesapeake legacies: The importance of legacy nitrogen to improving Chesapeake Bay water quality," oral presentation at *Joint Aquatic Sciences Meeting (JASM)*, Grand Rapids, MI, May 14-20, 2022.

- Tian, R., **Q. Zhang**, and P. Tango. 2022. "DO criteria assessment and data inventory," oral presentation at *Chesapeake Bay Program's Scientific and Technical Advisory Committee (STAC) Workshop: Advancing Monitoring Approaches to Enhance Tidal Chesapeake Bay Habitat Assessment including Water Quality Standards for Chesapeake Bay Dissolved Oxygen, Water Clarity/SAV and Chlorophyll a Criteria*, virtual conference, May 11, 2022.
- Zhang, Q.**, T. Fisher, E. Trentacoste, C. Buchanan, A. Gustafson, R. Karrh, R. Murphy, J. Keisman, C. Wu, R. Tian, J. Testa, and P. Tango. 2021. "Nutrient limitation of phytoplankton in Chesapeake Bay: Development of an empirical approach for water-quality management," oral presentation at *American Geophysical Union (AGU) Fall Meeting*, virtual conference, December 13-17, 2021.
- Zhang, Q.**, J. Bostic, and R.D. Sabo. 2021. "Regional patterns and drivers of nitrogen trends in a human-impacted watershed and management implications," oral presentation at *American Geophysical Union (AGU) Fall Meeting*, virtual conference, December 13-17, 2021.
- Chang, S.Y., **Q. Zhang**, D.K. Byrnes, N.B. Basu, and K.J. Van Meter. 2021. "Chesapeake legacies: the importance of legacy nitrogen to improving Chesapeake Bay water quality," poster presentation at *American Geophysical Union (AGU) Fall Meeting*, virtual conference, December 13-17, 2021.
- Van Meter, K.J., S.Y. Chang, N.B. Basu, S.P. Inamdar, and **Q. Zhang**. 2021. "Dams, Reservoirs, and Nutrients in the Chesapeake Bay Watershed: Past trajectories and Future Horizons (Invited)," oral presentation at *American Geophysical Union (AGU) Fall Meeting*, virtual conference, December 13-17, 2021.
- Sabo, R.D., B. Sullivan, C. Wu, E.M. Trentacoste, **Q. Zhang**, G. Shenk, G. Bhatt, and L. Linker. 2021. "Major sources of point and nonpoint source nutrient pollution to surface water have declined throughout the Chesapeake Bay watershed," oral presentation at *American Geophysical Union (AGU) Fall Meeting*, virtual conference, December 13-17, 2021.
- Zhang, Q.**, T. Fisher, E. Trentacoste, C. Buchanan, A. Gustafson, R. Karrh, R. Murphy, J. Keisman, C. Wu, R. Tian, J. Testa, and P. Tango. 2021. "Nutrient limitation of phytoplankton in Chesapeake Bay: Development of an empirical approach for water-quality management," oral presentation at *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, virtual conference, November 1-11, 2021.
- Chang, S.Y., **Q. Zhang**, D.K. Byrnes, N.B. Basu, and K.J. Van Meter. 2021. "Chesapeake legacies: The importance of legacy nitrogen to improving Chesapeake Bay water quality," oral presentation at *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, virtual conference, November 1-11, 2021.
- Langendorf, R.E., V. Lyubchich, J. M. Testa, and **Q. Zhang**. 2021. "Inferring controls on dissolved oxygen criterion attainment in Chesapeake Bay," oral presentation at *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, virtual conference, November 1-11, 2021.
- Tango, P.J., B. Sullivan, **Q. Zhang**, R.R. Murphy, and L. Chudoba. 2021. "New water quality monitoring data: Filling gaps for Chesapeake Bay Program decision-support," oral presentation at *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, virtual conference, November 1-11, 2021.
- Zhang, Q.**, P. Tango, R. Murphy, M. Forsyth, R. Tian, J. Keisman, and E. Trentacoste. 2021. "Long-term Changes in Chesapeake Bay Water Quality: An Integrated Assessment of Dissolved Oxygen, Chlorophyll-a, and Water Clarity," oral presentation at *ECSA 58 - EMECS 13 Estuaries and coastal seas in the Anthropocene*, virtual conference, September 6-9, 2021.
