Xin Zhang

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I. EDUCATION

- Ph.D., Yale School of Forestry and Environmental Studies, May 2013
- M.A. in Environmental Sciences, Peking University, July 2007;
- B.A. in Environmental Sciences, minor in Computer Science, Ocean University of China, July 2004

II. AWARDS AND HONORS

- Excellence in Scholarship or Research Award, University System of Maryland Board of Regents, 2024
- Global Environmental Change Early Career Award, American Geophysical Union, 2022
- President's Award for Excellence in Application of Science, University of Maryland Center for Environmental Science, 2022
- World's top 2% scientists by Stanford University
- Faculty Early Career Development Program (CAREER) Award, National Science Foundation, 2021
- Best paper award at International Conference on Sustainable Development, Sep. 2019
- Yale Center for Environmental Law & Policy Research Prize, 2012

III. PROFESSIONAL EXPERIENCE

University of Maryland Center for Environmental Science (UMCES) 2016-present

- ***Professor,*** Appalachian Laboratory, June 2024- present
- ***Associate Professor,*** Appalachian Laboratory, June 2021- June 2024
- ***Assistant Professor,*** Appalachian Laboratory, January 2016- June 2021

Global Nitrogen Innovation Center for Clean Energy and Environment 2023-present

- ***Director,*** December 2023- present

Princeton University 2012-2015

- ***Postdoctoral Research Associate,*** School of Public and International Affairs, November 2012-December 2015
- ***Postdoctoral Research Associate,*** Princeton Environmental Institute, November 2014-December 2015

United Nations 2011-2012

- ***Advisor on "Sustainable Development Dialogues",*** Executive Coordinator Office for Rio +20 United Nations Conference on Sustainable Development, February-June, 2012
- ***Policy Research Intern***, Division for Sustainable Development, Department for Economic and Social Affairs (DESA), June-August, 2011
- ***Sustainable Development Advisor***, Maldives Mission, March-May, 2011

Yale University 2008-2012

- ***Coordinator***, Environment and Sustainable Development Leadership Program, a joint effort among Yale, Tsinghua universities, and Chinese Mayors' Association, February 2010-June 2012
- ***Student Assistant,*** Yale-Chinese Women's Leadership Development Program, Office of International Affairs, May 2011

IV. Other Professional Affiliations

- ***Editor,*** Earth's Future, Jan. 2022-present
- ***Science Advisor,*** Working Group 3 for the Earth Commission on 'Nutrients and pollution' (https://earthcommission.org/, hosted by Future Earth), 2020-2023
- ***Panel member,*** International Fertilizer Association's Scientific Panel on Responsible Plant Nutrition, 2019- 2023
- ***Committee member,*** AGU Sustainability advisory group, 2020
- ***Committee member,*** The Scientific Committee for the 8th Global Nitrogen conference, 2019-2021

V. Research Grants

Total funding awarded: $14,220,031
Total funding for proposals led by Xin Zhang: $8,379,231

1. Spark Climate Solutions, 2025-2026 ($185,000) "Guiding the development and implementation of Nitrogen 2.0 vision with quantitative models" **PI: Xin Zhang**
2. National Science Foundation (NSF), 2024-2028 ($1,500,000) "AccelNet Implementation Phase 1: Accelerating coordination across research and policy networks to halve nitrogen waste (iN-Net)" PI: David Kanter (New York University); **CoI: Xin Zhang**, Peter Groffman (Cary Institute of Ecosystem Studies), William San Martin (Worcester Polytechnic Institute)
3. National Science Foundation (NSF), 2023-2028 ($5,000,000) "Global Centers Track 1: Global Nitrogen Innovation Center for Clean Energy and Environment (NICCEE)" **PI: Xin Zhang**; CoI: Matthew Houser (UMCES and The Nature Conservancy), Eric Davidson (UMCES AL), Nick Wu (University of Massachusetts), David Kanter (New York University). OISE-2330502. In addition to NSF funding, the Center will be also supported by international collaborators, with funding sourced from U.K. Research and Innovation (about $3,000,000), and Natural Sciences and Engineering Research Council of Canada (about $3,000,000).
4. NSF, 2023-2027 ($2,841,159) "Collaborative Research: SCIPE: Enhancing the Transdisciplinary Research Ecosystem for Earth and Environmental Science with Dedicated Cyber Infrastructure Professionals", PI: Andrew Elmore (UMCES AL); **CoI: Xin Zhang**, Victoria Coles.
5. International Fertilizer Association, 2023-2024 ($269,989) "Improving global to national nutrient monitoring", **PI Xin Zhang.**
6. NSF, 2021-2025 ($510,000) "CAREER - Sustainable Nitrogen Management Across Spatial and System Scales" PI: Xin Zhang. CBET-2047165.
7. Belmont Forum, 2021-2022 ($360,000) "Guiding the pursuit for sustainability by co-developing a Sustainable Agriculture Matrix" **PI: Xin Zhang**; CoI: Christian Folberth (International Institute for Applied Systems Analysis, Austria), Luiz Antonio Martinelli (Universidade de São Paulo, Brazil), Thomas Oberthür (African Plant Nutrition Institute, Morocco), Tafadzwanashe Mabhaudhi (University of KwaZulu-Natal, South Africa), Levent Ozturk (Sabanci University, Turkey).
8. NSF, 2021-2024 ($500,000) "INFEWS: US-China: Managing Agricultural Nitrogen to Achieve Sustainable Food-Energy-Water Nexus in China and the U.S." **PI: Xin Zhang**; CoI: Eric Davidson. CBET-2025826.
9. Bayer, 2020-2022 ($750,000) "Enhancing Biodiversity & Resilience in Crop Production" PI: Wei Zhang (International Food Policy Research Institute); **CoI: Xin Zhang**, Jaboury Ghazoul (ETH Zurich).
10. National Aeronautics and Space Administration (NASA), 2020-2022 ($749,641) "LCLUC: Land-use transitions in Indonesian Peatlands", PI: Mark Cochrane (UMCES AL); **CoI: Xin Zhang**, Andrew Elmore (UMCES AL).
11. International Fertilizer Association, 2021 ($15,000) "Quantifying N deposition inputs to crop production", **PI Xin Zhang**

12. Food and Agriculture Organization of the United Nations, 2019-2020 ($27,000) "A literature review and analysis of the synergies and trade-offs between agricultural productivity and sustainability", **PI: Xin Zhang**
13. National Socio-Environmental Synthesis Center through the grant from National Science Foundation, 2018-2020 (financial and facility support for three international workshops with 18 participants) "Understanding dynamic environmental and socio-economic interactions in food systems to support decision-making towards a sustainable and resilient agriculture" **PI: Xin Zhang**; CoI: Eric Davidson (UMCES AL), Kimberly Pfeifer (Oxfam)
14. NSF, 2017-2022 ($1,252,467) "INFEWS/T2: Sustainable Agriculture in the nexus of food, energy, water, and nutrient on national and global scales", **PI: Xin Zhang**; CoI: Cathlyn Stylinski (UMCES AL), Vyacheslav Lyubchich (UMCES CBL).
15. OCP Research, LLC, 2016-2018 ($193,275) "Managing Phosphorus for Sustainable Development" **PI: Xin Zhang**
16. National Socio-Environmental Synthesis Center through the grant from National Science Foundation, 2016-2017 (financial and facility support for an international workshop with 25 participants) "Developing a Sustainable Agriculture Matrix on a National Scale" **PI: Xin Zhang**; CoI: Eric Davidson
17. Cooperative Institute for Climate Science at Princeton, 2015-2016 ($72,000) "Improving the cropland parameterization in the GFDL land model LM3" **PI: Xin Zhang**; CoI: Denise Mauzerall (Princeton University)
18. Yale Center for Environmental Law & Policy, 2012-2013 ($7,500) "Using the Global Observation Network to Improve National Greenhouse Gas Inventories" **PI: Xin Zhang**
19. Yale Center for Field Ecology Pilot Grants, 2008 ($2,000) "Characterizing greenhouse gases emissions from corn and soybean plants" **PI: Xin Zhang**

