YANG SONG

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EDUCATION

[1] 2009 – 2015: Ph.D. in Department of Atmospheric Sciences, University of Illinois at Urbana-Champaign, USA (UIUC)

[2] 2006 – 2009: M.S in Ecology, Institute of Botany, the Chinese Academy of Sciences (IBCAS)

[3] 2002– 2006: B.Eng. in Environmental Engineering. University of Science and Technology in Beijing, China (USTB)

RESEARCH INTERESTS

[1] The interactions of terrestrial biosphere processes, in terms of water and energy balance and Carbon, Nitrogen and Phosphorus cycle, with climate change
[2] Using genomic information to improve the representation of biogeochemical Carbon, Nitrogen and Phosphorus cycles in the earth system models
[3] Implementing experiment-informed new schemes in the earth system models to improve parameterization of vegetation dynamics and its interaction with water and energy balances and soil Carbon, Nitrogen and Phosphorus dynamics.
[4] The impact of climate change and extreme weather facts on food/bioenergy production and agricultural management practices
[5] The impact of land cover and land use change (LCLUC), especially for expanded food crops production and bioenergy industry, on water balance, greenhouse gas emission, as well as regional and global climate
[6] Development of agriculture big data and decision support tools (DST)

PROFESSIONAL EXPERIENCE

[1] ***Postdoctoral Research Associate*** (May 2016-Now), Climate Change Science Institute, Environmental Sciences Division, Oak Ridge National Lab, Oak Ridge, TN

Integrating genomic information into microbial-enzyme-mediated biogeochemical model and developing a new model scheme to predict climate feedbacks from microbial function in tropical ecosystems

Improving representation of biogeochemical Carbon and Phosphorus cycles in the earth system model

Mainly participating in the following projects:

(i) **ORNL LDRD project:** Predicting climate feedbacks from microbial function in tropical ecosystems

(ii) **DOE Early Career Research project**: A comprehensive framework for modeling emissions from tropical soils and wetlands

[2] ***Postdoctoral Research Associate*** (August 2015-March 2016), Department of Atmospheric Sciences, University of Illinois at Urbana-Champaign, Urbana, IL

Extended the earth system model, Integrated Science Assessment Model (ISAM), to simulate corn and soybean growth process at the global scale

Applied two earth system models, the extended ISAM and the Community Land Model (CLM) to project future global crop productivity under climate change and corresponding adaptation strategies, in term of change in sowing date, rotation, irrigation and fertilization practices.

Participated projects including:

(i) **AgMIP project:** Agricultural Model Intercomparison and Improvement Project

(ii) **NSF EaSM2 project:** Linking Human and Earth System Models to Assess Regional Impacts and Adaption in Urbana Systems and Their Hinterlands

[3] ***Graduate Research Assistant*** *(August 2009 – July 2015)*, Department of Atmospheric Sciences, University of Illinois at Urbana- Champaign, Urbana, IL

Developed dynamic growth scheme for food crops (corn and soybean) and bioenergy crops (Miscanthus and switchgrasses) and implemented it in the earth system model, Integrated Science Assessment Model (ISAM).

Improved the hydrological cycle modeling in ISAM by (a) parameterizing the effect of root growth on soil structure and soil hydraulic characteristics and (b) implementing spatial heterogeneity in bedrock depth.

Applied the extended ISAM to assess the potential implications of bioenergy crop production for water and energy balance and carbon and nitrogen dynamics in the United States. This output of this study has been contributed to the following project:

(i) **NSF EFRI-RESIN Projec**t: Interdependence, Resilience and Sustainability of Infrastructures for Biofuel Development.

Applied the extended ISAM to assess the implication of climate change and variability for crop productivity. The output of this study has been contributed to the following project:

(i) **Useful To Usable Project (U2U):** Transforming Climate Variability and Change Information for Cereal Crop Producers.

[4] ***Graduate Fellowship Internship*** *(June, 2010-July, 2010),* Environmental Sciences Division, Oak Ridge National Lab (ORNL), Oak Ridge, TN.

Parameterized switchgrass in the Environmental Policy Integrated Model (EPIC) through a nonlinear parameterization approach.

[5] ***Graduate Research Assistant*** *(August 2006-2009),* State key laboratory of Vegetation and Environmental Change, the Chinese Academy of Sciences, Beijing, China

Worked on the project of Aerobic Methane Emission from Plants.

Estimated methane fluxes between atmosphere and grassland ecosystems in Chinese grassland using the DNDC model

RESEARCH SKILLS

- Operating Systems: UNIX/LINUX Systems, parallel calculation
- Programming: Fortran90/95, Python, Matlab
- Tools: GIS, Ferret, NCO, PEST, SPSS, SAS
- Numerical Models: ISAM, CESM, MEND, EPIC, ALAMANC, DNDC
- Data: 'Omics data, CRUNCEP climate forcing data, NLDAS-2 climate forcing data, CLM historical and RCP climate forcing data, AmeriFlux fluxes data, NASS crop yields dataset, PDO index, STATSGO2 soil database, CONUS-SOIL soil characteristics dataset etc.

