ZHONGJIE YU

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ACADAMIC APPOINTMENTS

Assistant Professor, March 2020 – present. Department of Natural Resources and Environmental Sciences, *University of Illinois Urbana-Champaign*.

Postdoctoral Associate, October 2018 – February 2020. Biometeorology Research Group, Department of Soil, Water, and Climate, *University of Minnesota*.

Graduate Research Assistant, August 2013 – August 2018. Department of Geology and Environmental Science, *University of Pittsburgh*.

Graduate Teaching Assistant, August 2011 – July 2013. Department of Earth and Environmental Sciences, *Rutgers University*.

EDUCATION

Ph.D. in Biogeochemistry, August 2018, *University of Pittsburgh*.

M.S. in Environmental Geophysics, July 2013, *Rutgers University*

M.S. in Environmental Geochemistry, July 2011, *East China Normal University*.

B.S. in Geographical Sciences (with honor), July 2008, *East China Normal University*.

RESEARCH INTERESTS

My research seeks to gain a mechanistic understanding of the biogeochemical nitrogen cycle by investigating how biological, ecological, and hydrological drivers of the nitrogen cycle are recorded and reflected in natural abundance stable nitrogen and oxygen isotope composition and how these isotopic imprints can be effectively used to infer and model the source, transport, and transformation of reactive nitrogen in the environment. Areas of active research including:

- Nitrogen transformations in agricultural soil
- Nitrogen sources and cycling in agricultural watersheds
- Nitrous oxide emissions from soil and aquatic environments

AWARDS AND FELLOWSHIPS

- Andrew Mellon Predoctoral Fellowship ($48,000), University of Pittsburgh, 2016-2018.
- Outstanding Student Presentation Award, American Meteorological Society, Third Conference on Atmospheric Biogeosciences, 2016.
- The Henry Leighton Memorial Graduate Scholarship ($2,000), University of Pittsburgh, 2016.
- Mascaro Center for Sustainable Innovation Fellowship ($8,800), University of Pittsburgh, 2015.

- Graduate Student Research Award ($2,400), Geological Society of America, 2015.
- Graduate Student Teaching Award, Department of Earth and Environmental Sciences, Rutgers University, 2012.
- Fall Meeting Student Travel Grant ($800), American Geophysical Union, 2012.
- College Graduation with Honor, Ministry of Education, China, 2008.
- Tier One Scholarship, East China Normal University, 2004 – 2008.

PEER-REVIEWED PUBLICATIONS

[29] Chen, C, D Wang, Y Ding, **Z Yu**, L Liu, Y Li, D Yang, Y Gao, H Tian, R Cai, Z Chen (2021). Ebullition controls on CH_4 emissions in an urban, eutrophic river: A potential time-scale bias in determining the aquatic CH_4 flux, *Environmental Science & Technology*, 55(11), 7287-7298.

[28] McNicol, G, **Z Yu**, ZC Berry, N Emery, FM Soper, WH Yang (2021). Tracing plant-environment interactions from organismal to planetary scales using stable isotopes: a mini review, *Emerging Topics in Life Sciences*, ETLS20200277.

[27] Hu, C, TJ Griffis, A Frie, JM Baker, JD Wood, DB Millet, **Z Yu**, X Yu, AC Czarnetzki (2021). A multi-year constraint on ammonia emissions and deposition within the U.S. Corn Belt, *Geophysical Research Letters*, e2020GL090865.

[26] **Yu, Z**, TJ Griffis, JM Baker (2021). Warming temperatures lead to reduced summer carbon sequestration in the U.S. Corn Belt, *Communications Earth & Environment*, 2, 53.

[25] Wang, D, JR White, RD Delaune, **Z Yu**, Y Hu (2021) Peripheral freshwater deltaic wetlands are hotspots of methane flux in the coastal zone, *Total Science of the Environment*, 775, 145784.

[24] **Yu, Z** and EM Elliott (2021) Nitrogen isotopic fractionations during nitric oxide production in an agricultural soil, *Biogeosciences*, 18, 805-829.

[23] Chen, J, D Wang, Y Li, **Z Yu**, S Chen, X Hou, JR White, Z Chen (2020). The carbon stock and sequestration rate in tidal flats from coastal China, *Global Biogeochemical Cycles*, 34(11).

