# Xiao-Jun Allen Liu, PhD

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## EDUCATION

2017 Ph.D. in *Soil Microbiology*, Northern Arizona University, Flagstaff, AZ.
2012 M.S. in *Crop and Soil Environmental Sciences*, Virginia Tech, VA.
2008 M.S. in *Soil and Plant Sciences*, Northwest A&F University, Yangling, China.
2005 B.S. in *Agriculture Science*, Henan Institute of Science and Technology, Xinxiang, China.

## PROFESSIONAL EXPERIENCE

2021- Postdoctoral Researcher *(Microbial Ecology and Community Genomics)*, Institute for Environmental Genomics, University of Oklahoma.
2017-2021 Postdoctoral Associate *(Soil Microbial Ecology)*, Department of Microbiology, University of Massachusetts.
2016-2017 Graduate Teaching Assistant in Biology, Northern Arizona University.
2013-2016 Graduate Research Assistant in Biology, Northern Arizona University.
2010-2013 Graduate Research Assistant in Crop and Soil Environmental Sciences, Virginia Tech.
2008-2010 Research Scientist in Plant Nutrition and Soil Science, Northwest A&F University, China.
2007-2008 Visiting Scientist in Soil Ecology, University of Bayreuth, Germany.
2005-2008 Graduate Research Assistant in Soil and Plant Sciences, Northwest A&F University, China.
2004-2005 Research Assistant in Life Sciences, Henan Institute of Science and Technology, China.

## MANUSCRIPTS IN PREPARATION

1. **Liu X.J.A.**, Frey S.D., Melillo J.M., DeAngelis K.M. Responses of microbial functional communities to long-term soil warming.
2. Liu Y., **Liu X.J.A.** Responses of soil nutrients and microbial communities to tillage and organic matter amendment.

## MANUSCRIPTS IN REVIEW

1. **Liu X.J.A.**, Mau R.L., Hayer M., Finley B.K., Schwartz E., Dijkstra P., Hungate B.A. Labile substrates modulate the soil carbon cycling by altering community composition and structure. ***Soil Biology and Biochemistry*** (in review).
2. Stone B.W., Blazewicz S.J., Koch B.J., Dijkstra P., Hayer M., **Liu X.J.A.**, Mau R.L., Pett-Ridge J., Schwartz E., Hungate B.A. Nutrients strengthen density dependence of per-capita growth and mortality rates across all major phyla of soil bacteria. ***Ecology*** (in review).
3. Li J, Mau R.L., Stone B.W., Dijkstra P., Koch B.J., Morrissey E.M., Blazewicz S.J., Hofmockel K., **Liu X.J.A.**, Mau R.L., Hayer M., Pett-Ridge J., Schwartz E., Hungate B.A. Divergent microbial traits in regulating plant and microbial cell wall residue degradation. ***The ISME Journal*** (in review).
4. Tao X., Feng J., Jian S., Yang Z., Yang Y., Bates C.T., Wang G., Guo X., Ning D., Kempher M.L., **Liu X.J.A.**, Ouyang Y., Wu L., Zeng Y., Kuang J., Zhang Y., Zhou X., Firestone M.K., Tiedje J.M., Zhou J.Z. Climate warming accelerates soil priming-induced carbon loss. ***PNAS*** (in review).

