KAMALJIT BANGER

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EDUCATION

- PhD candidate, Auburn University, Fall 2010-present.
  Title: "*Net Exchanges of CO_2, CH_4, and N_2O between Terrestrial Ecosystems and the Atmosphere in Tropical Asia during 1901-2010"*
- MS Soil & Water Science, University of Florida, USA (July, 2010)
- MS Soil Science & Agricultural Chemistry, University of Agricultural Sciences, India (September, 2007)
- BS Agriculture (Soil Science Honors), Punjab Agricultural University, India (June, 2005).

PROFESSIONAL EXPERIENCE

➢ **Graduate Research Assistant, Fall 2010 – Present, School of Forestry & Wildlife Sciences, Auburn University, Alabama**

My PhD work involves the estimation of greenhouse gas (CO_2, CH_4, and N_2O) emissions from tropical terrestrial ecosystems using synthesis and modeling approaches. This task involves the use of Remote Sensing and Geographic Information System tools (e. g. land cover and land use data development), biogeochemistry (e. g. soil microbial processes, nutrient dynamics), and synthesis (to identify the mechanisms from previous field and laboratory scale experiments) in addition to the computer programing for developing modeling algorithms. To reduce uncertainties in biogeochemical cycles in the tropical ecosystems, I coupled the phosphorus cycle with carbon and nitrogen cycles in the Dynamic Land Ecosystem Model (DLEM) with the help of other group members.

➢ **Graduate Research Assistant, August, 2008-May, 2010, Soil & Water Sciences, University of Florida, Gainesville, Florida**

I worked on the nitrogen and phosphorus transport from an urbanizing watershed in the Tampa Bay Estuary, Florida. In addition, I conducted laboratory analysis on impact of land use change on Polycyclic Aromatic Hydrocarbons in urban land use soils of Miami, Florida.

➢ **Research Fellow, October, 2007-April, 2008, Punjab Agricultural University, Ludhiana, India**

I supervised two field coordinators involved in the soil sample collections and farm survey in the sub-mountainous regions in Punjab, India. In addition, I planned and conducted laboratory experiments on estimation of soil physical properties (texture, bulk density, water content, and conductivity), and chemical analysis (plant available and total nitrogen, phosphorus, and sulfur).

RESEARCH INTERESTS

I have been involved in the quantifying on how multiple environmental factors (e. g., land use, land management, rising CO_2 concentration, climate change, and air quality) can alter biogeochemical cycles at regional and global scales using ecosystem modeling approaches. Specifically, I am interested in improving the existing biogeochemical processes in the land ecosystem models.

PROFESSIONAL SKILLS AND TECHNIQUES

- **Computer techniques:** C++ programing, Fortran
- **Synthesis:** Meta-analysis, Metawin software
- **Remote Sensing & Geographical Information Systems:** Advanced GIS, ArcMacro Language (AML programing)
- **Laboratory analytical skills:** Extensive experience in estimation of soil physical (bulk density, water content, soil texture), chemical (soil carbon, nitrogen, phosphorus, and micronutrients), and biological properties (microbial biomass carbon, soil respiration), physical and chemical fractionation of different soil organic carbon pools. In addition, experience in handling CHNS analyzer, and atomic absorption spectrophotometer.
- **Team work and supervision:** Experience in working with colleagues from different scientific backgrounds as well as coordinating with field workers and technicians.

ACADEMIC ACHIEVEMENTS

- **Graduate Research Assistantship** (August, 2010 to present) for pursuing PhD program in Ecosystem Modeling in School of Forestry & Wildlife Sciences, Auburn University, USA.
- **Graduate Research Assistantship** (August, 2008 to May, 2010) for pursuing MS program in Soil & Water Science department at University of Florida, USA.
- Recipient of the national level prestigious **Junior Research Fellowship** award from Indian Council of Agricultural Research, India in 2005.