- Chang, S.Y., **Q. Zhang**, D.K. Byrnes, N.B. Basu, and K.J. Van Meter. 2021. "Chesapeake legacies: The importance of legacy nitrogen to improving Chesapeake Bay water quality," oral presentation at *Society for Freshwater Scientists (SFS) Annual Meeting*, virtual conference, May 23-27, 2021.
- Preisendanz, H., T. Veith, **Q. Zhang**, J. Biertempfel, and J. Shortle. 2021. "Coupling C-Q and Lorenz Inequality Analyses to Create a Temporal Targeting Framework for Watershed-Scale Decision-Making," oral presentation at *European Geosciences Union (EGU) General Assembly*, virtual conference, April 19-30, 2021.
- Zhang, Q.**, J.S. Webber, D.L. Moyer, and J.G. Chanut. 2021. "Estimating river water-quality trends under different flow conditions," oral presentation at *European Geosciences Union (EGU) General Assembly*, virtual conference, April 19-30, 2021.

- Zhang, Q.**, J.S. Webber, D.L. Moyer, and J.G. Chanat. 2021. “An Approach for Decomposing River Water-Quality Trends Into Different Flow Classes,” oral presentation at *National Monitoring Council Annual Conference*, virtual conference, April 19-23, 2021.
- Zhang, Q.**, T. Fisher, E. Trentacoste, C. Buchanan, A. Gustafson, R. Karrh, R. Murphy, J. Keisman, C. Wu, R. Tian, J. Testa, and P. Tango. 2021. “Chesapeake Bay nutrient limitation: A re-analysis of long-term monitoring data and implications for water-quality management,” oral presentation at *National Monitoring Council Annual Conference*, virtual conference, April 19-23, 2021.
- Zhang, Q.**, J.S. Webber, D.L. Moyer, and J.G. Chanat. 2020. “An approach for decomposing estimated river water-quality trends into different flow classes,” oral presentation at *American Geophysical Union (AGU) Fall Meeting*, virtual conference, December 1-17, 2020.
- Van Meter, K.J., S. Chang, N.B. Basu, **Q. Zhang**, and D.K. Byrnes. 2020. “Chesapeake Legacies: Implications of Legacy N Accumulation for Water Quality Improvements in the Chesapeake Bay,” invited oral presentation at *American Geophysical Union (AGU) Fall Meeting*, virtual conference, December 1-17, 2020.
- Wu, C., B. Sullivan, **Q. Zhang**, R. Sabo, and E. Trentacoste. 2020. “Chesapeake Bay Watershed County-Wide Nutrient Inventory: Assessing Spatial Patterns and Trends to Inform Management Decisions,” poster presentation at *American Geophysical Union (AGU) Fall Meeting*, virtual conference, December 1-17, 2020.
- Zhang, Q.**, T. Fisher, E. Trentacoste, C. Buchanan, R. Murphy, J. Keisman, C. Wu, R. Tian, A. Gustafson, R. Karrh, J. Testa, and P. Tango. 2020. “Chesapeake Bay nutrient limitation: A re-analysis of long-term monitoring data and implications for water-quality management,” oral presentation at *Maryland Water Monitoring Council Annual Conference*, virtual conference, December 3-4, 2020.
- Zhang, Q.**, T. Fisher, E. Trentacoste, C. Buchanan, R. Murphy, J. Keisman, C. Wu, R. Tian, A. Gustafson, R. Karrh, J. Testa, and P. Tango. 2020. “Nutrient Limitation in Three Major Tributaries to Chesapeake Bay,” oral presentation at *Chesapeake Bay Program Modeling Quarterly Review Meeting*, virtual meeting, October 6-7, 2020.
- Zhang, Q.**, R. Tian, and L. Linker. 2020. “Estimated Tidal Bay Nutrient Limitation with Applications to the 2017 Bay Model,” oral presentation at *Chesapeake Bay Program Modeling Workgroup Conference Call*, virtual meeting, September 10, 2020.
