

## Curriculum Vitae

### Ning Zeng

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### Professional Preparation

- Postdoctoral research, Atmospheric Sciences and IGPP, UCLA, 1995-1996
- Ph. D. Atmospheric Sciences, University of Arizona, December 1994
- M. S. Physics/Astronomy, University of Arizona, May 1991 (US-China CUSPEA program)
- B. S. Physics, University of Science and Technology of China, July 1987

### Appointments

- Professor, University of Maryland, College Park. 2001-present
- Adjunct Professor, Institute of Atmospheric Physics, Beijing, 2016-2017
- Alexander Von Humboldt fellow, Max-Planck Institute for Meteorology, Germany. 2000
- Scientist (IPA), NASA Goddard Space Flight Center. 1999
- Assistant Research Scientist, Institute of Geophysics and Planetary Physics (IGPP), UCLA. 1997-2000
- Visiting postdoctoral scientist, Massachusetts Institute of Technology. 1995

**Publication:** 121 (Publons.com, as of 12/2021). Citation: 14463 (Clarivate Highly Cited Researcher). H-index: 51  
Six papers in Science (three first author) and three papers in Nature (one first author)

### Selected publications (Annotated, with clickable URL link to paper)

1. **Zeng, N.**, H. Hausmann\*, 2022: Wood Vault: Remove atmospheric CO<sub>2</sub> with trees and store wood as biomass, bioenergy and carbon for the future. Carbon Balance and Management. Accepted. ([Practical implementation of Wood Harvesting and Storage \(WHS\) CDR method; how to reach giga-tonne scale](#))
2. **Zeng, N.** and 12 co-authors, 2022: Global to local impacts on atmospheric CO<sub>2</sub> from the COVID-19 lockdown, biosphere and weather variabilities. Environmental Research Letters, 17 015003. ([Our current carbon monitoring systems are at the border of being able to detect COVID-like emissions reduction, on multiple scales](#))
3. **Zeng, N.**, Kejun Jiang, Pengfei Han, Zeke Hausfather, Junji Cao, Daniel Kirk-Davidoff, Shaukat Ali, Sheng Zhou. 2022. Carbon Neutral: The Chinese Challenge. Adv. Atmos. Sci. ([China's Carbon Neutral Goal will be a profound Yin to Yang reversal that pushes physical resource limitations](#)).
4. Liu\*, Z., **Zeng, N.**, Liu, Y., Kalnay, E., Asrar, G., Wu, B., Cai, Q., Liu, D., and Han, P.: Improving the joint estimation of CO<sub>2</sub> and surface carbon fluxes using a Constrained Ensemble Kalman Filter in COLA (v1.0), Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2021-375>, in review, 2021. (\*: **Grad student**) ([A new carbon data assimilation system is finally working, after more than 10 years of development by several people from multiple institutions](#))
5. Liu, D., Sun, W., **Zeng, N.**, Han, P., Yao, B., Liu, Z., Wang, P., Zheng, K., Mei, H., and Cai, Q.: Observed decreases in on-road CO<sub>2</sub> concentrations in Beijing during COVID-19 restrictions, Atmos. Chem. Phys., 21, 4599-4614, [doi.org/10.5194/acp-21-4599-2021](https://doi.org/10.5194/acp-21-4599-2021), 2021. ([Dramatic decrease in on-road CO<sub>2</sub> in Beijing due to COVID-19 lockdown: not surprising but shows the power of the low-cost sensors](#))
6. Li, Yan & Kalnay, Eugenia & Motesharrei, Safa & Rivas, Jorge & Kucharski, Fred & Kirk-Davidoff, Daniel & Bach, Eviatar & **Zeng, Ning**. (2018). Climate model shows large-scale wind and solar farms in the Sahara increase rain and vegetation. Science. 361. 1019-1022. [doi.org/10.1126/science.aar5629](https://doi.org/10.1126/science.aar5629). ([Renewable](#)

[energy can have direct co-benefits on climate where wind/solar farms are placed, as shown by our intermediate-complexity Earth system model\)](#)