[22] Huang, S, F Wang, EM Elliott, F Zhu, W Zhu, K Koba, **Z Yu**, E Hobbie, G Michalski, R Kang, A Wang, J Zhu, S Fu, Y Fang (2020) Multiyear measurements on $\Delta^{17}O$ of stream nitrate indicate high nitrate production in a temperate forest, *Environmental Science & Technology*, 54(7), 4231-4239.

[21] Yu, L, D Wang, S Chen, **Z Yu**, L Liu, M Wang, Z Chen (2020) N_2 fixation in urbanization area rivers: spatial-temporal variations and influencing factors, *Environmental Science and Pollution Research*, 27(7), 7211-7221.

[20] Hu, C, TJ Griffis, JN Baker, JD Wood, DB Millet, **Z Yu**, X Lee (2020) Modeling the sources and transport processes during extreme ammonia episodes in the U.S. Corn Belt, *Journal of Geophysical Research: Atmospheres*, 125(2), p.e2019JD031207.

[19] Griffis, TJ, C Hu, JM Baker, JD Wood, DB Millet, M Erickson, **Z Yu**, MJ Deventer, C Winker, Z Chen. (2019) Tall tower ammonia observations and emission estimates in the US Midwest, *Journal of Geophysical Research: Biogeosciences*, 124(11), 3432-3447.

[18] Walk, JT, et al. (48 co-authors including **Z Yu**) (2019) Toward the improvement of total nitrogen deposition budgets in the United States, *Science of the Total Environment*, 691, 1328-1352.

[17] Liu, L., D Wang, S Chen, **Z Yu**, Y Xu, Z Chen. (2019) Methane emissions from estuarine coastal wetlands: Implications for global change effects, *Soil Science Society of America Journal*, 83(5), 1368-1377.

[16] Rose, LA, **Z Yu**, DJ Bain, EM Elliott. (2019) High resolution, extreme isotopic variability of precipitation nitrate, *Atmospheric Environment*, 207, 63-74.

[15] Elliott, EM, **Z Yu**, AS Cole, JG Coughlin. (2019) Isotopic advances in understanding reactive nitrogen deposition and atmospheric processing, *Science of the Total Environment*, 662, 393-403.

[14] **Yu, Z** and EM Elliott. (2018) Probing soil nitrification and nitrate consumption using $\Delta^{17}O$ of soil nitrate, *Soil Biology and Biochemistry*, 127, 187-199.

[13] **Yu, Z** and EM Elliott. (2017) Novel method for nitrogen isotopic analysis of soil-emitted nitric oxide, *Environmental Science & Technology*, 51(11), 6268-6278.

[12] **Yu, Z**, D Wang, Y Li, H Deng, B Hu, M Ye, X Zhou, L Da, Z Chen, S Xu. (2017) Carbon dioxide and methane dynamics in a human-dominated lowland coastal river network, *Journal of Geophysical Research: Biogeosciences*, 122(7), 1738-1758.

[11] Coughlin, JG, **Z Yu**, EM Elliott. (2017) Efficacy for passive sampler collection for atmospheric NO_2 isotopes under simulated environmental conditions, *Rapid Communication in Mass Spectrometry*, 31, 1211-1220.

[10] Cheng, C, C Bi, D Wang, **Z Yu**, Z Chen. (2017) Atmospheric deposition of polycyclic aromatic hydrocarbons (PAHs) in Shanghai: Spatio-temporal variations and source identification, *Frontiers of Earth Science*, 1-9.

[9] Terry, N, LD Slater, X Comas, AS Reeve, KVR Schäfer, **Z Yu**. (2016) Free phase gas processes in a northern peatland inferred from autonomous field-scale resistivity imaging, *Water Resources Research*, 52(4), 2996-3018.

[8] Wang, D, Y Tan, **Z Yu**, Y Li, S Chang, H Deng, B Hu, Z Chen. (2015) Nitrous oxide production in river sediment of highly urbanized area and the effects of water quality, *Wetlands*, 1-11.

[7] **Yu, Z**, LD Slater, KVR Schäfer, AS Reeve, RK Varner. (2014) Dynamics of methane ebullition from a peat monolith revealed from a dynamic flux chamber system, *Journal of Geophysical Research: Biogeosciences*, 119(9), 1789-1806.

[6] Liu, L, D Wang, H Deng, Y Li, S Chang, Z Wu, L Yu, Y Hu, **Z Yu**, Z Chen. (2014) The capability of estuarine sediments to remove nitrogen: Implications for drinking water resource in the Yangtze Estuary, *Environmental Science and Pollution Research*, 21(18), 10890-10899.