- Zhang, Q.**, T. Fisher, E. Trentacoste, C. Buchanan, R. Murphy, J. Keisman, C. Wu, R. Tian, A. Gustafson, R. Karrh, J. Testa, and P. Tango. 2020. “Refined Analysis of Tidal Bay Nutrient Limitation and Potential Applications to the 2017 Bay Model,” oral presentation at *Chesapeake Bay Program Modeling Quarterly Review Meeting*, virtual meeting, July 7-8, 2020.
- Zhang, Q.**, T. Fisher, E. Trentacoste, C. Buchanan, R. Murphy, J. Keisman, C. Wu, R. Tian, A. Gustafson, R. Karrh, J. Testa, and P. Tango. 2020. “Chesapeake Bay nutrient limitation: A re-analysis of long-term monitoring data and implications for water-quality management,” oral presentation at *Chesapeake Community Research Symposium*, virtual conference, June 8-10, 2020.
- Preisendanz, H., **Q. Zhang**, and T. Veith. 2020. “Quantifying the Temporal and Spatial Inequality of Nutrient Transport to the Chesapeake Bay using Lorenz Inequality and Gini Coefficients,” oral presentation at *Chesapeake Community Research Symposium*, virtual conference, June 8-10, 2020.
- Bostic, J., **Q. Zhang**, and R. Sabo. 2020. “Classification of river discharge and nutrient export from the tributaries to Chesapeake Bay: Cluster analysis of riverine monitoring data in 1985-2016,” oral presentation at *Chesapeake Community Research Symposium*, virtual conference, June 8-10, 2020.
- Wu, C., B. Sullivan, **Q. Zhang**, R. Sabo, and E. Trentacoste. 2020. “Chesapeake Bay Watershed county-wide maps for nutrient inputs: Spatial and temporal patterns in 1985-2018,” oral presentation at *Chesapeake Community Research Symposium*, virtual conference, June 8-10, 2020.
- Sullivan, B., C. Wu, R. Sabo, **Q. Zhang**, and E. Trentacoste. 2020. “Illustrating the History of Nutrient Inputs from Counties in the Chesapeake Bay Watershed,” oral presentation at *Chesapeake Community Research Symposium*, virtual conference, June 8-10, 2020.

- Thomas, Z., O. Fovet, **Q. Zhang**, C. Rajanayaka, C. Zammit, and C. Gascuel-Oudou. 2020. "Main knowledge gaps in critical zone processes and behaviour: Extracting information from water quality time-series data and models outputs," oral presentation at *EGU General Assembly 2020*, online, May 4-8, 2020.
- Chang, S., **Q. Zhang**, D. Byrnes, N. Basu, and K. Van Meter. 2019. "Water Futures: Legacy Nitrogen and Chesapeake Bay Water Quality," poster presentation at *American Geophysical Union (AGU) Fall Meeting*, San Francisco, CA, December 9-13, 2019.
- Wei, Z., J. Wolf, E. Trentacoste, **Q. Zhang**, R. Tian, and P. Tango. 2019. "Web-based Spatio-temporal Visualization of Water Quality and Habitat Status and Change in Chesapeake Bay," poster presentation at *American Geophysical Union (AGU) Fall Meeting*, San Francisco, CA, December 9-13, 2019.
- Zhang, Q.**, E. Trentacoste, C. Wu, C. Buchanan, A. Gustafson, and T. Fisher. 2019. "Revisiting Chesapeake Bay resource limitation: A re-analysis of bioassay and tidal monitoring data and implications for water-quality management," oral presentation at *Maryland Water Monitoring Council Annual Conference*, virtual conference, December 6, 2019.
- Zhang, Q.**, P. Tango, R. Murphy, M. Forsyth, R. Tian, J. Keisman, and E. Trentacoste. 2019. "Long-term monitoring data and science-based assessment approaches combined to reveal water-quality changes in Chesapeake Bay," poster presentation at *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, Mobile, AL, November 3-7, 2019.
- Trentacoste, E., **Q. Zhang**, C. Buchanan, C. Wu, T. Fisher, and A. Gustafson. 2019. "Seasonal and spatial variations in phytoplankton resource limitation have changed over time in Chesapeake Bay," poster presentation at *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, Mobile, AL, November 3-7, 2019.
- Wei, Z., J. Wolf, E. Trentacoste, **Q. Zhang**, R. Tian, and P. Tango. 2019. "Web-based 4-Dimensional Visualization of Water Quality and Habitat Status and Change in Chesapeake Bay," oral presentation at *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, Mobile, AL, November 3-7, 2019.