VI. PUBLICATIONS

Total citation: 9,087; H-index: 36; i10-index: 64 (Google Scholar)

Peer-reviewed publications

***** Corresponding author; † These authors contributed equally to this work
[#] Student or postdoc supervised by Zhang

2025

1. SM Garvey[#], EA Davidson, C Wagner-Riddle, A Collins, M Houser, T Li, GK MacDonald, M Tenuta, D Kanter, P Kyle, N Wu, KA Congreves, Y Wang, L Cardenas, **Xin Zhang*,** 2025. Emerging opportunities and research questions for green ammonia adoption in agriculture and beyond. *Nature Reviews Clean Technology*, 1(1), pp.10-11. doi:10.1038/s44359-024-00012-2
2. S Vishwakarma, **X Zhang***, V Lyubchich, 2025. Unveiling the drivers contributing to global wheat yield shocks through quantile regression. *Artificial Intelligence in Agriculture*, doi:10.1016/j.aiia.2025.03.004

2024

3. **X Zhang**, D R Sabo, L Rosa, H Niazi, P Kyle, JS Byun, Y Wang, X Yan, B Gu, E Davidson, 2024. Nitrogen Management during Decarbonization. *Nature Reviews Earth & Environment*, pp.1-15. doi:10.1038/s43017-024-00586-2
4. T Zou[#], EA Davidson, RD Sabo, GK MacDonald, **X Zhang***, 2024. Disparities in nitrogen and phosphorus management across time and space: a case study of the Chesapeake Bay using the CAFE framework. *Environmental Research Letters*, 19(11), p.114016. doi:10.1088/1748-9326/ad786c
5. J Gupta, X Bai, DM Liverman, J Rockström, D Qin, B Stewart-Koster, JC Rocha, L Jacobson, JF Abrams, LS Andersen, DIA McKay, G Bala, SE Bunn, D Ciobanu, F DeClerck, K Ebi, L

Gifford, C Gordon, S Hasan, N Kanie, TM Lenton, S Loriani, A Mohamed, N Nakicenovic, D Obura, D Ospina, K Prodani, C Rammelt, B Sakschewski, J Scholtens, T Tharammal, D van Vuuren, PH Verburg, R Winkelmann, C Zimm, E Bennett, A Bjørn, S Bringezu, W Broadgate, H Bulkeley, B Crona, P Green, H Hoff, L Huang, M Hurlbert, CYA Inoue, Ş Kilkiş, SJ Lade, J Liu, I Nadeem, C Ndehedehe, C Okereke, I Otto, S Pedde, L Pereira, L Schulte-Uebbing, JD Tàbara, W de Vries, G Whiteman, C Xiao, X Xu, N Zafra-Calvo, **X Zhang**, P Fezzigna, G Gentile, 2024. A just world on a safe planet: Earth system boundaries, transformations and translation, *The Lancet Planetary Health*, 8(10), pp.e813-e873. doi: 10.1016/S2542-5196(24)00042-1

6. Y Yang, the Clim-Ag Team, 2024. Climate change exacerbates the environmental impacts of agriculture, *Science*, 385(6713). doi: 10.1126/science.adn3747
7. AGU Editorial Network, 2024. Challenges Facing Scientific Publishing in the Field of Earth & Space Sciences. *AGU Advances*, *5*(4), p.e2024AV001334. doi:10.1029/2024AV001334
8. X Cui, Y Bo, W Adalibieke, W Winiwarter, **X Zhang**, EA Davidson, Z Sun, H Tian, P Smith, F Zhou, 2024. The global potential for mitigating nitrous oxide emissions from croplands. *One Earth*, 7(3), pp.401-420. doi: 10.1016/j.oneear.2024.01.005
9. CI Ludemann, N Wanner, P Chivenge, A Dobermann, R Einarsson, P Grassini, A Gruere, K Jackson, L Lassaletta, F Maggi, G Obli-Laryea, MK van Ittersum, S Vishwakarma, **X Zhang**, and FN Tubiello, 2024. A global FAOSTAT reference database of cropland nutrient budgets and nutrient use efficiency (1961–2020): nitrogen, phosphorus and potassium. *Earth System Science Data*, 16(1), pp.525-541. doi:10.5194/essd-16-525-2024

2023

10. J Rockström, J Gupta, D Qin, SJ Lade, JF Abrams, LS Andersen, DI Armstrong McKay, X Bai, G Bala, SE Bunn, D Ciobanu, …, **X Zhang**, 2023. Safe and just Earth system boundaries. *Nature*, pp.1-10. doi:10.1038/s41586-023-06083-8
11. S Cai, X Zhao, CM Pittelkow, M Fan, **X Zhang**, X Yan, 2023. Optimal nitrogen rate strategy for sustainable rice production in China, *Nature* 615 (7950): 73-79. doi:10.1038/s41586-022-05678-x
12. GP Kyle, M Ollenburger#, **X Zhang**, H Niazi, S Durga, and Y Ou, in press. Assessing Multi-Dimensional Impacts of Achieving Sustainability Goals by Projecting the Sustainable Agriculture Matrix into the Future, *Earth's Future*. doi:10.1029/2022EF003323
13. J Zhao[#], AJ Elmore, JSH Lee, I Numata, **X Zhang***, MA Cochrane, 2023. Replanting and yield increase strategies for alleviating the potential decline in palm oil production in Indonesia. *Agricultural Systems*, 210, p.103714. doi:10.1016/j.agsy.2023.103714
14. S Vishwakarma[#], **X Zhang***, A Dobermann, P Heffer, F Zhou, 2023. Global nitrogen deposition inputs to cropland at national scale from 1961 to 2020. *Scientific Data*, 10(1), p.488. doi:10.1038/s41597-023-02385-8
15. N Möhring, D Kanter, R Aziz, IB Castro, F Maggi, L Schulte-Uebbing, V Seufert, FH Tang, **X Zhang**, P Leadley, 2023. Successful implementation of global targets to reduce nutrient and pesticide pollution requires suitable indicators. *Nature Ecology & Evolution*, pp.1-4. doi:10.1038/s41559-023-02120-x
16. CI Ludemann, N Wanner, P Chivenge, A Dobermann, R Einarsson, P Grassini, A Gruere, K Jackson, L Lassaletta, F Maggi, F. G Obli-Laryea, MK van Ittersum, S Vishwakarma, **X Zhang**, FN Tubiello, 2023. A global reference database in FAOSTAT of cropland nutrient budgets and nutrient use efficiency: nitrogen, phosphorus and potassium, 1961–2020. *Earth System Science Data Discussions*, 2023, pp.1-24. doi:10.5194/essd-2023-206
17. X Liu[#], H Du, **X Zhang***, K Feng, X Zhao, H Zhong, N Zhang, Z Chen, 2023. Assessing Transboundary Impacts of Energy-Driven Water Footprint on Scarce Water Resources in China: Catchments under Stress and Mitigation Options. *Environmental Science & Technology*. doi:10.1021/acs.est.2c08006

