

Xin Zhang

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OVERVIEW

Specialist in agricultural policies for nutrient management and greenhouse gases mitigation. Knowledgeable about sustainable development science and policy. Outstanding analytical and organizational skills. Excellent communicator.

I. EDUCATION

- Ph.D., Yale School of Forestry and Environmental Studies, May 2013
Thesis: Improving Regional-scale Greenhouse Gas Inventories in an Agriculture-dominated Landscape Using a Multi-scale Approach
- M.A. in Environmental Sciences, Peking University (PKU), July 2007;
Thesis: A Footprint Analysis of Atmospheric Pollution in Pearl River Delta District
- B.A. in Environmental Sciences, minor in Computer Science, Ocean University of China (OUC), July 2004
Thesis: The Application of MM5 model in Forecasting Air Pollution

II. PROFESSIONAL EXPERIENCE

University of Maryland Center for Environmental Science 2016-present

- *Assistant Professor*, Appalachian Laboratory, January 2016- present

Princeton University 2012-2015

- *Postdoctoral Research Associate*, Princeton Environmental Institute, November 2014-December 2015
- *Postdoctoral Research Associate*, Woodrow Wilson School of Public and International Affairs, November 2012- 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 and Tsinghua universities and Chinese mayors, February 2010-June 2012
- *Student Assistant*, Yale-Chinese Women's Leadership Development Program, Office of International Affairs, May 2011

Ministry of Environmental Protection of China (MEP) 2005-2006

- *Assistant to Deputy Director*, Center for Environmental Education & Communication (CEEC), February 2005- February 2006

III. RESEARCH

A. Publications

1. Peer-reviewed publications

- X Zhang** (2017) A plan for efficient use of nitrogen fertilizers, *Nature*, 543:322-323.
- Rubel B Chowdhury and **X Zhang*** (accepted) Phosphorus use efficiency in agriculture: Concepts, quantitative and comparative assessment at the national scale, *Procedia Engineering*.
- 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*.
- J Ranganathan, D Vennard, R Waite, B Lipinski, T Searchinger, P Dumas, A Forslund, H Guyomard, S Manceron, E Marajo-Petizon, 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>.
- X Zhang**, EA Davidson, DL Mauzerall, TD Searchinger, P Dumas, Y Shen (2015) Managing Nitrogen for Sustainable Development, *Nature*, 528(7580): 51-59. doi: 10.1038/nature15743.
- X Zhang**, DL Mauzerall, EA Davidson, DR Kanter, RH Cai (2015) 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.

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.

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.

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.

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.

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.

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.

In review

W Peng, F Wagner, DL Mauzerall, MV Ramana, H Zhai, M Small, C Dalin, **X Zhang**, Air pollutant and water implications of power sector decarbonization: Effects of strengthening environmental policies, in review at *Nature Sustainability*

BN Sulman, E Shevliakova, ER Brzostek, SN Kivlin, S Malyshev, DNL Menge, **Xin Zhang**, Diversity in nitrogen acquisition strategies enables enhanced terrestrial carbon storage, in review at *Nature Geoscience*

T li†, **X Zhang**†, H Gao, B Li, H Wang, Q Yan, W Zhang, Searching for optimal nitrogen management practices according to ecological and socioeconomic conditions, in review at *Environmental Research Letter*

* Corresponding author; † These authors contributed equally to this work

2. Other publications

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/>

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>

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/>

X Zhang (2011) A Network Analysis of Clean Technology Cooperation Programs, an internship report for UN DESA.

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.

S Shao, **X Zhang** (2006) Personal Experience in Alashan, *World Environment*, No.4: 48-52.

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.

G He, **X Zhang** (2005) Perspective on Yuanmingyuan Project, *Life World*, No.5: 48-61.