- Wu, C., **B. Sullivan**, E. Trentacoste, Q. Zhang, and R. Sabo. 2019. "Integrating monitoring and modeling data to better inform management decisions," poster presentation at *AGNR Cornerstone Event: Ensure a clean and healthy Chesapeake Bay*, College Park, MD, October 30, 2019.
- Zhang, Q.** 2019. "Synthesis of long-term trends of nutrient and sediment loads to the Chesapeake Bay," invited oral presentation at *Appalachian Laboratory Visiting Scholar Seminar Series*, Frostburg, MD, October 3, 2019.
- Zhang, Q.** 2019. "Spatial and Temporal Patterns in Chesapeake Bay Resource Limitation," oral presentation at *Chesapeake Bay Program Modeling Quarterly Review Meeting*, Annapolis, MD, July 17, 2019.
- Wei, Z., J. Wolf, E. Trentacoste, **Q. Zhang**, R. Tian, and P. Tango. 2019. "Web-based 4D Visualization of Water Quality and Habitat Status in Chesapeake Bay," poster presentation at *USGS Chesapeake Bay Workshop*, Shepherdstown, WV, June 25-27, 2019.
- Zhang, Q.**, P. Tango, R. Murphy, M. Forsyth, R. Tian, J. Keisman, and E. Trentacoste. 2019. "Chesapeake Bay Water Quality Standards and Criteria Attainment: Temporal and Spatial Patterns in 1985-2016," poster presentation at *USGS Chesapeake Bay Workshop*, Shepherdstown, WV, June 25-27, 2019.
- Zhang, Q.**, P. Tango, R. Murphy, M. Forsyth, R. Tian, J. Keisman, and E. Trentacoste. 2018. "Water quality status and trends in Chesapeake Bay and its tidal tributaries in 1985-2016: Temporal and spatial patterns uncovered through criteria attainment assessments," poster presentation at *National Monitoring Conference*, Denver, CO, March 25-29, 2019.
- Zhang, Q.** 2019. "Characteristics and temporal trends of nutrient and sediment loads from the nontidal Chesapeake watershed," oral presentation at *Chesapeake Bay Program's Scientific and Technical Advisory Committee (STAC) Workshop: Assessing the Environment in Outcome Units (AEIOU): Using Eutrophying Units for Management*, Annapolis, MD, March 20-21, 2019.
- Zhang, Q.**, P. Tango, R. Murphy, M. Forsyth, R. Tian, J. Keisman, and E. Trentacoste. 2018. "Water quality status and trends in Chesapeake Bay and its tidal tributaries in 1985-2016: Temporal and spatial patterns uncovered

- through criteria attainment assessments,” oral presentation at *American Geophysical Union (AGU) Fall Meeting*, Washington, D.C., December 10-14, 2018.
- Van Meter, K. J., **Q. Zhang**, and N. Basu. 2018. “Chesapeake Legacies: Implications of Groundwater N Accumulation for Water Quality Improvements in the Chesapeake Bay (Invited),” oral presentation at *American Geophysical Union (AGU) Fall Meeting*, Washington, D.C., December 10-14, 2018.
- Zhang, Q.**, R. Murphy, M. Forsyth, R. Tian, E. Trentacoste, J. Keisman, and P. Tango. 2018. “Long-Term Status and Trends in Chesapeake Bay Water Quality: Insights from Criteria Attainment Assessments and Linkage to Nutrient Load Management,” oral presentation at *American Water Resources Association (AWRA) Annual Conference*, Baltimore, MD, November 4-8, 2018.
- Blomquist, J., R. Fanelli, J. Keisman, **Q. Zhang**, D. Moyer, and M. Langland. 2018. “A History of Nutrient and Sediment Inputs to Chesapeake Bay, 1985-2016: Three Decades of Monitoring and Coordinated Restoration in the Chesapeake Watershed,” oral presentation at *American Water Resources Association (AWRA) Annual Conference*, Baltimore, MD, November 4-8, 2018.
- Zhang, Q.** 2018. “Synthesis of long-term trends of nutrient and sediment loads to Chesapeake Bay: Insights from statistical analyses of monitoring data,” invited oral presentation at *University of Maryland Eastern Shore Seminar Series*, Princess Anne, MD, October 11, 2018.