2022

18. T Zou[#], **X Zhang***, EA Davidson, 2022. Global Trends of Cropland Phosphorus Use and Sustainability Challenges, *Nature.* doi:10.1038/s41586-022-05220-z
(This paper was featured by Nature Food with a News and Views article: EK Burchfield, 2022. Where and how to grow food. Nature Food. doi:10.1038/s43016-022-00663-z)
19. T Li†[#], **X Zhang†**, EA Davidson, Z Dou, W Zhang*, PS Pavinato, LA Martinelli, DR Kanter, J Liu, F Zhang, 2022. A Hierarchical Framework for Unpacking the Nitrogen Challenge, *Earth's Future*. doi:10.1029/2022EF002870
20. P Wolfram, P Kyle, **X Zhang**, S Gkantonas, S Smith, 2022. Potential nitrogen cycle disturbance from the use of ammonia for maritime shipping, *Nature Energy*. doi:10.1038/s41560-022-01124-4
21. S Vishwakarma[#], **X Zhang***, V Lyubchichb, 2022. Wheat trade tends to happen between countries with contrasting extreme weather stress and synchronous yield variation. *Communications Earth & Environment.* doi:10.1038/s43247-022-00591-7
22. **X Zhang,** Y Wang[#], L Schulte-uebbing, W De Vries, T Zou[#], EA Davidson, 2022. Sustainable nitrogen management index: definition, global assessment and potential improvements. *Frontiers of Agricultural Science and Engineering*. doi:10.15302/J-FASE-2022458
23. **X Zhang**, L Lassaletta, 2022. Manure management benefits climate with limits. *Nature Food*, 3(5), pp.312-313. doi:10.1038/s43016-022-00496-w
24. S Vishwakarma[#], **X Zhang***, ND Mueller, 2022. Projecting future nitrogen inputs: are we making the right assumptions? *Environmental Research Letters*, 17(5), p.054035. doi:10.1088/1748-9326/ac6619
25. I Numata, AJ Elmore, CJ Wang, J Zhao, **X Zhang**, MA Cochrane, 2022. Deforestation, plantation-related land cover dynamics and oil palm age structure change during 1990-2020 in Riau Province, Indonesia. *Environmental Research Letters*. doi:10.1088/1748-9326/ac8a61
26. A Dobermann, T Bruulsema, I Cakmak, B Gerard, K Majumdar, M McLaughlin, P Reidsma, B Vanlauwe, L Wollenberg, F Zhang, **X Zhang**, 2022. Responsible plant nutrition: A new paradigm to support food system transformation. *Global Food Security*, 33, p.100636. doi:10.1016/j.gfs.2022.100636
27. J Zhao[#], JSH Lee, AJ Elmore, YA Fatimah, I Numata, **X Zhang***, MA Cochrane, 2022. Spatial patterns and drivers of smallholder oil palm expansion within peat swamp forests of Riau, Indonesia. *Environmental Research Letters*. doi:10.1088/1748-9326/ac4dc6
(This paper was featured by Mongabay: https://news.mongabay.com/2022/08/nearness-to-roads-and-palm-oil-mills-a-key-factor-in-peatland-clearing-by-smallholders/)
28. E Sinha, KV Calvin, PG Kyle, MI Hejazi, ST Waldhoff, M Huang, S Vishwakarma, and **X Zhang**, 2022. Implication of imposing fertilizer limitations on energy, agriculture, and land systems. *Journal of environmental management*, 305, p.114391. doi:10.1016/j.jenvman.2021.114391
29. M Ollenburger[#], GP Kyle and **X Zhang**, 2022. Uncertainties in estimating global potential yields and their impacts for long-term modeling. *Food Security*. doi:10.1007/s12571-021-01228-x
30. Y Guo, P He, T Searchinger, Y Chen, M Springmann, M Zhou, **X Zhang**, L Zhang, D Mauzerall, 2022. Environmental and human health trade-offs in potential Chinese dietary Shifts. *One Earth,* 5(3): 268-282. doi:10.1016/j.oneear.2022.02.002

2021

31. **X Zhang†,** G Yao†, S Vishwakarma, C Dalin, AM Komarek, DR Kanter, KF Davis, K Pfeifer, J Zhao, T Zou, P D'Odorico, C Folberth, F Galeana, J Fanzo, L Rosa, W Dennison, M Musumba, A Heyman, EA Davidson (2021a). Quantitative assessment of agricultural sustainability reveals divergent priorities among nations, *One Earth.* doi:10.1016/j.oneear.2021.08.015
32. X Liang, SK Lam, **X Zhang**, O Oenema, D Chen, 2021. Pursuing sustainable nitrogen management following the "5 Ps" principles: Production, People, Planet, Policy and Partnerships. *Global Environmental Change*, 70, p.102346. doi:10.1016/j.gloenvcha.2021.102346

33. G Yao[#], **X Zhang***, F Taheripour, EA Davidson (2021). The increasing global environmental consequences of a weakening US–China crop trade relationship. *Nature Food*, pp.1-9. doi: 10.1038/s43016-021-00338-1
(This paper was featured by Nature Food with a News and Views article: M Li, W Zhang, 2021. Trade policies have environmental implications. Nature Food. doi:10.1038/s43016-021-00342-5)
34. **X Zhang†***, T Zou[#]†, L Lassaletta†, N Mueller, MD Lisk, C Lu, R Conant, J Gerber, H Tian, T Bruulsema, W Zhang, K Nishina, B Bodirsky, A Popp, L Bouwman, A Beusen, D Leclere, P Canadell, R Jackson, F Tubiello, EA Davidson* (2021b). Quantification of global and national nitrogen budgets for crop production, *Nature Food*. doi:10.1038/s43016-021-00318-5
35. C Ren, S Jin, Y Wu, B Zhang, D Kanter, B Wu, X Xi, **X Zhang**, D Chen, J Xu, B Gu (2021). Fertilizer overuse in Chinese smallholders due to lack of fixed inputs. *Journal of Environmental Management*. doi:10.1016/j.jenvman.2021.112913
36. Z Quan[#], **X Zhang***, Y Fang, EA Davidson (2021). Different quantification approaches for nitrogen use efficiency lead to divergent estimates with varying advantages. *Nature Food*. doi: 10.1038/s43016-021-00263-3
37. Z Quan[#], **X Zhang***, F Zhu, S Li, X Zhao, X Chen, LM Zhang, JZ He, W Wei, Y Fang (2021). Fates and use efficiency of nitrogen fertilizer in maize cropping systems and their responses to technologies and management practices: a global analysis on field ^{15}N tracer studies, *Earth's Future*. doi:10.1029/2020EF001514
38. GS Metson, A Chaudhary, **X Zhang**, B Houlton, A Oita, N Raghuram, QD Read, L Bouwman, H Tian, A Uwizeye, AJ Eagle (2021). Nitrogen and the food system. *One Earth*. Jan 22; 4(1):3-7. doi:10.1016/j.oneear.2020.12.018
39. R Chowdhury[#], **X Zhang*** (2021) Phosphorus use efficiency in the agricultural system: A comprehensive assessment through the review of national scale substance flow analyses, *Ecological Indicators*, 121, p.107172. doi:10.1016/j.ecolind.2020.107172
40. Z Quan[#], **X Zhang***, Y Fang (2021) The undefined N source might be overestimated by ^{15}N tracer trials, *Global Change Biology*. doi:10.1111/gcb.15371

2020

41. **X Zhang**, EA Davidson, T Zou[#], L Lassaletta, Z Quan[#], T Li[#], W Zhang (2020) Centennial Challenges: Quantifying nutrient budgets to inform sustainable nutrient management. *Global Biogeochemical Cycles* 34, e2018GB006060. doi:10.1029/2018GB006060
(Top 10% most downloaded article in 2021)
42. R Prudhomme, T Brunelle, P Dumas, AL Moing, **X Zhang** (2020) Assessing the impact of increased legume production in Europe on global agricultural emissions. *Regional Environmental Change* 20 (3):1-13. doi:10.1007/s10113-020-01651-4
43. GC Hurtt, LP Chini, R Sahajpal, SE Frolking, J Fisk, B Bodirsky, KV Calvin, S Fujimori, K Goldewijk, T Hasegawa, P Havlik, A Heinimann, F Humpenöder, JO Kaplan, T Krisztin, DM Lawrence, P Lawrence, O Mertz, A Popp, K Riahi, E Stehfest, D van Vuuren, L de Waal, **X Zhang** (2020) Harmonization of global land-use scenarios for the period 850-2100 (LUH2) for CMIP6, *Geoscientific Model Development*. doi:10.5194/gmd-2019-360
44. Z Quan[#], S Li, **X Zhang**, F Zhu, P Li, R Sheng, X Chen, LM Zhang, JZ He, W Wei, Y Fang (2020) Fertilizer nitrogen use efficiency and fates in maize cropping systems across China: Field 15N tracer studies. *Soil and Tillage Research* 197:104498. doi:10.1016/j.still.2019.104498
45. DR Kanter, W Winiwarter, B Bodirsky, L Bouwman, E Boyer, S Buckle, J Compton, T Dalgaard, W Vries, D Leclere, A Leip, C Müller, A Popp, N Raghuram, S Rao, M Sutton, H Tian, H Westhoek, **X Zhang**, M Zurek (2020). A framework for nitrogen futures in the shared socioeconomic pathways, *Global Environmental Change* 61:102029. doi:10.1016/j.gloenvcha.2019.102029