B. Contracts and Grants

1. Awarded

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, Kimberly Pfeifer

National Science Foundation, 2017-2021 (\$1,252,467) “INFEWS/T2: Sustainable Agriculture in the nexus of food, energy, water, and nutrient on national and global scales”, PI: Xin Zhang

OCP Research, LLC, 2016-2018 (\$193,275) “Managing Phosphorus for Sustainable Development” PI: Xin Zhang

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

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

Yale Center for Environmental Law & Policy, 2012-2013 (\$7,500) "Using the Global Observation Network to Improve National Greenhouse Gas Inventories" PI: Xin Zhang

Yale Center for Field Ecology Pilot Grants, 2008 (\$2,000) “Characterizing greenhouse gases emissions from corn and soybean plants” PI: Xin Zhang

2. Pending or Rejected

National Aeronautics and Space Administration, 2017-2019 (\$1,349,254) “Cascading impacts of earlier spring through a linked terrestrial-estuarine ecosystem”, PI: Andrew Elmore; CoPI: Xin Zhang, Keith Eshleman, Jeremy Testa, rejected

National Science Foundation, 2017-2020 (\$329,997) “EPRI-WERE-WRF: Improving technological integration for clean water, air and energy with techno-economic analysis”, PI: Feng Chen; CoI: Xin Zhang, rejected

National Science Foundation, 2017-2020 (\$299,985) “MSB-ECA: Mycorrhizae across scales from forest stands to continental carbon and nitrogen cycling” PI: Xin Zhang; CoI: Eric Davidson, Zewei Song, Matthew Fitzpatrick, rejected

National Science Foundation, 2017-2021 (\$286,504) “INFEWS/T3: Innovative Diagnostics for Improved Utilization of Water and Energy for Food Production: Integrating Biophysical and Social Factors”, PI: Masoud Negahban-Azar; CoI: Xin Zhang, rejected

C. Seminars and conference presentations (I=Invited talk; P=Poster)

- **Xin Zhang**, *Nitrogen Use Efficiency: Historical Trends and Future Targets*, International Nitrogen

- Management System Workshop, New York, NY, Jan. 16, 2018 (I)
- **Xin Zhang**, *Global and regional Nitrogen budget data intercomparison*, AGU Global N2O Budget Side Event, New Orleans, LA, Dec. 13, 2017 (I)
- **X Zhang**, *Sustainable Agriculture and Nitrogen Management: A Global Perspective*, Healthy Soils Consortium, Maryland Department of Agriculture, Annapolis, MD, Nov. 27, 2017 (I)
- 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)
- **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)
- **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)
- **X Zhang**, *Sustainable Agriculture Matrix*, SESYNC workshop, Annapolis, MD, Aug. 28th, 2017 (I)
- **X Zhang**, R Chowdhury, *The historical trends of Phosphorus use in the crop production*, OCP Symposium, Morocco, May 2017 (I)
- **X Zhang**, *National NUE trends and socioeconomic drivers*, Nitrogen: At the Nexus Between Food Security and Sustainability, A Virtual Symposium, Mar. 9, 2017 (I)
- **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)
- **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)
- **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)
- **X Zhang**, *Nitrogen Use Efficiency*, Keynote speech for the Annual meeting for EU projects PANDA and MacroPolo, Hamburg, Germany, Jan. 26, 2015 (I)
- **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)
- **X Zhang**, et al., *Evaluating uncertainties in nitrous oxide emission inventories with multi-scale observations for an agriculture-dominated region*, American Geophysical Union Fall Meeting, San Francisco, CA, USA, Dec. 15, 2014 (I)
- **X Zhang**, *Managing nitrogen in crop production: the efficiency paradox*, Princeton Studies Food Conference, Princeton, NJ, USA, Sep. 26, 2014 (I)
- M Kang, **X Zhang**, M Reid, C Kanno, M Celia, D Mauzerall, K Sun, D Miller, M Zondlo, Y Chen, T Onstott, *Significant methane emissions from abandoned oil and gas wells in Northwest Pennsylvania*, American Geophysical Union Fall Meeting, San Francisco, CA, USA, Dec. 17, 2013 (I)
- **X Zhang**, D Mauzerall, *Impediments in improving nitrogen use efficiency in crop production – an economic perspective*, the 6th International Nitrogen Conference, Kampala, Uganda, Nov. 18, 2013 (I)
- **X Zhang**, D Mauzerall, R Cai, *The impact of improving nitrogen use efficiency on nitrous oxide emissions from cropland*, The Soil Science Society of America (SSSA) Nitrogen Use Efficiency Conference, Kansas City, MO, USA, Aug. 13, 2013 (P)