- Zhang, Q.** 2018. “Synthesis of long-term patterns of nutrient and sediment export from the Chesapeake Bay watershed: What have we learned from statistical analyses of monitoring data?” invited oral presentation at *UMCES Horn Point Seminars*, Cambridge, MD, July 5, 2018.
- Zhang, Q.**, R. Murphy, R. Tian, M. Forsyth, E. Trentacoste, J. Keisman, and P. Tango. 2018. “Status and trends of the Chesapeake Bay water quality standards criteria attainment in 1985-2016: Insights from assessment of thirty years of tidal water quality monitoring data,” oral presentation at *Chesapeake Research & Modeling Symposium*, Annapolis, MD, June 12-14, 2018.
- Zhang, Q.**, and J. Blomquist. 2018. “Watershed export of fine sediment, organic carbon, and chlorophyll-a to Chesapeake Bay: Spatial and temporal patterns in 1984-2016,” oral presentation at *Chesapeake Research & Modeling Symposium*, Annapolis, MD, June 12-14, 2018.
- Zhang, Q.**, D. Ha, H. Wei, and W. Ball. 2018. “Retrospective analysis of sediment-associated phosphorus concentration in the major tributaries to Chesapeake Bay,” oral presentation at *Chesapeake Research & Modeling Symposium*, Annapolis, MD, June 12-14, 2018.
- Staver, K., **Q. Zhang**, and W.P. Ball. 2018. “Improving estimates of sub-scour storm flow loads to Chesapeake Bay from the Susquehanna watershed,” oral presentation at *Chesapeake Research & Modeling Symposium*, Annapolis, MD, June 12-14, 2018.
- Testa, J., **Q. Zhang**, and V. Lyubchich. 2018. “Patterns and trends in Secchi disk depth over three decades in the Chesapeake Bay estuarine complex,” oral presentation at *Chesapeake Research & Modeling Symposium*, Annapolis, MD, June 12-14, 2018.
- Van Meter, K. J., P. Van Cappellen, **Q. Zhang**, and N. Basu. 2018. “Landscape legacies: Long-term nitrogen trajectories in the Chesapeake Bay watershed and beyond,” oral presentation at *Chesapeake Research & Modeling Symposium*, Annapolis, MD, June 12-14, 2018.
- Blomquist, J., R. Fanelli, J. Keisman, **Q. Zhang**, D. Moyer, and M. Langland. 2018. “A history of nutrient and sediment inputs to Chesapeake Bay: 1985-2016,” oral presentation at *Chesapeake Research & Modeling Symposium*, Annapolis, MD, June 12-14, 2018.
- Keisman, J., C. Friedrichs, C. Buchanan, R. Batiuk, J. Blomquist, J. Cornwell, M. Lane, S. Lyubchich, K. Moore, R. Murphy, G. Noe, R. Orth, E. Porter, L. Sanford, J. Testa, M. Trice, **Q. Zhang**, and R. Zimmerman. 2018. “Examining trends in water clarity in the Chesapeake Bay: A synthesis of findings from recent STAC workshops,” oral presentation at *Chesapeake Research & Modeling Symposium*, Annapolis, MD, June 12-14, 2018.

- Zhang, Q.** 2018. “Synthesis of decadal-scale patterns of nutrient and sediment delivery from Susquehanna River to Chesapeake Bay: What have we learned from long-term monitoring records?” invited oral presentation at *Chesapeake Biological Laboratory Distinguished Scholar Seminar Series*, Solomons, MD, March 7, 2018.
- Keisman, J., R. Murphy, R. Karrh, M. Lane, **Q. Zhang**, M. Merritt, and P. Tango. 2018. “Tidal Water Quality Status and Trends: Aquatic Conditions Respond to Watershed Changes,” oral presentation at *Chesapeake Bay Program Principle Staff Committee Meeting*, Baltimore, MD, March 2, 2018.
- Zhang, Q.**, R. Tian, and P. Tango. 2017. “Status and Trends of the Chesapeake Bay Water Quality Standards Criteria Attainment,” oral presentation at *Maryland Water Monitoring Council Annual Conference*, Linthicum Heights, MD, December 8, 2017.