2019

46. T li†[#], **X Zhang†**, H Gao, B Li, H Wang, Q Yan, M Ollenburger[#], W Zhang (2019) Exploring optimal nitrogen management practices within site-specific ecological and socioeconomic

conditions. *Journal of Cleaner Production.* doi:10.1016/j.jclepro.2019.118295

47. G Huang[#], G Yao[#], J Zhao[#], MD Lisk, C Yu, **X Zhang*** (2019) The environmental and socioeconomic trade-offs of importing crops to meet domestic food demand in China. *Environmental Research Letters.* doi:10.1088/1748-9326/ab3c10
48. BZ Houlton, M Almaraz, V Aneja, AT Austin, E Bai, KG Cassman, JE Compton, EA Davidson, JW Erisman, JN Galloway, B Gu, G Yao[#], LA Martinelli, K Scow, WH Schlesinger, TP Tomich, C Wang, **X Zhang** (2019) A world of co-benefits: Solving the global nitrogen challenge. *Earth's Future*. doi:10.1029/2019EF001222
49. BN Sulman, E Shevliakova, ER Brzostek, SN Kivlin, S Malyshev, DNL Menge, **X Zhang** (2019) Diverse mycorrhizal associations enhance terrestrial C storage in a global model. *Global Biogeochemical Cycles.* doi:10.1029/2018GB005973

2018

50. W Peng, F Wagner, MV Ramana, H Zhai, MJ Small, C Dalin, **X Zhang**, DL Mauzerall (2018) Managing China's coal power plants to address multiple environmental objectives. *Nature Sustainability* 1(11): 693-701. doi:10.1038/s41893-018-0174-1

2017

51. **X Zhang** (2017) A plan for efficient use of nitrogen fertilizers. *Nature* 543:322-323. doi:10.1038/543322a

2016

52. D Kanter, **X Zhang**, DL Mauzerall, S Malyshev, E Shevliakova (2016) The importance of climate change and nitrogen use efficiency for future nitrous oxide emissions from agriculture. *Environmental Research Letters* 11. 094003. doi:10.1088/1748-9326/11/9/094003

2015

53. **X Zhang**, EA Davidson, DL Mauzerall, TD Searchinger, P Dumas, Y Shen (2015a) Managing Nitrogen for Sustainable Development. *Nature* 528(7580): 51-59. doi: 10.1038/nature15743. *(This paper was featured on the cover of Nature)*
54. **X Zhang**, DL Mauzerall, EA Davidson, DR Kanter, RH Cai (2015b) The economic and environmental consequences of implementing nitrogen-efficient technologies and management practices in agriculture. *Journal of Environmental Quality* 44(2):312-324. doi:10.2134/jeq2014.03.0129.

2014

55. DR Kanter, **X Zhang**, DL Mauzerall (2014) Reducing nitrogen pollution while decreasing farmers' costs and increasing fertilizer industry profits. *Journal of Environmental Quality* 44(2): 325-335. doi:10.2134/jeq2014.04.0173.
56. M Kang, C Kanno, M Reid, **X Zhang**, DL Mauzerall, M Celia, Y Chen, TC Onstott (2014) Direct measurements of methane emissions from abandoned oil and gas wells in Pennsylvania. *Proceeding of the National Academy of Sciences* 111(51): 18173-18177. doi:10.1073/pnas.1408315111.
57. **X Zhang**, X Lee, TJ Griffis, JM Baker, W Xiao (2014) Estimating regional greenhouse gas fluxes: An uncertainty analysis of planetary boundary layer techniques and bottom-up inventories. *Atmospheric Chemistry and Physics* 14(19): 10705-10719. doi:10.5194/acp-14-10705-2014.
58. **X Zhang**, X Lee, TJ Griffis, JM Baker, M Erickson, J Fasbinder, W Xiao, N Hu (2014) Quantifying nitrous oxide fluxes on multiple spatial scales in the Upper Midwest, USA. *International Journal of Biometeorology* 59(3): 299-310. doi:10.1007/s00484-014-0842-4.

2013

59. **X Zhang**, X Lee, TJ Griffis, JM Baker, M Erickson, W Xiao, N Hu (2013) The influence of plants on atmospheric methane in an agriculture-dominated landscape. *International Journal of*

Biometeorology 58(5): 819-833. doi:10.1007/s00484-013-0662-y.

60. TJ Griffis, X Lee, JM Baker, MP Russelle, **X Zhang**, R Venterea, DB Millet (2013) Reconciling the differences between top-down and bottom-up estimates of nitrous oxide emissions for the US Corn Belt. *Global biogeochemical cycles* 27(3): 746-754. doi:10.1002/gbc.20066.

2011

61. TJ Griffis, X Lee, JM Baker, K Billmark, N Schultz, M Erickson, **X Zhang**, J Fassbinder, W Xiao, N Hu (2011) Oxygen isotope composition of evapotranspiration and its relation to C4 photosynthetic discrimination. *Journal of Geophysical Research - Biogeosciences* 116, G01035. doi:10.1029/2010JG001514

2010

62. TJ Griffis, SD Sargent, X Lee, JM Baker, J Greene, M Erickson, **X Zhang**, K Billmark, N Schultz, W Xiao, N Hu (2010) Determining the oxygen isotope composition of evapotranspiration with eddy covariance. *Boundary-Layer Meteorology* 137(2): 307-326. doi:10.1007/s10546-010-9529-5

2006

63. **X Zhang**, X Cai (2006) Structures and Characteristics of the Atmospheric Boundary Layer over Beijing Area in Autumn, *Journal (Natural Sciences) of Peking University*, 42(2): 220-225.

2004

64. W Qu, X Xu, F Huang, **X Zhang**, T Zhang, (2004) Effect of Abnormal Temperature Variation in the Tropical Pacific on High Level Air Temperature, *Advances in Marine Science,* 22(2): 147-155.

Peer-reviewed conference paper

65. G Yao[#], **X Zhang*** (2020) The role of international trade in wheat supply resilience, An Agricultural & Applied Economics Association (AAEA) selected paper accepted for presentation at AAEA Annual Meeting, Virtual, August 10-11, 2020. Available at https://ageconsearch.umn.edu/record/304641?ln=en. doi: 10.22004/ag.econ.304641
66. G Yao[#], **X Zhang***, E Davidson, F Taheripour, W Tyner (2020) The environmental consequences of a weakening US-China crop trade relationship, An Agricultural & Applied Economics Association (AAEA) selected paper accepted for presentation at AAEA Annual Meeting, Virtual, August 10-11, 2020. Available at: https://ageconsearch.umn.edu/record/304646?ln=en. doi: 10.22004/ag.econ.304646
67. G Yao[#], **X Zhang***, S Vishwakarma[#], C Dalin, A Komarek, DR Kanter, KF Davis, K Pfeifer, J Zhao, T Zou, P D'Odorico, C Folberth, F Galeana, J Fanzo, L Rosa, W Dennison, E Davidson (2020) Measuring national socio-economic aspects of sustainable agriculture and the interactions with environmental indicators, An Agricultural & Applied Economics Association (AAEA) selected poster accepted for presentation at AAEA Annual Meeting, Virtual, August 10-11, 2020. Available at: https://ageconsearch.umn.edu/record/304643?ln=en. doi: 10.22004/ag.econ.304643
68. RH Cai, **X Zhang**, DR Kanter (2014) The impact of crop price on nitrous oxide emissions: A dynamic programming approach, An Agricultural & Applied Economics Association (AAEA) selected paper accepted for presentation at AAEA Annual Meeting, Minneapolis, MN, July 27-29, 2014. Available at: https://ageconsearch.umn.edu/record/170691?ln=en. doi:10.22004/ag.econ.170691

Book chapters

69. A Dobermann, T Bruulsema, I Cakmak, B Gerard, K Majumdar, M McLaughlin, P Reidsma, B Vanlauwe, L Wollenberg, F Zhang, **X Zhang** (2023). A new paradigm for plant nutrition. In Science and Innovations for Food Systems Transformation (pp. 361-374). Cham: Springer International Publishing.
70. X Zhang, T Zou (2023). Managing Nutrients in the Anthropocene: Integrating Social and

Ecological Perspectives. Lectures in Modern Ecology. Higher Education Press.