[5] **Yu, Z**, H Deng, D Wang, M Ye, Y Tan, Y Li, Z Chen, S Xu. (2013) Nitrous oxide emissions in the Shanghai river network: Implications for the effects of urban sewage and IPCC methodology, *Global Change Biology*, 19(10), 2999-3010.

[4] Zhou, D, C Bi, Z Chen, **Z Yu**, J Wang, J Han. (2013) Phosphorus loads from different urban storm runoff sources in southern China: A case study in Wenzhou City, *Environmental Science and Pollution Research*, 20(11), 8227-8236.

[3] **Yu, Z**, Y Li, H Deng, D Wang, Z Chen, S Xu. (2012) Effect of *Scirpus mariqueter* on nitrous oxide emissions from a subtropical monsoon estuarine wetland, *Journal of Geophysical Research: Biogeosciences*, 117(G2).

[2] **Yu, Z**, D Wang, Z Chen, Y Qi, Z Ni, S Xu. (2011) Purification of eutrophic river water using artificial floating beds, *China Water & Wastewater*, 27(17), 31-35 (in Chinese with English abstract).

[1] Sun, C, C Bi, Z Chen, D Wang, C Zhang, Y Sun, **Z Yu**, D Zhou. (2010) Assessment on environmental quality of heavy metals in agricultural soils of Chongming Island, Shanghai City, *Journal of Geographical Sciences, 20(1)*, 135-147.

CONFERENCE PRESENTATIONS

Yu, Z and EM Elliott. (2020) Nitrogen isotopic fractionations during nitric oxide production in an agricultural soil, poster presentation, Fall Meeting of the American Geophysical Union, Virtual meeting.

Griffis, TJ, JM Baker, DB Millet, Z Chen, JD Wood, **Z Yu**. (2019) The imprint of agricultural ecosystems on trace gas emissions in the US Midwest, poster presentation, Fall Meeting of the American Geophysical Union, San Francisco, CA.

Singh, A, MJ Deventer, M Erickson, **Z Yu**, N Fahmy, JM Baker, DB Millet, TJ Griffis. (2019) Importance of CH_4 and CO_2 fluxes from stream and river networks: Constraints from agricultural watersheds in Southern Minnesota, poster presentation, Fall Meeting of the American Geophysical Union, San Francisco, CA.

Elliott, EM, LA Rose, **Z Yu**. (2018) Deciphering land-atmosphere interactions of reactive nitrogen using high-frequency isotope analysis, invited talk, General Assembly of European Geophysical Union, Vienna, Austria.

Chen, X, X Comas, **Z Yu**, AS Reeve, LD Slater. (2018) Permeable glacial deposits regulate hydrology and methane emissions in eccentric bogs, poster presentation, Fall Meeting of the American Geophysical Union, Washington DC.

Yu, Z and EM Elliott. (2017) Probing soil nitrogen transformations using triple nitrate isotopes, poster presentation, Fall Meeting of the American Geophysical Union, New Orleans, LA.

Yu, Z and EM Elliott. (2016) A novel method for collection of soil-emitted NO for natural abundance stable N isotope analysis, poster presentation, Fall Meeting of the American Geophysical Union, San Francisco, CA.

Yu, Z and EM Elliott. (2016) A novel method for collection of soil-emitted NO for natural abundance stable N isotope analysis, oral presentation, American Meteorological Society, Third Conference on Atmospheric Biogeosciences, Salt Lake City, UT.

Terry, N, LD Slater, X Comas, KVR Schäfer, **Z Yu**, AS Reeve. (2015) Controls on free phase gas dynamics in a Northern peatland inferred from field-scale ERT, American Geophysical Union Joint Assembly session "Innovative Methods to Study Greenhouse Gas Exchange in Wetland Ecosystems", poster presentation, Montreal, Canada.

Terry, N, **Z Yu**, LD Slater. (2013) GPR signal scattering from gas bubble formation in peat, poster presentation, Fall Meeting of the American Geophysical Union, San Francisco, CA.

Yu, Z, H Deng, D Wang, M Ye, Y Tan, Y Li, Z Chen, S Xu. (2013) Spatiotemporal variability of nitrous oxide and methane emissions in the Shanghai river network, poster presentation, Gordon Conference on Catchment Science, Andover, NH.