**PUBLISHED PAPERS (available at Google Scholar and ResearchGate)**

1. **Liu X.J.A.**, Frey S.D., Melillo J.M., DeAngelis K.M. (2021). Microbial carbon efficiency and soil physical protection in response to chronic warming. ***Soil Biology and Biochemistry***. 159, 108298 (PDF).
2. Stone B.W., Li J., Koch B.J., Blazewicz S.J., Dijkstra P., Hayer M., Hofmockel K.S., **Liu X.J.A.**, Mau R.L., Morrissey E.M., Pett-Ridge J., Schwartz E., Hungate B.A. (2021) Nutrients cause consolidation of soil carbon flux to small proportion of bacterial community. ***Nature Communications***. 12, 3381 (PDF).
3. **Liu X.J.A.**, Pold G., Domeignoz-Horta L.A., Geyer K.M., Caris H., Nicolson H., Kemner K.M., Frey S.D., Melillo J.M., DeAngelis K.M. (2021). Soil aggregate-mediated microbial responses to long-term warming. ***Soil Biology and Biochemistry***. 152, 108055 (PDF).
4. Waring B.G., Sulman B., Reed S., Smith A.P., Averill C., Creamer C., Cusack D., Hall S.J., Jastrow J.D., Jilling A., Kemner K., Kleber K., **Liu X.J.A.**, Pett-Ridge J., Schulz M. (2020). From pools to flow: the PROMISE framework provides new insights on soil carbon cycling in a changing world. ***Global Change Biology*** (PDF).
5. Domeignoz-Horta L.A., Pold G., **Liu X.J.A.**, Frey S.D., Melillo J.M., DeAngelis K.M. (2020). Microbial diversity drives CUE in a model soil. ***Nature Communications***. 11, 3684 (PDF).
6. **Liu X.J.A.**, Finley B.K., Mau R.L., Schwartz E., Dijkstra P., Bowker M.A., Hungate B.A. (2020). The soil priming effect: Consistent across ecosystems, elusive mechanisms. ***Soil Biology and Biochemistry***. 140, 107617 (PDF).
7. Li J, Mau R.L., Dijkstra P., Koch B.J., Schwartz E., **Liu X.J.A.**, Morrissey E.M., Blazewicz S.J., Pett-Ridge J., Stone B.W., Hayer M., Hungate B.A. (2019). Predictive genomic traits for bacterial growth in culture versus actual growth in soil. ***The ISME Journal***. 13: 2162-2172 (PDF).
8. Morrissey E.M., Mau R.L., Hayer M. **Liu X.J.A.**, Schwartz G., Dijkstra P., Koch B.J., Allen K., Blazewicz S., Hofmockel K., Pett-Ridge J., Hungate B.A. (2019). Evolutionary history constrains microbial traits across environmental variation. ***Nature Ecology and Evolution***.3: 1064-1069 (PDF).
9. Finley B.K., Dijkstra P., Rasmussen C., Schwartz E., Mau R.L., **Liu X.J.A.**, van Gestel N., Hungate B.A. (2018). Soil mineral assemblage and substrate quality affect microbial priming (PDF). ***Geoderma***. 322: 38-47.
10. **Liu X.J.A.**, van Groenigen K.J., Dijkstra P., Hungate B.A. (2017). Increased plant uptake of native soil nitrogen following fertilizer addition – not a priming effect? (PDF). ***Applied Soil Ecology***. 114: 105-110.
11. **Liu X.J.A.**, Sun J., Mau R.L., Finley B.K., Compson Z.G., van Gestel N., Brown J.R., Schwartz E., Dijkstra P., Hungate B.A. (2017). Labile carbon input determines the direction and magnitude of the priming effect (PDF). ***Applied Soil Ecology***. 109: 7-13.
12. **Liu X.J.A.**, Fike J.H., Galbraith J.M. and Fike W.B. (2015). Biosolids amendment and harvest frequency affect nitrogen use dynamics of switchgrass grown for biofuel production (PDF). ***BioEnergy Research***. 8: 560-569.
13. **Liu X.J.A.**, Fike, J. H., Galbraith, J. M., Fike, W. B., Parrish, D. J., Evanylo, G. K. and Strahm, B. D. (2015). Effects of harvest frequency and biosolids application on switchgrass yield, feedstock quality, and theoretical ethanol yield (PDF). ***GCB Bioenergy***. 7: 112-121.
14. **Liu X.J.A.**, Fike J.H., Galbraith J.M. and Fike W.B. (2014). Switchgrass response to cutting frequency and biosolids amendment: biomass yield, feedstock quality, and theoretical ethanol yield (PDF). ***BioEnergy Research***. 7: 1191-1200.
15. Zhou J.B., Chen J.Z., **Liu X.J.**, Zhai B.N., Powlson D.S. (2010). Nitrate accumulation in soil profiles under seasonally open 'sunlight greenhouses' in northwest China and potential for leaching loss during summer fallow (PDF). ***Soil Use and Management***. 26: 332-339.
16. **Liu X.J.**, Zhou J.B., Chen Z.J., Wang Y., Ding X.L. (2010). Nitrate leaching from sunlight greenhouse soils with different cultivation years during summer fallow periods. ***Transactions of the Chinese Society of Agricultural Engineering***. 26:272-278.
17. **Liu X.J.**, Chen Z.J., Zhang Y.L., Zhou J.B. (2009). Nutrient accumulation in the sunlight greenhouse soils with the different cultivating years. ***Chinese Journal of Soil Science***. 40: 285-289.