FELLOWSHIPS & AWARDS

- Invited Participant, USDA/NCAR workshop: Agriculture in a Changing Climate Across Scales: Broadening Participation in Research and Decision-Making, USA, 2014
- Invited Participant, NCAR Community Earth System Modeling (CESM) Tutorial, USA, 2012
- Oak Ridge National Lab Graduate Research Fellowship, USA, 2010

JOURNAL PUBLICATION

2016 Fu Y H, Piao S, Ciais P, Huang M, Menzel A, Peaucelle M, Peng S**, Song Y**, Vitasse Y, Zeng Z, Zhao H, Zhou G, Peñuelas J; Janssens I A: Long-term linear trends mask phenological shifts, International Journal of Biometeorology, doi :10/1007/s00484-016-1253-5**.**

2016 **Song Y,** Jain A K, Landuyt W, Kheshgi H S: The interplay between bioenergy grass production and water resources in the United States of America, Environmental Science and Technology, doi :10.1021/acs :est.5b05239**.**

2015 Fu Y H, Zhao H, Piao S, Peaucelle M, Peng S, Zhou G, Ciais P, Huang M, Menzel A, Penuelas J, **Song Y**, Vitasse Y, Zeng Z, and Janssens I A: Declining global warming effects on the phenology of spring leaf unfolding. Nature, 526(7571), 104–107.

2014 **Song Y**, Jain A K, Landuyt W, Kheshgi H S, and Khanna M: Estimates of Biomass Yield for Perennial Bioenergy Grasses in the United States. Bioenergy Research, doi : 10.1007/s12155-014-9546-1.
News Release : http://news.illinois.edu/news/14/1121bioenergy_yields_AtulJain.html.

2014 Niyogi D, Liu X, Andresen J, **Song Y**, Jain A K, Kellner O, Takle E S, Doering O C: Crop Models can capture the impacts of climate variability on corn yield, Geophysical Research Letters 42(9) : 3356-3363**.**

2014 Housh M, Cai X, Ng T, McIsaac G, Ouyang Y, Khanna M, Jain A, Eckhoff S, Gasteyer S, AI-Qadi I, Bai Y, Yaeger M, Ma S, and **Song Y**: System of systems model for analysis of biofuel development. Journal of Infrastructure Systems, doi : 10.1061/(ASCE)IS.1943-555X.0000238**.**

2013 **Song Y**, Jain A K, and Mclsaac G F: Implementation of dynamic crop growth processes into a land surface model : evaluation of energy, water and carbon fluxes under corn and soybean rotation. Biogeosciences, 10: 8039-8066**.**

2013 El-Masri B, Barman R, Meiyappan P, **Song Y**, Liang, M, and Jain, A K: Carbon dynamics in the Amazonian Basin : Integration of eddy covariance and ecophysiological data with a land surface model. Agricultural and Forest Meteorology, doi : 10.1016/j.agrformet.2013.03.011.

2013 Jain A K, Meiyappan P, **Song Y**, and House J I: CO_2 emissions from land use change affected more by nitrogen cycle, than by the choice of land cover data. Global Change Biology, doi : 10.1111/gcb.12207.

2009 Wang Z P, **Song Y**, Han X G, Yu Q, and Gulledge J: China's grazed temperate grassland are a net source of atmospheric methane. Atmospheric Environment. 13(43) : 2148-2153.

2008 Wang Z P, Han X G, Wang G G, **Song Y**, and Gulledge J: Aerobic methane emission from plants in the Inner Mongolia steppe. Environmental Science and Technology, 42(1) : 62-68.

Google Scholar: https://scholar.google.com/citations?user=EYOO40wAAAAJ&hl=en

PRSENTATIONS

2015 **Song Y,** Jain A K, Lawrence P: The impact of climate change on production of multiple food crops in the 21st Century- An analysis based on two land surface models, In AGU2015, San Francisco, CA, US.

2014 **Song Y**., Jain A K, Landuyt W, and Kheshgi H: The interplay of bioenergy crops production and water resource in the US. In AGU2014. San Francisco, CA, US.

2013 **Song Y**, Jain A K, Landuyt W, and Kheshgi H: Estimates of spatial and temporal variations of energy crops biomass yields in the US. In AGU2013. San Francisco, CA, US.

2012 Jain A. K. and **Song Y**: Impact of climate change and variability on crop productivity. In AGU2012, San Francisco, CA, US.

2012 **Song Y**, Jain A K, Landuyt W, and Kheshgi H: Implications of growing bioenergy crops on the

hydrological cycle. In AGU2012, San Francisco, CA, US.

2012 **Song Y:** Implication of growing large-scale energy crops on water balance (invited talk). In Exxonmobil Research and Engineering Company, Annandale, NJ, US.

2011 **Song Y,** Barman R. and Jain A K**:** Energy crops and their implications on surface energy and water balance. In AGU2011, San Francisco, CA. US.

2011 **Song Y**, Meiyappan P, Jain A K, Khanna M, Huang, H**:** An integrated biogeochemical, biophysical and economic analysis of bioenergy crops. In Biomass and Energy Crop IV, Champaign-Urbana, IL, US.

2011 **Song Y**. Meiyappan P. Jain A K, Khanna M, Huang H**:** An Integrated biogeochemical, biophysical and economic analysis of bioenergy crops (invited talk). In ESA2011, Austin, Texas, US.

TEACHING EXPERIENCE

Graduate Mentor *(September 2014-January 2015)* for Illinois Scholars Undergraduate Research Program, The College of Engineering, University of Illinois at Urbana-Champaign, Urbana IL

OTHER PROFESSIONAL ACTIVITIES

- AGU membership