Bon, CE, AS Reeve, LD Slater, X Comas, KVR Schäfer, **Z Yu**. (2013) Investigating flow patterns and mechanisms for free phase gas variability in a Maine peatland, poster presentation, 48th Annual Meeting of the Geological Society of America (Northeastern Section), Bretton Woods, NH.

Yu, Z, KVR Schäfer, LD Slater, RK Varner, J Amante, X Comas, AS Reeve, W Alcivar, D Gonzalez. (2012) Continuous measurement of methane ebullition flux from a Northern peatland using a fast methane analyzer, oral presentation, Fall Meeting of the American Geophysical Union, San Francisco, CA.

INVITIED TALKS

- Transport and transformation of reactive nitrogen along the atmospheric, terrestrial, and aquatic continuum, Department of Natural Resources and Environmental Sciences, University of Illinois Urbana - Champaign, January 17, 2019.
- Characterizing soil nitric oxide dynamics using stable nitrogen and oxygen isotopes, Center for Advanced Bioenergy and Bioproducts Innovation, University of Illinois Urbana - Champaign, January 29, 2018.
- Novel method for nitrogen isotopic analysis of soil-emitted nitric oxide, Department of Earth, Atmospheric, and Planetary Sciences, Purdue University, June 5, 2015.

GRANT ACTIVITY

Illinois Nutrient Research & Education Council

Sources and cycling of nitrate in tile-drained corn-soybean rotation systems: A stable isotope approach
Role: PI
Amount: $525,385
Dates: 10/1/2020 – 09/30/2024
Status: Current.

National Science Foundation: Atmospheric Chemistry

Collaborative Research: Isotopic fingerprinting of nitrous oxide emissions from the US Corn Belt
Role: PI
Amount: $360,970
Dates: 08/1/2021 – 07/31/2024
Status: Current.

Foundation for Food and Agriculture Research: New Innovator Award
Characterizing soil nitrogen mineralization to improve nitrogen management in midwestern corn-soybean systems

Role: PI
Amount: $432,410
Dates: 10/1/2021 – 09/30/2024
Status: Pending (submitted 5/5/2021)

USDA-NIFA: Agriculture and Food Research Initiative (AFRI)
Quantifying intermediate processes and plant-soil-microbe interactions that govern soil nitrogen mineralization in midwestern agroecosystems

Role: PI
Amount: $741,589
Dates: 1/1/2022 – 12/31/2024
Status: Pending (submitted 6/9/2021)

TEACHING

Aquatic Biogeochemistry (NRES499, every spring)

- This course examines the transport, transformation, and retention of carbon and nutrients in aquatic ecosystems across the continuum from streams to coastal waters. In addition, the course explores how disturbance (e.g., agriculture and urbanization) and global change drivers (e.g. land use change, atmospheric deposition, and climate change) alter nutrient and carbon cycling in the context of watersheds. Emphasis will be placed on the application of biogeochemical principals for improving water quality as well as biogeochemical approaches for aquatic ecosystem protection. These ideas will be explored by a combination of lectures, literature reading, field trips to study sites, and final project.

Environmental Biogeochemical Cycles (course for the NRES online Masters program, planned for Spring 2022)

ADVISING AND MENTORING

Graduate Student Advisees

Yinchao Hu, Ph.D. student, January 2021-present.

Undergraduate Student Research Advisees

Naglis Subacius, NRES, 2020-present.

Service on Graduate Committees

Kelsey Griesheim, Ph.D. candidate, NRES, ongoing.

Carly Fenstermacher, Masters student, Illinois Natural History Survey, ongoing.

SERVICE

Ad hoc Proposal Reviewer

NSF-Hydrological Sciences, US-Israel Binational Agricultural Research and Development (BRAD) Fund.

Manuscript Reviewer

Atmospheric Chemistry and Physics, Atmospheric Environment, Biogeochemistry, Environmental Pollution, Environmental Science & Technology, Environmental Science and Pollution Research, Global Biogeochemical Cycles, Journal of Geophysical Research - Atmospheres, Journal of Geophysical Research - Biogeosciences, Journal of Environmental Quality, Journal of Environmental Sciences, Pedosphere, Rapid Communications in Mass Spectrometry, Science of the Total Environment, Soil Science Society of America Journal, Tellus B: Chemical & Physical Meteorology, Geophysical Research Letters, Geoscientific Model Development, Agricultural and Forest Meteorology.