71. J Ranganathan, D Vennard, R Waite, B Lipinski, T Searchinger, P Dumas, A Forslund, H Guyomard, S Manceron, E Marajo-Petitzon, C Le Mouël, P Havlik, M Herrero, **X Zhang**, S Wirsenius, F Ramos, X Yan, M Phillips and R Mungkung (2016) Shifting Diets for a Sustainable Food Future, Working Paper, Installment 11 of Creating a Sustainable Food Future. Washington, DC: World Resources Institute. Accessible at http://www.worldresourcesreport.org.
72. **X Zhang,** Y Zhao, MS Ashton, X Lee (2012) Measuring carbon in forests, in *Managing Forest Carbon in a Changing Climate* (M. Ashton, M. L. Tyrrell, D Spalding, B Gentry eds), Springer, New York, 139-164.
73. JC Chan, **X Zhang** (2009) Air Pollution Status and Challenges Ahead in the Greater Pearl River Delta Region, in *Lectures on China's Environment*, Yale School of Forestry & Environmental Studies Publication Series Report Number 20.

Reports

74. L Lassaletta, G Guardia, ND Mueller, X Zhang, T Zou. Chapter 2. Nitrogen use efficiency in cropping systems. FAO. 2025. *Sustainable nitrogen management in agrifood systems*. Rome. https://doi.org/10.4060/cd3388en
75. DR Kanter and **X Zhang**, 2024. Chapter 3. Nitrous Oxide Scenarios and Abatement Measures. Global Nitrous Oxide Assessment, edited by DR Kanter and AR Ravishankara, United Nations Environment Programme and Food and Agriculture Organization. https://doi.org/10.59117/20.500.11822/46562
76. T Bruulsema, A Dobermann, I Cakmak, B Gerard, K Majumdar, M McLaughlin, P Reidsma, B Vanlauwe, **X Zhang,** 2023. Defining Nutrient Use Efficiency in Responsible Plant Nutrition. Issue Briefs by Scientific Panel on Responsible Plant Nutrition. https://www.sprpn.org/issue-briefs
77. W Winiwarter, K Hayashi, M Geupel, B Gu, X Zhang (in production). INMS Guidance Document on National Nitrogen Budgets. INMS Guidance Document Series. UK CEH, Edinburgh.
78. L Lassaletta, X Zhang, and coauthors (in production). Guidance Document on Nitrogen Use Efficiency Indicators across Multiple Scales. International Nitrogen Management System (INMS).
79. L Lassaletta, ND Mueller, X Zhang, G Guardia, T Zou (in production) Addressing nitrogen use efficiency in agrifood systems: Cropping systems. Nitrogen challenges and opportunities in agri-food systems, NSA report series, FAO.
80. T Bruulsema, A Dobermann, I Cakmak, B Gerard, K Majumdar, M McLaughlin, P Reidsma, B Vanlauwe, L Wollenberg, F Zhang, **X Zhang,** 2022. Furthering 4R Nutrient Stewardship. Issue Briefs by Scientific Panel on Responsible Plant Nutrition. https://www.sprpn.org/issue-briefs
81. FAO. 2022. Cropland nutrient budget – Global, regional and country trends, 1961–2020. FAOSTAT Analytical Brief No. 52. Rome.
82. S Attwood, A Dobermann, T Bruulsema, I Cakmak, B Gerard, K Majumdar, M McLaughlin, P Reidsma, B Vanlauwe, L Wollenberg, F Zhang, **X Zhang,** 2021. Achieving Nature-positive Plant Nutrition: Fertilizers and Biodiversity. Issue Briefs by Scientific Panel on Responsible Plant Nutrition. https://www.sprpn.org/issue-briefs
83. A Dobermann, T Bruulsema, I Cakmak, B Gerard, K Majumdar, M McLaughlin, P Reidsma, B Vanlauwe, L Wollenberg, F Zhang, **X Zhang,** 2021. A New Paradigm for Plant Nutrition. Issue Briefs by Scientific Panel on Responsible Plant Nutrition. https://www.sprpn.org/issue-briefs
84. T Zou[#], **X Zhang** (2019) Global phosphorus use in crop production: the past, present, and future. Final report. OCP Research LLC.
85. T Zou[#], **X Zhang**, EA Davidson (2020) Evaluating tradeoffs and synergies between agricultural productivity and sustainability. Final report. Food and Agriculture Organization of the United Nations.
86. **X Zhang** (2011) A Network Analysis of Clean Technology Cooperation Programs, an internship report for UN DESA.

Popular articles

1. **X Zhang** (2016) #IamAg! Meet Xin, Assistant Professor at the University of Maryland, *Farming First*. https://farmingfirst.org/2016/10/iamag-meet-xin-assistant-professor-at-the-university-of-maryland/
2. **X Zhang,** Cheryl Palm, Eric A. Davidson (2016) What can be done about badly depleted nitrogen levels in Africa's soil, *The Conversation*. https://theconversation.com/what-can-be-done-about-badly-depleted-nitrogen-levels-in-africas-soil-54611
3. **X Zhang** (2012) The future we want: special report for the Rio+20 United Nations Conference on Sustainable Development, *World Environment*. http://www.wem.org.cn/
4. S Shao, **X Zhang** (2006) Personal Experience in Alashan, *World Environment*, No.4: 48-52.
5. **X Zhang,** T Lin (2005) An Investigation into the Urban Planning and Development of Zitong, a southwest county in China, Embodied in Social Practice Reports of Peking University.
6. G He, **X Zhang** (2005) Perspective on Yuanmingyuan Project, *Life World*, No.5: 48-61.

E-learning modules

7. X Zhang (2021) The interactive learning module "Synergies and tradeoffs in food, land and water systems" developed by Agro Landscapes, a project funded by the CGIAR Research Program on Water, Land and Ecosystems. Home page: https://agrolandscapes.org/tosa-page/home/. Link to the interview https://videos.files.wordpress.com/NVu6Y5u7/38_xin_itw_edited.mp4
8. X Zhang (2022) Nutrient Use Efficiency and Other Indicators of Nutrient Management Performance. Sustainable Fertilizer Academy, an initiative of International Fertilizer Association. https://ifa-sfa.org/

Interactive web application and other products

9. K Jackson, X Zhang (2023) Sustainable Agriculture Matrix Dashboard https://research.al.umces.edu/sam/sustainable-agriculture-matrix-dashboard/ (interactive)
10. J Thornton, J Tu, K Jackson, X Zhang (2022) Global Nitrogen Database https://research.al.umces.edu/sam/global-nitrogen-database/ (interactive)

VII. Teaching and Training

A. University System of Maryland Courses Taught

Semester	Course Number	Title	Credits	Enrollment	Team Taught?
Spring 2018	MEES622	Sustainability Science: Quantitative and Systems Approach	3	4	Yes, co-teach with Dr. Eric A. Davidson
Spring 2018	MEES699	Biogeochemistry	2	3	Yes, I provided a guest lecture
Fall 2019	MEES620	Environment and Society	3	11	Yes, I provided a guest lecture and attended several discussion sessions
Fall 2019	MEES699	SPEC PRB ESTUR SCI:	2	1	No