7. Martin\*, C. R., **Zeng, N.**, Karion, A., Dickerson, R. R., Ren, X., Turpie, B. N., and Weber, K. J.: Evaluation and environmental correction of ambient CO<sub>2</sub> measurements from a low-cost NDIR sensor, *Atmospheric Measurement Techniques*, 10, 2383, 2017. ([Developing new generation of smart low-cost CO<sub>2</sub> sensors](#))
8. **Zeng, N.**, F. Zhao\*, G. J. Collatz, E. Kalnay, R. J. Salawitch, T. O. West, L. Guanter, 2014: Agricultural Green Revolution as a driver of increasing atmospheric CO<sub>2</sub> seasonal amplitude. *Nature* 515, 394–397, doi.org/10.1038/nature13893. ([The Agricultural Green Revolution’s signature in CO<sub>2</sub> record](#))
9. **Zeng, N.**, J. Yoon, A. Vinzileos, G. J. Collatz, E. Kalnay, A. Mariotti, A. Kumar, A. Busalacchi, S. Lord, 2008: Dynamical Prediction of Terrestrial Ecosystems and the Global Carbon Cycle: a 25-year Hindcast Experiment. *Global Biogeochem. Cycles*, 22, GB4015, doi.org/10.1029/2008GB003183. ([Using skill in seasonal-interannual climate prediction for ecosystem and carbon cycle forecasting](#))
10. Ahn, D., J. R. Hansford, Shaun Howe\*, X. R. Ren, R. J. Salawitch, **N. Zeng**, M. D. Cohen, B. Stunder, O. E. Salmon, and P. B. Shepson, K. R. Gurney, T. Oda, A. Karion, I. Lopez-Coto, J. Whetstone, R. R. Dickerson. Fluxes of Atmospheric Greenhouse-Gases in Maryland (FLAGG-MD): Emissions of Carbon Dioxide in the Baltimore-Washington area. *JGR-Atmospheres*. doi.org/10.1029/2019JD032004 ([Monitoring city-scale Greenhouse Gas emissions](#))
11. Huntzinger, DN et al., including **N. Zeng**, 2017: Uncertainty in the response of terrestrial carbon sink to environmental drivers undermines carbon-climate feedback predictions. *Scientific Reports*, doi.org/10.1038/s41598-017-03818-2. ([North American Carbon Program MsTMIP land carbon models](#))
12. Le Quéré, C., Moriarty, R., Andrew, R. M., Peters, G. P., Ciais, P., Friedlingstein, P., Jones, S. D., Sitch, S., Tans, P., ..., and **Zeng, N.**: Global carbon budget 2014, *Earth Syst. Sci. Data*, 7, 47-85, doi.org/10.5194/essd-7-47-2015, 2015. ([The Global Carbon Project annual carbon budget analysis](#))
13. **Zeng, N.**, Carbon sequestration via wood burial. *Carbon balance and manag.* doi.org/10.1186/1750-0680-3-1. 2008. ([A carbon dioxide removal \(CDR\) method now being implemented commercially](#))
14. **Zeng, N.**, A.W. King, B. Zaitchik, S.D. Wullschleger, J. Gregg\*, S. Wang, D. Kirk-Davidoff., Carbon sequestration via wood harvest and storage: An assessment of its harvest potential. *Climatic Change*, 2013. doi.org/10.1007/s10584-012-0624-0. ([A community effort looking at a key constraint of WHS: sustainable wood source](#))
15. **Zeng, N.**, Y. Ding, J. Pan, H. Wang, and J. Gregg\*: SUSTAINABLE DEVELOPMENT: Climate Change--the Chinese Challenge. *Science* 2008. doi.org/10.1126/science.1153368. ([together with an internal report, first proposed “Peak Carbon” for China that is now part of the ‘Dual Carbon’ national climate policy](#))
16. **Zeng, N.**, 2003: Glacial-Interglacial Atmospheric CO<sub>2</sub> Changes--The Glacial Burial Hypothesis. *Adv. Atmos. Sci.*, doi.org/10.1007/BF02915395. ([A novel theory on the Pleistocene glacial CO<sub>2</sub>-climate mystery, not yet widely accepted](#))
17. **Zeng, N.**, J. D. Neelin, and C. Chou, 2000: The first quasi-equilibrium tropical circulation model-implementation and simulation. *J. Atmos. Sci.*, 57, 1767—1796. ([An intermediate-complexity atmospheric model that formed the dynamical core of the later UMD Earth System Model](#))
18. **Zeng, N.**, J. D. Neelin, 2000: The role of vegetation-climate interaction and interannual variability in shaping the African Savanna. *J. Climate*, 13, 2665-2670. ([Nonlinearity and variability are important in vegetation-climate interaction](#))
19. **Zeng, N.**, and J. D. Neelin, 1999: A land-atmosphere interaction theory for the tropical deforestation problem. *J. Climate*, 12, 857-872. ([A series of theoretical work on vegetation-land-atmosphere interaction](#))
20. **Zeng, N.**, J. D. Neelin, K.-M. Lau, and C. J. Tucker, 1999: Enhancement of interdecadal climate variability in the Sahel by vegetation interaction. *Science*, doi.org/10.1126/science.286.5444.1537. ([Arguably the first climate modeling exercise to show that vegetation-climate feedback mechanism can significantly modify regional climate and ecosystem](#), offering a full explanation of the multi-decadal Sahel Drought