- Zhang, Q.** and J.D. Blomquist. 2017. “Quantification of Fine Sediment, Organic Carbon, and Chlorophyll-a Export from Major Tributaries to Chesapeake Bay,” oral presentation at the *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, Providence, RI, November 5-9, 2017.
- Ball, W.P. and **Q. Zhang**. 2017. “Net Deposition behind Conowingo Dam under Different Flow Conditions: Trends and Uncertainties,” poster presentation at the *Coastal & Estuarine Research Federation (CERF) Biennial Conference*, Providence, RI, November 5-9, 2017.
- Zhang, Q.** and W.P. Ball. 2017. “Synthesis of Long-term Patterns of Nutrient and Sediment Export from the Chesapeake Bay Watershed,” invited oral presentation at the *International Association for Great Lakes Research (IAGLR) Annual Conference*, Detroit, MI, May 15-19, 2017.
- Zhang, Q.** 2017. “Evaluation of Results from the HDR Conowingo Sediment Transport Model,” oral presentation at *Chesapeake Bay Program Modeling Quarterly Review Meeting*, Annapolis, MD, February 14, 2017.
- Zhang, Q.** and J.D. Blomquist. 2017. “Long-term Riverine Inputs from Major Tributaries to Chesapeake Bay Relevant to Water Clarity,” oral presentation at *Chesapeake Bay Program's Scientific and Technical Advisory Committee (STAC) Workshop: Understanding and Explaining 30+ Years of Water Clarity Trends in the Bay's Tidal Waters*, Solomons, MD, February 6-7, 2017.
- Zhang, Q.**, C.J. Harman, and W.P. Ball. 2016. “An Improved Method for Interpretation of Concentration-Discharge Relationships in Riverine Water-Quality Data,” poster presentation at *American Geophysical Union Fall Meeting*, San Francisco, CA, December 12-16, 2016.
- W.P. Ball and **Q. Zhang**. 2016. “Improving Riverine Constituent Concentration and Flux Estimation by Accounting for Antecedent Discharge Conditions,” oral presentation at *American Geophysical Union Fall Meeting*, San Francisco, CA, December 12-16, 2016.
- Zhang, Q.** 2016. “Decadal-Scale Changes in Sediment and Nutrient Delivery from Conowingo Reservoir to Chesapeake Bay: Statistical Evaluations of Reservoir Trapping Using Long-Term Monitoring Data,” invited oral presentation at *Chesapeake Bay Program Scientific, Technical Assessment and Reporting (STAR) Team Meeting*, Annapolis, MD, October 27, 2016.
- Zhang, Q.**, R.M. Hirsch, and W.P. Ball. 2016. “Temporal Changes in Net Deposition of Sediment and Nutrients behind Conowingo Dam under Different Flow Conditions: Statistical Evaluations of Monitoring Data between 1987 and 2013,” oral presentation at *Chesapeake Modeling Symposium*, Williamsburg, VA, June 1-2, 2016.
- Zhang, Q.**, D.C. Brady, W.R. Boynton, and W.P. Ball. 2016. “Nutrient and Sediment Trends from the Nontidal Chesapeake Bay Watershed: Synthesis of Progress by Season for the Nine Major Tributaries,” oral presentation at *Chesapeake Modeling Symposium*, Williamsburg, VA, June 1-2, 2016.
- Zhang, Q.**, R.M. Hirsch, and W.P. Ball. 2016. “Effects of Reservoir Filling on Sediment and Nutrient Delivery from Susquehanna River to Chesapeake Bay: Input-Output Analyses based on Long-Term Monitoring,” invited oral presentation at *U.S. Geological Survey MD-DE-DC Water Science Center Seminars*, Baltimore, MD, April 12, 2016.
- Zhang, Q.**, R.M. Hirsch, and W.P. Ball. 2016. “Effects of Reservoir Filling on Sediment and Nutrient Removal in the Lower Susquehanna River Reservoir System: An Input-Output Analysis based on Long-Term Monitoring,”

- invited** oral presentation at *Chesapeake Bay Program's Scientific and Technical Advisory Committee (STAC) Workshop: Conowingo Infill Influence on Chesapeake Water Quality*, Annapolis, MD, January 13-14, 2016.