PUBLISHED JOURNAL PUBLICATIONS

Total citations: 102 in August, 2014.

12. Tian, HQ, **Banger, K.,** Tao, Bo & VK Dadhwal, (2014). "History of land use in India during 1880-2010: Large-scale land transformations reconstructed from satellite data and historical archives" (***Global &Planetary Change,*** *doi:10.1016/j.gloplacha.2014.07.005*).

11. Pan, S, Tian, HQ, Dangal, S., Zhang, C.,Yang, J., Tao, B., Ouyang, Z., Wang, X., Lu, C.; Ren, W., **Banger, K.,** Yang, Q., Zhang, B., & Li, Xia. (2014). Complex spatiotemporal responses of global terrestrial primary production to climate change and increasing atmospheric CO2 in the 21st century. (Accepted in ***PloS ONE; doi: 10.1371/journal.pone.0112810***).

9. Qichun Yang, Tian, HQ, Xia Li, Bo Tao, Wei Ren, Guangsheng Chen, Chaoqun Lu, Jia Yang, Shufen Pan**, Banger, K.,** & Bowen Zhang (2014). Spatiotemporal patterns of evapotranspiration along the North American east coast as influenced by multiple environmental changes. (***Ecohydrology***, doi 10.1002/eco.1538).

8. **Banger, K.,** Tian, HQ, & Bo, T (2013). "Contemporary land cover and land use patterns in India estimated by different regional and global datasets" (***Journal of Land Use Science,*** *doi 10.1080/1747423X.2013.858786)**.***
7. Tian, HQ, Chen, Guangsheng, Lu, Chaoqun, Xu, Xiaofeng, Ren, Wei, **Banger, K.,** Bowen Zhang, Bo Tao, S. Pan, M. Liu, and C. Zhang (2013). "Recent trends in global soil methane and nitrous oxide fluxes: Magnitude and spatiotemporal patterns" (***Biogeoscience discussions,*** *doi10.5194/bgd-10-1-2013**).***
6. **Banger, K.,** Tian, HQ, & Lu, C, (2012). "Do Nitrogen Fertilizers Stimulate or Inhibit Methane Emissions from Rice Fields" (***Global Change Biology*****,** 18, 3259–3267).
5. Sidhu, SS, Brar, JS, Biswas, A, **Banger, K.,** & Saroa, GS, (2012). Arsenic contamination in soil-water-plant (Rice, Oryza sativa L.) continuum in Northern districts of Punjab, Northwest India. (***Bulletin of Environmental Contamination & Toxicology,*** *doi 10.1007/s00128-012-0799-0).*
4. Sidhu, S.S., S.S. Dhaliwal, **Banger, K.,** H.S. Dhadli & S.S. Aulakh (2010). An assessment of changes in groundwater quality with the variations in depth of aquifers in north-eastern districts of Punjab. (***Indian Journal of Ecology,*** 37(2): 162-164).
3. **Banger, K.,** Toor, GS, Biswas, A, & Sudhir, K, (2010). Soil Organic Carbon Fractions after 16 years Applications of Commercial Fertilizers and Organic Manure in a Typic Rhodalfs in Semi-arid Tropics (***Nutrient Cycling in Agroecosystems*****,** 86(3):391-399).
2. **Banger, K.,** Toor, GS, Ma, L, & Chirenje, T, (2010). Polycyclic Aromatic Hydrocarbons in Four Urban Land Use Soils of Miami, Florida. (***Soil & Sediment Contamination,*** 19: 2, 231-243).
1. **Banger, K.,** Toor, GS, Kukal, SS, Sudhir, K, & Hanumanthraju, TH, (2009). Impact of long term additions of chemical fertilizers and farm yard manure on carbon and nitrogen sequestration under rice-cowpea system in semi-arid tropics. (***Plant & Soil*****,** 318; 27-35).