which prompted the United Nations Convention to Combat Desertification)

### **Synergistic Activities**

- Conference Chair, The 9<sup>th</sup> International Carbon Dioxide Conference (ICDC9), 2013
- Contributing author to IPCC reports 2001, 2007, 2013.
- Founding Co-chief editor 'Earth System Dynamics' of EGU; Lead convener for AGU Meeting sessions 2000, 2002, 2008, 2010, 2018 and WPGM meeting 2006, EGU 2008, 2009, 2012;
- Member, US-CLIVAR PPAI panel, USGCRP Carbon Cycle Science Working Group (CCSWG); Member, European CO<sub>2</sub> Human Emissions (CHE) and COCO<sub>2</sub> project External Expert Group.
- Two US patents, on carbon monitoring and carbon dioxide removal technology
- On the Reuters Hot List of Top Climate Scientists; [Media/K12/public outreach](#).

### **List of collaborators within the last 48 months**

E. Kalnay, R. Dickerson, R. Salawitch (U Maryland); A. Karion, J. Whetstone (NIST); G. J. Collatz, T. Oda (NASA Goddard Space Flight Center); G. Asrar, T. O. West (JGCRI/PNNL); A. Alessandri (ENEA/Italy), F. Kucharski (ICTP); Z. Chen (U East Anglia, UK), Y. Liu (Texas A&M); J. Wang (Nanjing University), J. Cao, P. Han, Z. Liu (Chinese Academy of Sciences); K. Jiang (Energy Research Institute, NDRC, Beijing); S. Zhou (Tsinghua University); S. Maksyutov (NIES, Japan), S. Ali (Pakistan Ministry of Climate Change); D. Kirk-Davidoff (UL Inc.), Z. Hausfather (Breakthrough Institute)

Collaboration in a broad sense with the North American Carbon Program MsTMIP model intercomparison participants (Huntzinger et al., 2012/2017), the Global Carbon Project (Le Quere et al. 2009-), the international TRENDY project (Sitch et al., 2015), the US CLIVAR drought group (Schubert et al., 2009), and the EMICAR5 project (Zickfeld et al., 2013), the NIST Greenhouse Gas Measurement Program (Ahn et al., 2019).

**Ph.D. thesis advisor:** R. E. Dickinson (Now emeritus at UCLA)

**Postdoctoral advisor:** J. D. Neelin (UCLA)

**Graduate students advised:** H. Qian, E. Munoz, A. Alessandri, S. Liu, B. Wauer, B. Cook, J. Gregg, J.-S. Kang, R. Chen, B. Johnston, F. Zhao, Y. Pan, J. Wang, R. Esmaili, C. Martin, S. Howe, H. Hausmann

**Postdoctoral scientists advised:** J. Yoon, R. Joseph, M. Su, B. Jia, Z. Chen, Y. Liu