YIFAN ZHU

Ph.D. Candidate
Department of Ocean and Earth Sciences
Old Dominion University, Norfolk, VA, USA
Email: yzhu003@odu.edu
URL: https://www.researchgate.net/profile/Yifan-Zhu-15
https://github.com/Zhu-Yifan

EDUCATION

Ph.D. <u>Oceanography</u>, Old Dominion University, Norfolk, USA (August 2017- present).
Supervisor: Dr. Margaret R. Mulholland

M.S. <u>Marine Chemistry</u>, College of Ocean & Earth Sciences, Xiamen University, Xiamen, China (December 2015).
Supervisor: Dr. Minhan Dai
Thesis: "Ammonium distribution and dynamics in the South China Sea"

B.S. <u>Chemistry</u>, College of Chemistry and Chemical Engineering, Ocean University of China, Qingdao, China (June 2013).

RESEARCH TOPICS

- Distribution and cycling of reactive nitrogen compounds (e.g., ammonium, cyanate, primary amines, and labile DON) at estuaries (e.g., lower Chesapeake Bay) and ocean fronts (e.g., Mid- and South Atlantic Bight–Gulf Stream and South China Sea–Kuroshio).
- Development and application of new analytical techniques for determination of ultra-trace nutrients.

RESEARCH EXPERIENCE

- July 2019 – present

Project: Shelfbreak Productivity Interdisciplinary Research Operation at the Pioneer Array (NSF funded)

Responsibilities: Field work on a cruise aboard the R/V *Thomas G. Thompson* across the northern Mid-Atlantic Bight shelf (New England shelf) and shelf break in July 2019. Work includes ammonium sampling and on-board measurement, DOC sampling, and post-cruise DNA/RNA extraction and nitrifiers gene abundance measurement, data analysis and presentation, first-authored a manuscript (L&O, submitted, see below).

- July 2018 – present

Project: Algal bloom and water quality monitoring at time-series stations in the Lower Chesapeake Bay (NOAA-ECOHAB)

Responsibilities: Summer months field work include YSI sondes deployment and water sample collection in the Lafayette River; samples measurement; data analysis; conference presentation; first-authored a publication (see below)

- February 2018 – present

Project: Cyanate in the Sea: Sources, Sinks, and Quantitative Significance (NSF funded)
Responsibilities: Analysis of cyanate samples collected from Mid- and South Atlantic Bight, Slope Sea, and Gulf Stream off Cape Hatteras; data synthesis of the nitrogen uptake rates measured from nutrient amendment bioassay; manuscript writing (in-progress).

- October 2017, 2018, 2019, 2020

Project: "Measure the muck" on the King tide to investigate flooding in Norfolk, Virginia
Responsibilities: Sampling and locating the flooding edge by using sea level rise app.

- September 2013 – May 2017

Project: Comparative studies of nitrification and denitrification processes between the Pearl River Estuary and the South China Sea Basin. NSF Key Program
Responsibilities: Sampling and analysis of nutrients, data analysis, first-authored two publications (see below).

- June 2010 – May 2011

Project: Research on template agent on the control of aperture size of mesoporous alumina. Student Research Developing Program in Ocean University of China (SRDP-OUC).
Responsibilities: Experiment design, data report, and group presentation.

TECHNICAL SKILLS

- Culturing marine phytoplankton organisms. Batch/chemo-state culture of cyanobacteria (e.g., *Synechococcus*) and diatoms.

- Flow Cam Imaging and Epifluorescence Microscopy

- DNA/RNA extraction and qPCR measurement of marine microbes (e.g., nitrifiers).

- Determination of trace level cyanate, amino acids, primary amines using High Performance Liquid Chromatography (HPLC).

- C/N isotope ratio mass spectrometer combined with C/N elemental analyzer

- Determination of TOC/TDN using Shimadzu C/N elemental analyzer.

- Determination of trace level ammonium, phosphate, and nitrate + nitrite onboard using fluorescence spectrometry combined with solid phase extraction technique (SPE), UV- spectrometry combined with SPE, and UV- spectrometry combined with Liquid Waveguide Capacity Cell (LWCC) device, respectively.

- Seal Analytical AA3 HR Nutrient Autoanalyzer.