		Tradeoffs and synergies for sustainable agriculture			
Spring 2020	MEES622	Sustainability Science: Quantitative and Systems Approach	3	8	Yes, co-teach with Dr. Eric A. Davidson
Fall 2020	MEES620	Environment and Society	3	6	Yes, I provided a guest lecture
Fall 2021	MEES620	Environment and Society	3	6	Yes, I provided a guest lecture
Spring 2021	MATH/COSC 495	Directed Consulting (iFarm project)	4	6	Yes, I advised course project development.
Spring 2022	MATH/COSC 495	Directed Consulting (iFarm project)	4	8	Yes, I advised course project development.
Spring 2023	MEES718K	Sustainable nitrogen management with a transdisciplinary approach: Co-developing science communication products with stakeholders	2	4	Yes, co-teach with Dr. Cat Davis
Spring 2025	MEES698N	Emerging Nitrogen Technology and Sustainability Challenges From Farm to Fork	3	15	Yes, co-teach with Dr. Lora Harris, Cat Davis

B. Graduate Students Supervised as Major Advisor

Name	Degree	Institution	Progress	Dissertation Title
Tan Zou	Ph.D.	UMCES	Graduated. One manuscript is accepted by *Nature. Currently works as a postdoc with a fellowship by IFA-UMCES*	Sustainable Phosphorus Management across Systems and Spatial Scales
Srishti Vishwakarma	Ph.D.	UMCES	Graduated. Currently works at Pacific Northwest National Laboratory as a postdoc	Assessing socioeconomic and ecological drivers for crop yield and agricultural sustainability
Yanyu Wang	Ph.D.	UMCES	Enrolled in Summer 2021	Nitrogen Management for sustainable Food-Energy-Water nexus in US and China
Meghna Matthews	M.A.	UMCES	Enrolled in Fall 2022	Food system and environmental justice in Baltimore
Jun Suk Byun	Ph.D.	UMCES	Enrolled in Fall 2023	Sustainable nutrient management and stakeholder engagement
Chun Dai	Ph.D.	UMCES	Enrolled in Fall 2024	Nitrogen Information Systems

C. Graduate Students Advised as Graduate Committee Member

Name	Degree	Institution	Progress	Dissertation Title
Jake Hagedorn	Ph.D.	UMCES	Graduated. Assistant professor at University of North Carolina at Asheville	Nitrous oxide, methane, and soil nitrate dynamics in a drainage water controlled agricultural field on the Eastern Shore of Maryland
Qiurui Zhu	Ph.D.	UMCES	Graduated. Postdoc researcher at USDA	Quantifying nitrous oxide and methane fluxes using the tower-based gradient method on a drainage water managed farm on the Eastern Shore of Maryland
Natalie Snider	Ph.D.	UMCES	Graduated. Associate Vice President for Environmental Defense Fund	Coastal Resilience
Yu Xin	Ph.D.	Univ. of Maryland College Park	Graduated, Postdoc research scientist at University of Maryland	Forest Change and Estate Crop Expansion in Indonesia: Biophysical and Socioeconomic Analysis
Emileigh Rosso Lucas	Ph.D.	Univ. of Maryland College Park	In progress	Solubility and transport potential of organic and inorganic P from agricultural soils (tentative)

D. Postdoctoral Researchers Supervised

Sarah Garvey In process at UMCES AL

G. Burch Fisher	In process at UMCES
Yujing Gao	In process at UMCES AL
Jillian Sturtevant	In process at UMCES
Jing Zhao	In process at UMCES AL
Guolin Yao	Return to the job market and being interviewed at economic consulting firms
Mary Ollenburger	Co-advised, in process at Pacific Northwest National Laboratory
Rubel Chowdhury	Environment Protection Officer at the Environment Protection Authority Victoria in Australia

E. Visiting Students or Scholars Advised

Zhuo Wang	Visiting Scholar from School of Teacher Education, Qingdao University
Keyu Ren	Visiting Scholar from Institute of Agricultural Resources and Regional Planning, Chinese Academy of Agricultural Sciences
Tingyu Li	Visiting Ph.D. student from Chinese Agriculture University, now Associate Research Scientist at Hainan University
Guorui Huang	Visiting Ph.D. student from Tsinghua University, now Senior Staff at China Geological Survey
Kaiyan Luo	Visiting Ph.D. student from North China Electric Power University, now postdoc at China Electric Power Planning & Engineering Institute
Xi Liu	Visiting Ph.D. student from Tianjin University, now postdoc at Shandong University, Weihai Institute for Interdisciplinary Research
Zhi Quan	Visiting Research Scientist, now Associate Research Scientist at Institute of Applied Ecology, Chinese Academy of Sciences

F. Other Students or teachers advised through the *iFarm* project funded by NSF

Xushu Wang	High school student	High School Affiliated to Renmin University of China
Meige Yang	High school student	High School Affiliated to Renmin University of China
Eashan Siddalingaiah	High school student	Poolesville High School
Carolyn Levine	High school student	Poolesville High School
Mikhail Krepets	High school student	Poolesville High School
Pascal Sossou	High school student	Poolesville High School
Janice Bailey	High school teacher	Poolesville High School

VIII. Academic and community service

A. Service to UMCES and University System of Maryland

UMCES Faculty Senate, 2022-present
Faculty Steering Committee for Chesapeake Global Collaboratory, 2023 Sep. -present
Council of University System Faculty (CUSF), 2023 Oct. -present
Promotion committee, 2024 -present
Chair of the Admission committee for Environment and Society Foundation, 2022-present
MEES Program committee, 2017-present
Committee for the Environment and Society Foundation, 2017- present
Coordinator of the UMCES AL visiting scholar lecture series, 2017 Spring
UMCES AL Faculty search committee, 2016-2017

B. Service to national and international scientific community

Peer Review

Editor, Earth's Future, 2022-present

Associate editor, Sustainable Horizons, 2021-present

Guest editor, Global Biogeochemical Cycles, Journal of Geophysical Research: Biogeosciences, Agriculture, Ecosystems & Environment

Peer-reviewer, Nature, Science, Nature Geoscience, Global Biogeochemical Cycles, Global Change Biology, Bioscience, Environmental Research Letters, Agricultural and Forest Meteorology, Journal of Cleaner Production, Environmental Reviews, Sustainability, Environmental Science & Technology, GeoHealth, Journal of Environmental Management

Report reviewer, United Nations Environment Programme Report (The Forgotten Pollutants: Nitrous Oxide and the Disruption of Climate and the Ozone Layer), International Energy Agency Report (Nitrogen Fertiliser Technology Roadmap)

Proposal reviewer or review panelist, United States National Science Foundation, United States Department of Energy, German Federal Ministry of Education and Research, São Paulo Research Foundation (FAPESP)

Peer-review panel participant, United States Department of Energy

Review materials for an online course on "Future of Food" *(2017) https://serc.carleton.edu/integrate/teaching_materials/food_supply/index.html*

Other activities

Special session on "Pursuing Sustainable Agriculture in the Context of Changing Climate" at the Sustainability Research and Innovation Congress, leading organizer, co-organized with L Nkengla, T Mabhaudhi, D Choruma, EA Davidson, P Chivenge, L Öztürk, D Avcı, L Martinelli, J Ometto, C Folberth, 2023

Special session on "Get the Grade (SAM Edition)! A Board Game for Sustainable Agriculture" at the Sustainability Research and Innovation Congress, co-organizer, worked with K Jackson, D Avci, LP Canisares, R Castro, C Folberth, TF Gomes, LMartinelli, L Öztürk, S Vishwakarma, X Zhang, W Dennison, 2023

Quantifying Nutrient Budgets for Sustainable Nutrient Management Special Session at American Geophysical Union (AGU) annual meeting, leading organizer, co-organize with Dr. Luis Lassaletta, Dr. Nathan D. Mueller, Dr. Richard T. Conant, Dr. Josep G. Canadell, Dr. Eric A. Davidson, Dr. Jill S. Baron, Dr. Kate Tully, Dr. Wilfried Winiwarter, Dr. Tan Zou, Dr. David Kanter, 2018-present