ARTICLES UNDER REVIEW

7. **Banger, K.,** Tian, HQ, & Bo Tao (2014). "Contribution of multiple environmental factors on terrestrial net primary productivity in India during 1901–2010" (***revisions requested in Climatic Change***).
6. Tian, HQ, Chaoqun Lu,Jia Yang, **Banger, K.,** Deborah N. Huntinzger, Christopher R. Schwalm, Anna M. Michalak,Robert Cook, *et al.,* (2014). Global patterns of soil carbon stocks and fluxes as simulated by multiple terrestrial biosphere models: sources and magnitude of uncertainty (under review in ***Global Biogeochemical Cycles***).
5. **Banger, K.,** Tian, HQ, Bowen Zhang et al. (2014). "Biosphere-atmosphere exchange of methane in India during 1901–2010 as influenced by multiple environmental changes". (under review in ***Atmospheric Environment***).
4. **Banger, K.,** Tian, HQ, & Bo Tao (2014). "Magnitude and drivers for soil organic carbon stocks in India during 1901–2010" (under review in ***Soil Science Society of America Journal***).
3. **Banger, K.,** Tian, HQ et al., (2014). "Human activity induced nitrous oxide emissions from terrestrial biosphere of India during 1901-2010 (under review in ***Agriculture, Ecosystem & Environment***)".
2. Tian, HQ, Ren, W., Yang, J., Tao, B., Cai, W., Lohrenz, S., Liu, M., Yang, Q., Lu, C., Zhang, B., **Banger, K.,** Pan, S., Hopkinson, C., He, R. (2014). Short term climate extreme events control recent

terrestrial carbon export from the Mississippi River basin (under review in ***Geophysical Research Letter***).

1. Lu, C., Tian, HQ, Lohrenz, S., Ren, W., Yang, J., Cai, W., Tao, B., Liu, M., Zhang, B., Yang, Q., **Banger, K.,** Pan, S., He, R., Hopkinson, C. (2014). Climate extremes decouple water and nitrogen fluxes from land to oceans (under review in ***Environmental Science & Technology***).

REVIEWER FOR JOURNALS

- Global Change Biology
- Land Degradation & Development
- Environmental Monitoring & Assessment

OTHER CURRICULUM ACTIVITIES & PUBLIC OUTREACH

- My research work on emerging contaminants in urban soils of Miami has been featured in University of Florida News (http://news.ufl.edu/2010/05/18/miami-soil/).
- **Student Editor** of monthly newsletter of Carbon Sequestration School, University of Agricultural Sciences, Bangalore, India in 2007. I planned four environment awareness events involving scientists, students, as well as non-scientific audience at UAS-Bangalore. I conducted surveys on lack of youth participation in government policies on climate change and food security and started a newsletter at Carbon Sequestration School. A part of this experience was shared with undergraduate students at University of Florida in Fall, 2006.

TEACHING/MENTORING EXPERIENCE

- In the School of Forestry & Wildlife Sciences, I mentored a summer intern in 2014 in a short project on climate extremes, irrigation, and agriculture productivity in India.
- **Teaching Assistant in "Climate Change Science &Policy (FORY 7970)"** in the School of Forestry & Wildlife Sciences, Auburn University, USA in spring, 2014.
- **Teaching Assistant in "Forest Measurements (FORY 3180)**" in the School of Forestry & Wildlife Sciences, Auburn University, USA. Major responsibility was to assist with field exercises.
- **Mentor for undergraduate students in "Humans, Soils, and Environment Impact (SOS2008)",** in the University of Florida (US) Fall Semester, 2006. This was a joint initiative by University of Florida and Carbon Sequestration School, University of Agricultural Sciences, India. I exchanged ideas with undergraduate students on topics such as global climate change, food security, and related policies in developed and developing countries.