- Onboard CTD operations and seawater sampling for nutrient (NO_3^-/NO_2^-/PO_4^{3-}/NH_4^+), carbon system parameters (DO/PH/DIC/TA/Ca), DOC and POC/Chlorophyll filtration.

COMPUTIONAL SKILLS

Applications: MATLAB, Python, ArcGIS Pro, and R.

SELECTED CONFERENCE AND SEMINAR PRESENTATIONS

- Cyanate dynamics under algal blooms and sediment resuspension events in a shallow micro-tidal estuary in the lower Chesapeake Bay. <u>Yifan Zhu,</u> Margaret R. Mulholland et al. Chesapeake Community Research and Modeling Symposium, Annapolis, Maryland, Jun 5–7, 2022 (**Oral**).

- Ammonium dynamics in the mid-Atlantic Shelf Break frontal zone. <u>Yifan Zhu</u>, Margaret R. Mulholland et al. Ocean Science Meeting (virtual), Feb 28–Mar 4, 2022 **(Oral)**.

- Ammonium Dynamics in the South China Sea-Kuroshio and the Mid-Atlantic Shelf Break Frontal Zones. <u>Yifan Zhu</u>, Minhan Dai et al. Ocean Science Meeting, San Diego, California, Feb 16–21, 2020 (**Poster**).

- Ammonium distributions in the South China Sea Based on shipboard high-resolution measurements. <u>Yifan Zhu</u>, Minhan Dai et al. The 8th University Consortium on Aquatic Sciences Postgraduate Symposium (8th UCAS Postgraduate Symposium), Taipei, Taiwan, March 7–11, 2016 (**Oral**).

- Ammonium distributions in the South China Sea Based on shipboard high-resolution measurements. <u>Yifan Zhu</u>, Minhan Dai *et al.* The 12th Asia Oceania Geosciences Society annual meeting, Singapore. August 2–7, 2015 (**Poster**).

- Intergovernmental Panel on Climate Change Annual Report 5 (IPCC AR5, The Working Group I report). Xiamen, China. November 15, 2014.

SELECTED PROFESSIONAL / PRACTICAL TRAINING

- Advanced Data Science Techniques in Ocean, Earth, and Environmental Sciences (Python and machine learning). Spring 2023. Instructor: Dr. Sophie Clayton (Old Dominion University, ODU).

- Data Science Boot Camp (Python, R, and machine learning). May 9–14, 2022. Instructor: faculties from department of data and computer science, and mathematics (ODU).

- Image analysis techniques for remote sensing using ArcGIS Pro and python. Spring 2022. Instructor: Dr. Victoria Hill (ODU).

- Plotting and Programming with Python (Jupyter Notebook). Research Computing workshop. March 1–3, 2022. Instructor: Dr. John D. Pratt and Dr. Wirawan Purwanto (ODU).

- Phytoplankton image processing via ECO-Taxa (ODU Phytoplankton Laboratory).

- MATLAB training class. Spring 2019. Instructor: Dr. John Klinck (ODU).

- Mini course "English as a tool in writing scientific manuscripts" at State key laboratory of Marine Environmental Science (MEL), Xiamen, China. October 22–November 7, 2013. Instructor: Dr. John Hodgkiss (University of Hong Kong).

- Training course on *"Statistics and Experimental Design"* at MEL, Xiamen, China. June–July 2013. Instructor: Dr. Robert Armstrong (Stony Brook University).

TEACHING EXPERIENCE

- *Lab:* OEAS108N_Understanding Global Climate Change (Fall 2019, Spring 2020, Fall 2020, Spring 2021, Spring 2023)

- *Lab:* OEAS106N_Introductory to Oceanography (Spring 2018, Spring 2019)

FIELDWORK EXPERIENCE

- Sampling (near daily) at two time-series stations established in the Lafayette River, Norfolk to investigate Harmful Algal Bloom events in summer 2018, 2019, 2020, 2021, and 2022.

- Cruise on R/V *Thomas Thompson* to the mid-Atlantic continental shelfbreak frontal zone, July 2019.

- Cruise on R/V *Haike 68* to the Pearl River and coastal South China Sea, Dec 2016.

- Cruises on R/V *Dongfanghong II* to the northern South China Sea and West Pacific, May-July 2014, and May–June 2016.