Quantifying Nutrient Budgets for Sustainable Nutrient Management Special Issue across five AGU journals (including Global Biogeochemical Cycles, Earth's Future, Journal of Geophysical Research: Biogeosciences, Geophysical Research Letters, GeoHealth), leading organizer, co-organize with Dr. Eric A. Davidson, Dr. Luis Lassaletta, Dr. Nathan D. Mueller, Dr. Richard T. Conant, Dr. Josep G. Canadell, 2018-2021

Special Issue on "Farm size and environment" at Agriculture, Ecosystems & Environment (AGEE), co-lead organizer, co-lead with Dr. Baojing Gu, Dr. Bernard Vanlauwe, and Dr. Stefan Reis, 2021-2022

Quantifying Nutrient Budgets for Sustainable Nutrient Management Special Session at the 8th Global Nitrogen conference, leading organizer, co-organize with Dr. Luis Lassaletta, 2019 Aug.-present

International Nitrogen Management System project, participant, 2018-present

The Plant Nitrogen Network National Steering Committee, 2017-present

Sustainable Agricultural Matrix workshop at SESYNC, co-lead with Dr. Eric Davidson and Dr. Kimberly Pfeifer, 2016–present

Global N_2O Budget Workshop, co-organize with Dr. Eric Davidson, Dr. Hanqin Tian, Dr. Pep Canadell, and Dr. Robert Jackson, June-Dec., 2017

C. Public Service

Adviser, International Scientific Advisory Board for Canadian Nitrous Oxide Network, Oct. 2024-present

Technical committee member, INSOILFER Working Group 1, FAO, Sep. 2024 -present

Expert panelist, working group 3 for the Earth Commission on 'Nutrients and pollution' (https://earthcommission.org/, hosted by Future Earth), Nov. 2020-2023

Expert panelist, International Fertilizer Association's Scientific Panel on Responsible Plant Nutrition, 2019-2023

Committee member, Advisory Committee for TGCC (The Greater Cumberland Committee) Forest Products ESG Certified Branding Project, Nov. 2021-Jan. 2023

Committee member, AGU Sustainability advisory group, April 2020-Oct 2020

Committee member, The Scientific Committee for the 8th Global Nitrogen conference, 2019-2021

President, Association of Chinese Students and Scholars at Yale, May 2009-May 2010

Co-organizer, Doctoral Research Conference, Yale School of Forestry and Environmental Studies, February 2008- February 2009

Chinese youth delegate, Tällberg Forum, June 2007

Chairman, Graduate Students Union, College of Environmental Sciences, Peking University, September 2005- September 2006

Beijing Moderator, Global Classroom, "Exploring the Links between International Business and Poverty Reduction," joint MIT-World Bank program, February-March 2006

Founder and Chairman, Students' International Environmental Forum (2006) Organizing committee, May 2006-June 2006

Chinese youth delegate, the fourth World Water Forum, March 2006

Lead Contributor, "World Environment," Ministry of Environmental Protection publication, September 2005-2012

IX. SELECTED SEMINARS AND CONFERENCE PRESENTATIONS

I=Invited talk; P=Poster

1. **X Zhang,** EA Davidson. *The impact of green ammonia on the environment.* American Geophysical Union (AGU) 2024 Fall Meeting, Washington DC and online, Dec. 10 2024 (I).
2. **X Zhang,** *Decarbonization in a eutrophic world,* invited keynote for the XXII International Nitrogen Workshop, Aarhus, Denmark, June 2024 (I)
3. **X Zhang,** *Decarbonization in a eutrophic world,* invited keynote for the International Nitrogen Initiative Conference, Feb 2024 (I)
4. **X Zhang,** LP Canisares, R Castro, P Chivenge, C Folberth, KE Jackson, L Nkengla, L Ozturk. *Measuring the impacts of agricultural production on sustainability.* Sustainable Agriculture Matrix (SAM) Learning Event, hosted by Oxfam, Sep. 14, 2023 (I)
5. **X Zhang**. *Guiding the pursuit of sustainable agriculture with data-driven and transdisciplinary approaches.* Efficient Nutrition Use and Green Agriculture Development Consortium, Dali, China, July 30, 2023 (I)
6. **X Zhang**. *Pursuing Sustainable Agriculture in the Context of Changing Climate*. Sustainability Research and Innovation Congress, Panama City, Panama, June, 2023 (I)
7. **X Zhang,** L Ozturk, C Folberth, P Chivenge, LA Martinelli, T Mabhaudhi, JP Ometto, KE Jackson, L Nkengla, RC Bernardini, S Vishwakarma, W Dennison, EA Davidson. *Sustainable Agriculture*

Matrix (SAM) Consortium: A Transdisciplinary and Transnational Network to Guide the Pursuit of Sustainable Agriculture. American Geophysical Union (AGU) 2022 Fall Meeting, Chicago and online, Dec. 13 2022 (I).

8. **X Zhang**, A Komarek, W Zhang, M Castellano. *Co-developing a framework and indicators for assessing the performance of biodiversity enhancing practices.* Research Seminar titled "Enhancing Biodiversity and Resilience in Intensive Farming Systems: Results from an ETH Zürich-IFPRI Collaborative study", online (Recording: https://www.ifpri.org/event/enhancing-biodiversity-and-resilience-intensive-farming-systems-results-eth-ifpri). Dec 6, 2022 (I)
9. **X Zhang***, Decarbonization in a eutrophic world: Is nutrient-efficient agriculture a magic cure?* invited seminar at Carnegie Science, Stanford campus (https://bse.carnegiescience.edu/xin-zhang-decarbonization-eutrophic-world-nutrient-efficient-agriculture-magic-cure). Nov 30, 2022 (I)
10. **X Zhang,** *Nitrogen Use Efficiencies in cropping systems,* invited keynote for the XXI International Nitrogen Workshop, October 2022 (I)
11. P Wolfram, P Kyle, **X Zhang**, S Gkantonas, S Smith. Ammonia as a maritime shipping fuel: do the benefits outweigh the risks. Potential and impacts of the uptake of novel energy carriers, organized by Corporate Partnership Board of the International Transport Forum. Online, April. 1 2022 (I)
12. **X Zhang,** Interdisciplinary and Integrative Systems Frameworks. INFEWS PI Workshop, online, Feb 9, 2022 (I)
13. **X Zhang,** *A plan for efficient use of nitrogen fertilizers.* Reducing chemical input in agriculture: Barriers & solutions, a workshop organized by Cland, a convergence institute funded by French government. Feb 3-4, 2022 (I)
14. **X Zhang,** T Zou, *Sustainable Nutrient Management across Systems and Spatial Scales in the Chesapeake Bay Watershed*, Chesapeake Bay Speaker Series organized by Maryland Department of the Environment, Jan 27, 2022 (I)
15. **X Zhang,** *Understanding and assessing discrepancies in nutrient budgets,* American Geophysical Union (AGU) 2021 Fall Meeting, New Orleans, LA and online, Dec. 13-17, 2021 (P).
16. T Zou, **X Zhang**, Eric Davidson, *Sustainable Nitrogen and Phosphorus Management across Systems and Spatial Scales in the Chesapeake Bay Watershed,* Invited talk for the American Geophysical Union (AGU) 2021 Fall Meeting, New Orleans, LA and online, Dec. 13-17 2021 (I).
17. T Zou, **X Zhang**, Eric Davidson *Improving Phosphorus Use Efficiency in Cropland to Address Phosphorus Challenges by 2050,* American Geophysical Union (AGU) 2021 Fall Meeting, New Orleans, LA and online, Dec. 13-17 2021 (P).
18. **X Zhang,** *Sustainable Agriculture Matrix: An Overview.* Learning Event hosted by Oxfam America, online, Oct. 13 2021 (I)
19. **X Zhang,** *Nutrient Use Efficiencies on and Beyond Crop Farms,* Soil Fertility and Plant Nutrition Symposium 2021, South Africa and online, Sep. 15 2021 (I)
20. **X Zhang,** *Global nutrient cycles in relation to food.* Science Days for the United Nations Food Systems Summit, Virtual event "A new paradigm for plant nutrition", online, July 7 2021 (I)
21. **X Zhang,** invited keynote for the 8th Global Nitrogen Conference, Berlin, Germany, June 2021 (I)
22. **X Zhang,** Tan Zou, Eric A. Davidson. *Evaluating Tradeoffs and Synergies Between Agricultural Productivity and Sustainability*, Policy roundtable on "Synergies and Tradeoffs in Sustainable Agriculture" organized by Food and Agriculture Organization of the United Nations (FAO) DC office, online (Meeting Recording: https://bit.ly/2SXcE52), May 2020 (I)
23. **X Zhang,** *Current state of nitrogen around the world,* invited keynote for the "curtain-raiser" event to the 8th Global Nitrogen Conference, online (Meeting Recording: https://www.youtube.com/watch?v=OEuDfa8sxY8&feature=youtu.be), May 2020 (I)
24. **X Zhang,** *Nitrogen Use Efficiency Trends and the Sustainability of Agricultural Production,* International Fertilizer Association (IFA) Global Stewardship Conference, New York, Feb. 2020 (I)