- **X Zhang**, et al., *Estimating the Greenhouse Gas Budgets of an Agriculture-Dominated Landscape*, American Meteorological Society 30th Conference on Agricultural and Forest Meteorology and first conference on atmospheric Biogeosciences, Boston, MA, USA, May 30, 2012 (I)
- **X Zhang**, et al., *Top-down Constraints on the Landscape-scale Nitrous Oxide Budget in the Upper Midwest*, American Geophysical Union Fall Meeting, San Francisco, CA, USA, Dec. 17, 2010 (P)
- **X Zhang**, *The Future Change-makers: Opportunities for Youth*, Beijing Forum 2010, Beijing, China, Nov. 6 (I)
- **X Zhang**, et al., *Evaluating Land Surface Flux of Methane and Nitrous Oxide in an Agricultural Landscape with Tall Tower Measurements and a Trajectory Model*, American Meteorological Society 29th Conference on Agricultural and Forest Meteorology, Keystone, CO, USA, Aug. 4, 2010 (I)
- **X Zhang**, et al., *Characterizing CO₂, CH₄, and N₂O Fluxes in a Landscape Dominated by Soybean and Corn*, American Geophysical Union Fall Meeting, San Francisco, CA, USA, Dec. 17, 2009 (P)
- **X Zhang** et al., *Spatio-temporal Variation of Air Pollutants and Footprint Analysis of Regional Accumulation Effect over PRD Area*, The 12th International Joint Seminar on Regional Deposition Processes in the Atmosphere, Beijing, China, Nov. 14, 2006 (P)
- **X Zhang**, et al., *Business Plan of “Blue Spire” Environmental Management Consulting Ltd.*, 12th International Environmental Forum on Leapfrogging Development in China, Beijing, China, May, 2006 (I)
- **X Zhang**, *Water --the basic of poverty reduction and sustainable development*, The 4th World Water Forum, Mexico City, Mexico, Mar. 20, 2006 (I)
- **X Zhang**, *Poverty reduction requires systematic change*, Global Classroom, MIT-World Bank joint program, Beijing and Boston, Mar. 8, 2006 (I)
- **X Zhang**, *Public participation in Green Olympics*, Green Olympics Forum, Beijing, China, Dec. 8, 2005(I)

IV. Teaching and Training

A. Advising and Mentoring

1. Graduate committee member for

Tan Zou (PhD, in progress at UMCES AL)
Yixin Guo (PhD, in progress at Princeton University)
Jake Hagedorn (PhD, in progress at UMCES AL)
Qiurui Zhu (PhD, in progress at UMCES AL)
Tingyu Li (PhD, in progress at Chinese Agriculture University)

2. Postdoctoral mentor for

Jing Zhao (in process at UMCES AL)
Rubel Biswas Chowdhury

V. Academic and community service

A. Peer Review

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, UNEP Report (The Forgotten Pollutants: Nitrous Oxide and the Disruption of Climate and the Ozone Layer)

Proposal reviewer, United States National Science Foundation, United States Department of Energy, German Federal Ministry of Education and Research

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

B. Service to UMCES

UMCES AL visiting scholar lecture series, 2017 Spring
UMCES AL Faculty search committee, 2016-2017

C. Service to other Academic institution

The Plant Nitrogen Network National Steering Committee, 2017-present
Sustainable Agricultural Matrix workshop at SESYNC, co-lead with Dr. Eric Davidson May, 2017-present
Global N2O Budget Workshop, co-organize with Dr. Eric Davidson, Dr. Hanqin Tian, Dr. Pep Canadell, and Dr. Robert Jackson, June-Dec., 2017

D. Public Service

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, PKU, 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,” MEP publication, September 2005-present