- Cruise on R/V *Tianlong* to investigate hypoxia in the Pearl River, August 2012.

PUBLICATIONS

Yifan Zhu, Jing Liu, Tao Huang, Lifang Wang, Thomas W. Trull, Minhan Dai* (2018). On the fluorometric measurement of ammonium in oligotrophic seawater: Assessment of reagent blanks and interferences: Ammonium reagent blanks and interferences (*Limnology and Oceanography: Methods*). DOI: 10.1002/lom3.10263

Yifan Zhu, Jing Liu, Margaret R. Mulholland, Chuanjun Du, Lifang Wang, Brittany Widner, Tao Huang, Yan Yang and Minhan Dai* (2021). Dynamics of ammonium biogeochemistry in an oligotrophic regime in the South China Sea (*Marine Chemistry*). DOI: 10.1016/j.marchem.2021.104040

Yifan Zhu*, Margaret R.Mulholland, Alfonso Macias Tapia, Michael A. Echevarria, Eduardo Perez Vega, Peter Bernhardt (2022). Cyanate dynamics under algal blooms and sediment resuspension events in a shallow micro-tidal estuary in the lower Chesapeake Bay (*Estuarine, Coastal and Shelf Science*). DOI: 10.1016/j.ecss.2022.108188

Yifan Zhu*, Margaret R. Mulholland, Corday R. Selden, Dennis J. McGillicuddy Jr., P. Dreux Chappell, Weifeng Gordon Zhang, Meredith G. Meyer, Katherine E. Crider, Hilde Oliver, Sophie Clayton (2022). Contrasting Nitrogen and Nitrifier Dynamics in the Euphotic Zone across the Mid-Atlantic Bight Shelfbreak Front (*Limnology and Oceanography,* under-review). Submitted in August 2022, see a copy here.

Yifan Zhu*, Peter Bernhardt, Brittany Widner, Kenneth Mopper, Margaret R.

Mulholland (2023). Summertime phytoplankton composition and nitrogen uptakes across contrasted North Atlantic Ocean regimes off Cape Hatteras (in-progress, target journal *JGR Biogeosciences*).

Min Xu, Weijie Zhang, **Yifan Zhu**, Li Liu, Zhenzhen Zheng, Xianhui Sean Wan, Wei Qian, Minhan Dai, Jianping Gan, David A. Hutchins, and Shuh-Ji Kao (2018)
Enhanced Ammonia Oxidation Caused by Lateral Kuroshio Intrusion in the Boundary Zone of the Northern South China Sea (*Geophysical Research Letter*). DOI: 10.1029/2018GL07789.

Xianhui Wan, Hua-Xia Sheng, Minhan Dai, Yao Zhang, Dalin Shi, Thomas W. Trull, **Yifan Zhu**, Michael W. Lomas, and Shuh-Ji Kao (2018)
Ambient nitrate switches the ammonium consumption pathway in the euphotic ocean (*Nature Communication*). DOI: 10.1038/s41467-018-03363-0

Hilde Oliver, Weifeng G. Zhang, Walker O. Smith Jr., Philip Alatalo, P. Dreux Chappell, Andrew J. Hirzel, Corday R. Selden, Heidi M. Sosik, Rachel H. R. Stanley, **Yifan Zhu**, Dennis J. McGillicuddy Jr (2021). Diatom Hotspots Driven by Western Boundary Current Instability (*Geophysical Research Letter*). DOI: 10.1029/2020GL091943

Jiaming Shen, Nianzhi Jiao, Minhan Dai, …., **Yifan Zhu**, Birgit Gaye, Martin G. Wiesner, and Yao Zhang (2020) Laterally Transported Particles From Margins Serve as a Major Carbon and Energy Source for Dark Ocean Ecosystems (*Geophysical Research Letter*). DOI: 10.1029/2020GL088971

Peihong Kang, Han Zhang, Zixiang Yang, **Yifan Zhu**, Biyan He, Qing Li, Cindy Lee, Tiantian Tang (2021) A model of algal organic carbon distributions in the Pearl River estuary using the amino acid carbon isotope values (*Geochimica et Cosmochimica Acta*). DOI: 10.1016/j.gca.2020.11.010