25. **X Zhang**, Eric A. Davidson, Guolin Yao, et al. *A Sustainable Agricultural Matrix (SAM) for Protecting Earth's Climate*, American Geophysical Union Fall Meeting, San Francesco, Dec. 2019 (I)
26. **X Zhang**, et al., *Discrepancies in Nitrogen Budgets and Nitrogen Use Efficiencies for crop production*, International Nitrogen Management System workshop, Madrid, Spain, Nov. 2019 (I)
27. **X Zhang,** *Nitrogen Use Efficiency: definition, global trends, and their key drivers*. International Fertilizer Association (IFA) Webinar Nitrogen Use Efficiency for Climate Change Adaptation & Mitigation, Nov. 2019 (https://www.youtube.com/watch?v=fsKd8PH9myQ&feature=youtu.be)
28. **X Zhang,** EA Davidson, G Yao, J Zhao, S Vishwakarma, T Zou: *A National Scale Sustainable Agriculture Matrix of Indicators to Inform Policy*, International Conference on Sustainable Development, New York, NY, Sep. 2019 (I; won the ***Best Paper Award***).
29. **X Zhang**, Eric A. Davidson, Guolin Yao, et al. *Sustainable Agricultural Matrix (SAM).* Roundtable on Measuring Progress Towards Sustainable Agriculture. Organized by Food and Agriculture Organization of the United Nations (FAO) DC office, Washington D.C., June 2019 (I) http://www.fao.org/north-america/news/detail/en/c/1199670/
30. **X Zhang**, *Managing Nutrient in the Anthropocene: Integrating Ecological and Social Perspectives,* the 10th International Symposium on Modern Ecology, Hebei, China, May 2019 (I)
31. **X Zhang**, Eric A. Davidson, *Improving Nitrogen and Water Management in Crop Production on a National Scale,* American Geophysical Union Fall Meeting, Washington D.C., Dec. 2018 (I)
32. **X Zhang**, Luis Lassaletta, Nathan Mueller, Tan Zou, Matthew D. Lisk , Crystal Lu, Rich Conant, James Gerber, Hanqin Tian, Tom Bruulsema, Weifeng Zhang, Kazuya Nishina, Benjamin Bodirsky, Alexander Popp, Lex Bouwman, Pep Canadell, Rob Jackson, Eric A. Davidson, *Tracking fast-evolving Nitrogen budgets in crop production on a national scale*, American Geophysical Union Fall Meeting, Washington D.C., Dec. 2018 (P)
33. **X Zhang**, *Nitrogen Use Efficiency Indicators at Country Level*, European Union Nitrogen Expert Panel, Rothamsted Research, Harpenden, UK, May 23, 2018 (I)
34. EA Davidson, **X Zhang**, J Zhao, T Zou, MD Lisk, *Developing a Sustainable Agriculture Matrix on National Scales*, Japan Geoscience Union Meeting, Japan, May 20, 2018 (I)
35. **X Zhang,** *Assessing agricultural intensification strategies with a Sustainable Agriculture Matrix,* 255th America Chemistry Society National Meeting, New Orleans, LA, Mar. 18, 2018 (I, Best presentation)
36. **X Zhang,** *Nitrogen Use Efficiency: Historical Trends and Future Targets*, International Nitrogen Management System Workshop, New York, NY, Jan. 16, 2018 (I)
37. **X Zhang,** *Global and regional Nitrogen budget data intercomparison*, AGU Global N_2O Budget Side Event, New Orleans, LA, Dec. 13, 2017 (I)
38. **X Zhang**, EA Davidson, G Huang, T Zou, MD Lisk, 2017. Assessing Agricultural Intensification Strategies with a Sustainable Agriculture Matrix, American Geophysical Union Fall Meeting, New Orleans, LA, Dec., 2017 (P)
39. **X Zhang**, EA Davidson, T Zou, J Zhao, MD Lisk, 2017. How a national scale Sustainable Agriculture Matrix can inform policy? American Geophysical Union Fall Meeting, New Orleans, LA, Dec., 2017 (P)
40. **X Zhang**, *Sustainable Agriculture and Nitrogen Management: A Global Perspective*, Healthy Soils Consortium, Maryland Department of Agriculture, Annapolis, MD, Nov. 27, 2017 (I)
41. E Davidson and **X Zhang**, *Manure Happens: The Consequences of Feeding Seven Billion Human Omnivores*, plenary talk for the 9th US Symposium on Harmful Algae, Baltimore, MD, USA, Nov. 11, 2017 (I)
42. **X Zhang,** *Assessing agricultural intensification strategies with a Sustainable Agriculture Matrix,*

keynote talk for International Conference of Nitrogen Cycling and Its Environmental Impacts in East Asia (NCEIEA), Nanjing, China, Oct. 20, 2017 (I)

43. **X Zhang**, *Sustainable Nutrient Management in Agricultural Production: Integrating Social and Ecological Perspectives*, The Henry Samueli School of Engineering, University of California, Irvine, CA Sep. 29th, 2017 (I)
44. **X Zhang**, *Sustainable Agriculture Matrix*, SESYNC workshop, Annapolis, MD, Aug. 28th, 2017 (I)
45. **X Zhang**, R Chowdhury, The historical trends of Phosphorus use in the crop production, OCP Symposium, Morocco, May 2017 (I)
46. **X Zhang**, *National NUE trends and socioeconomic drivers*, Nitrogen: At the Nexus Between Food Security and Sustainability, A Virtual Symposium, Mar. 9, 2017 (I)
47. **X Zhang**, *The Nitrogen Use Efficiency Paradox: searching for win-win outcomes for farmers and the environment*, The Delmarva Conservation Partnership Winter Partner Meeting, Chesapeake College, MD, Jan. 18, 2017 (I)
48. **X Zhang**, *Nitrogen use efficiency trends in different parts of the world*, The 84th International Fertilizer Industry Association Annual Conference, Moscow, Russia, May. 30, 2016 (I)
49. **X Zhang**, et al., *Managing Nitrogen Managing Nitrogen for Sustainable Intensification of Crop Production*, The Second International Conference on Global Food Security, Ithaca, NY, USA, Oct. 13, 2015 (I)
50. **X Zhang**, *Nitrogen Use Efficiency*, Keynote speech for the Annual meeting for EU projects PANDA and MacroPolo, Hamburg, Germany, Jan. 26, 2015 (I)
51. **X Zhang,** et al., *Managing Nitrogen in the anthropocene: integrating social and ecological science*, American Geophysical Union Fall Meeting, San Francisco, CA, USA, Dec. 18, 2014 (I)
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