- Zhang, Q.** and W.P. Ball. 2015. "Non-stationary Concentration-Discharge Relationships for Nitrogen, Phosphorus, and Sediment for Nine Major Tributaries of the Chesapeake Bay," oral presentation at *American Geophysical Union Fall Meeting*, San Francisco, CA, December 14-18, 2015.
- W.P. Ball, **Q. Zhang**, and R.M. Hirsch. 2015. "Effects of Reservoir Filling on Sediment and Nutrient Removal in the Lower Susquehanna River Reservoir: An Input-Output Analysis Based on Long-Term Monitoring," oral presentation at *American Geophysical Union Fall Meeting*, San Francisco, CA, December 14-18, 2015.
- Zhang, Q.** and W.P. Ball. 2015. "Concentration-Discharge Relationships for Nutrients and Sediment in Major Tributaries to Chesapeake Bay: Typical Patterns and Non-Stationarity," poster presentation at *Maryland Water Monitoring Council Annual Conference*, Linthicum Heights, MD, November 13, 2015.
- Zhang, Q.**, W.P. Ball., and D.L. Moyer. 2015. "Long-Term Export of Nitrogen, Phosphorus, and Sediment in the Susquehanna River Basin: Analysis of Decadal-Scale Trends and Sub-Basin Mass Balances," oral presentation at *Geological Society of America Annual Meeting*, Baltimore, MD, November 1-4, 2015.
- Ball, W.P., **Q. Zhang**, D.C. Brady, and W.R. Boynton. 2015. "Long-term Trends of Nutrients and Sediment from the Non-tidal Chesapeake Watershed: An Assessment of Progress by River and Season," oral presentation at *Association of Environmental Engineering and Science Professors Annual Conference*, New Heaven, CT, June 13-16, 2015.
- Zhang, Q.**, C.J. Harman, and W.P. Ball. 2014. "Evaluation of Methods for Estimating Long-Range Dependence in Water Quality Time Series with Missing Data and Irregular Sampling," poster presentation at *American Geophysical Union Fall Meeting*, San Francisco, CA, December 15-19, 2014.
- Ball, W.P., **Q. Zhang**, D.C. Brady, and W.R. Boynton. 2014. "Long-Term Loads of Nutrients and Sediment from Non-Tidal Regions of the Chesapeake Bay Watershed: An Assessment of Seasonal Trends and Progress," poster presentation at *American Geophysical Union Fall Meeting*, San Francisco, CA, December 15-19, 2014.
- Wei, H., D. Ha, **Q. Zhang**, and W.P. Ball. 2014. "Effectiveness of Nitrogen Assimilation in the Non-Tidal Chesapeake Bay Watershed: Evaluations Based on Thirty Years of Data," poster presentation at *American Geophysical Union Fall Meeting*, San Francisco, CA, December 15-19, 2014.
- Ha, D., H. Wei, **Q. Zhang**, and W.P. Ball. 2014. Retrospective Analysis of Sediment-associated Phosphorus Concentration in the Non-Tidal Chesapeake Bay Watershed, poster presentation at *Maryland Water Monitoring Council Annual Conference*, Linthicum Heights, MD, November 21, 2014.
- Ha, D., H. Wei, **Q. Zhang**, and W.P. Ball. 2014. Nitrogen Source Input from the Non-Tidal Chesapeake Bay Watershed and Output in the Major Rivers: Evaluation of Changes Based on Long-term Data, poster presentation at *Maryland Water Monitoring Council Annual Conference*, Linthicum Heights, MD, November 21, 2014.
- Wei, H., D. Ha, **Q. Zhang**, and W.P. Ball. 2014. "Retrospective Analysis of Phosphorus Source Input and Riverine Output in the Chesapeake Bay Watershed," poster presentation at *Maryland Water Monitoring Council Annual Conference*, Linthicum Heights, MD, November 21, 2014.
- Zhang, Q.** and W.P. Ball. 2014. "Decadal-scale Trends of Nutrients and Sediment from the Non-tidal Chesapeake Bay Watershed: Are We Making of Progress in Loading Reduction," poster presentation at *Gordon Research Conference - Environmental Sciences: Water*, Holderness, NH, June 22-27, 2014.