PROFESSIONAL AFFILIATIONS

- Soil Science Society of America
- American Geophysical Union
- Ecological Society of America

SELECTED POSTER, ABSTRACTS & PRESENTATIONS

11. **Banger, K.,** Tian, HQ, & Qichun Yang, (2014). Quantification of carbon uptake inhibited by the phosphorus limitation in tropics: Application of Dynamic Land Ecosystem Model. To be presented In AGU Fall Meeting 2014. Link: https://agu.confex.com/agu/fm14/webprogrampreliminary/Paper24185.html.

10. Chaoqun Lu, Tian, HQ, **Banger, K.** &Bowen Zhang, (2014). Natural and Anthropogenic Controls over Global Terrestrial N2O Emission Growth at a Century-Long Time Scale. To be presented In AGU Fall Meeting 2014. Link: https://agu.confex.com/agu/fm14/webprogrampreliminary/Paper31106.html.

9. Bowen Zhang, Tian, HQ, Chaoqun Lu, Jia Yang, **Banger, K.** & Shufen Pan, (2014). Net exchanges of CO2, CH4 and N2O between the terrestrial ecosystems and the atmosphere in boreal and arctic region: Towards a full greenhouse gas budget. To be presented In AGU Fall Meeting 2014. Link: https://agu.confex.com/agu/fm14/webprogrampreliminary/Paper31908.html.

8. Lu, Chaoqun, H. Tian, G. Chen, W. Ren, J. Yang, B. Tao, B. Zhang, **Banger, K.** S. Pan, S. Dangal (2013). Changes in soil organic carbon storage in the context of multi-factor global changes: Linking region to globe. Mini-Symposium on Carbon Cycle and Climate Change & Partnership Meeting. October 8, 2013 (poster).

7. **Banger, K.,** Tian, HQ, Ren Wei, & Jia Yang (2013). Microbial mechanisms to reduce the uncertainties in the CH4 emissions from global rice fields. In AGU Fall Meeting 2013. Link: http://abstractsearch.agu.org/meetings/2013/FM/sections/B/sessions/B33C/abstracts/B33C-0502.html.

6. **Banger, K,** Tian, HQ, Tao Bo, Jia Yang, and Shree Sharma, (2013) Impact of Multifactor Global Change on Crop Productivity on net primary productivity and soil organic carbon storage in India during 1901-2010. ASA-CSSA-SSSA, Tampa, Florida (Oral presentation). Link: https://scisoc.confex.com/crops/2013am/webprogram/Paper82540.html.

5. Tian, H., C. Lu, W. Ren, T. Bo., J. Yang., **Banger, K.,** et al., (2013). The balance of greenhouse gases in the terrestrial biosphere: can we predict large-scale and long-term patterns from short-term plot level observations? Ecological Society of America Annual Meeting, Minneapolis, MN. Link: http://esameetings.allenpress.com/2013/webprogram/Paper40662.html.

4. Toor, G.S., **Banger, K,** P Inglett, C Stanley. (2010). Spatial and Temporal Patterns of Nitrogen Transport in a Subtropical Urban Coastal Watershed. In AGU Fall Meeting 2010 (poster).

3. **Banger, K,** Toor, G.S., P Inglett, and C Stanley (2010). Nitrogen Forms in Streams Draining Agricultural, Urban, Mining, and Pasture Sub-Basins of the Alafia River Watershed, Florida. In 2nd UF Water Institute Symposium, 2010 (poster).

2. Toor, G.S., and **Banger, K.,** (2010). Evolution of Nitrogen and Phosphorus Forms in a Subtropical Urban Coastal Watershed. ASA-CSSA-SSSA, Long Beach, CA (Oral presentation). Link: https://scisoc.confex.com/crops/2010am/webprogram/Paper58683.html.

1. Toor, G.S., **Banger, K,** T. Chirenje, L. Ma, & B. Bradley. (2008). Polycyclic aromatic hydrocarbons in urban soils of Miami, Florida. In Agronomy Abstracts. ASA-CSSA-SSSA, Madison, WI.