- Zhang, Q.** and W.P. Ball. 2014. "Nutrient and Sediment Delivery from the Susquehanna River to Chesapeake Bay: Long-term Changes in Loading Trend and Reservoir Sedimentation," oral presentation at *Chesapeake Modeling Symposium*, Annapolis, MD, May 28-29, 2014.
- Zhang, Q.** and W.P. Ball. 2014. "Long-term trends and mass-balance of nutrient and sediment loadings in the Lower Susquehanna River Watershed," **invited** oral presentation at *Chesapeake Bay Program Modeling Quarterly Review Meeting*, Annapolis, MD, January 7, 2014.

- Zhang, Q.** and W.P. Ball. 2013. “Long-term Seasonal Trends of Nutrients and Sediment from the Non-tidal Chesapeake Bay Watershed: An Assessment of Progress in Loading Reduction,” oral presentation at *American Water Resources Association Annual Conference*, Portland, OR, November 4-7, 2013.
- Zhang, Q.** and W.P. Ball. 2013. “Nutrient and Sediment Loads Delivered through the Conowingo Reservoir,” **invited** oral presentation at *Maryland Department of Natural Resources Conowingo Dam Sediment Load Meeting*, Annapolis, MD, August 19, 2013.
- Zhang, Q.**, D.C. Brady, and W.P. Ball. 2013. “Application of a USGS Statistical Tool (WRTDS) toward Assessing Watershed Management and Reservoir Function in the Susquehanna River Basin,” poster presentation at *Association of Environmental Engineering and Science Professors 50th Anniversary Conference*, Golden, CO, July 14-16, 2013.
- Zhang, Q.**, D.C. Brady, and W.P. Ball. 2013. “Long-term Seasonal Trends of Nitrogen, Phosphorus, and Suspended Sediment Load from the Non-tidal Susquehanna River Basin to Chesapeake Bay,” poster presentation at *Community Surface Dynamics Modeling System Annual Meeting*, Boulder, CO, March 23-25, 2013.
- Zhang, Q.** and W.P. Ball. 2012. “Long-term Seasonal Nutrient Trends for the Non-tidal Portions of the Major Tributaries to Chesapeake Bay,” poster presentation at *Chesapeake Modeling Symposium*, Annapolis, MD, May 21-22, 2012.

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Scientific Reports
Ecological Indicators
Environmental Modelling and Software
Limnology and Oceanography Letters
Journal of Environmental Quality
Journal of Geophysical Research - Oceans
Hydrological Processes
Climate Change
Atmospheric Environment
Progress in Oceanography
Frontiers in Marine Science

Frontiers in Environmental Science
Ecosphere
Biogeosciences
iScience
Marine Environmental Research
Stochastic Environmental Research and Risk Assessment
Earth Surface Processes and Landforms
Estuarine, Coastal and Shelf Science
Continental Shelf Research
Hydrological Sciences Journal
Agricultural Water Management
Journal of Water Resources Planning and Management
Agricultural and Forest Meteorology
Journal of Great Lakes Research
JAWRA Journal of the American Water Resources Association
Environmental Science and Pollution Research
Air, Soil and Water Research
Statistics and Computing
Water (MDPI)
Geosciences (MDPI)
Land (MDPI)
International Journal of Environmental Research and Public Health (MDPI)
Journal of Hydro-environment Research
U.S. Geological Survey Scientific Investigations Report
International Conference on Water Resource and Environment
* National Science Foundation
* Maryland Sea Grant
* Georgia Sea Grant
* California Sea Grant

Synergistic Activities

Member, American Geophysical Union (AGU)
Member, European Geosciences Union (EGU)
Member, Coastal & Estuarine Research Federation (CERF)
Member, Society for Freshwater Science (SFS)
Member, International Association for Great Lakes Research (IAGLR)
Member, Geological Society of America (GSA)
Member, American Water Resources Association (AWRA)
Member, American Water Works Association (AWWA)
Member, American Chemical Society (ACS)
Member, Association of Environmental Engineering and Science Professors (AEESP)

Member, Chinese-American Professors in Environmental Engineering and Science (CAPEES)

Member, Community Surface Dynamics Modeling System (CSDMS)

Member, International Association of Chinese Youth in Water Sciences (CYWater)