18. Chen Z.J., Wang Y.Q., Zhou J.B., **Liu X.J.**, Zhou B. (2009). Quantity and intensity of potassium and its exchange relationship with calcium in sunlight greenhouse soils. ***Plant Nutrition and Fertilizer Science***. 15: 1078-1084.
19. Zhou J.B., Wang C.Y., Liang B., **Liu X.J.**, Kalbitz K. (2009). Stock and distribution of organic carbon in the profiles of soil with long cultivating history. ***Journal of Agro-Environment Science***.12: 2540-2544.
20. Chen Z.J., Wang Y.Q., Zhou J.B., **Liu X.J.**, Zhou B. (2008). Effects of concentrations and ratios of $K^+$ and $Mg^{2+}$ ions on their adsorption to soils under sunlight greenhouse cultivation. ***Journal of Soil and Water Conservation***. 22: 106-109.
21. Wu X.H., Peng K.Q., Liang Z.S., **Liu X.J**. (2008). Effects of nitrogen and phosphorus on root and shoot growth of lsatis indigotica Fort. ***Acta Agriculturae Boreali-Occidentalis Sinica***. 17: 274-278.
22. Jiang A.F., Ren X.J., **Liu X.J.** (2005). New study of nitrate contents about vegetables in Xinxiang. ***Journal of Henan Vocation-technical Teachers College***. 33: 53-55.

## GRANT PROPOSALS

- Daniel Schachtman, Sophie Alvarez and **Xiao-Jun Allen Liu**. Plant-soil-microbe interactions mediate nutrient use efficiency in bioenergy systems. DOE-BER Genomic Science Program (Systems Biology for Sustainable Bioenergy). 2019. $500,000 (high priority, not funded).
- **Xiao-Jun Allen Liu**, Serita D. Frey, Jerry M. Melillo, and Kristen M. DeAngelis. Responses of microbial carbon use efficiency to soil physical protection and temperature over long-term warming. NEON-ESA Early Career Scholar funded by NSF. 2018. $1,800.
- **Xiao-Jun Allen Liu** and Kristen M. DeAngelis. Disentangling the relative contributions of the microbiome and physical protection in soil response to long-term environmental stress. Community Science Program of DOE Joint Genome Institute. Awarded 2017. $24,000.
- **Xiao-Jun Allen Liu**, Rebecca Mau, Michaela Hayer, Brianna Finley, Egbert Schwartz, Paul Dijkstra, and Bruce Hungate. Responses of microbial communities and soil organic matter decomposition following labile carbon and nitrogen inputs. TerraGenome Young Scientist Grant from the NSF research coordination network. 2017. $1,500.
- Bruce Hungate and **Xiao-Jun Allen Liu**. The microbial ecology of the soil priming. NSF-DDIG in the Directorate for Biological Sciences. 2015. $19,760 (high priority, not funded).

## PROFESSIONAL ACTIVITIES

- **Subject editor** for ***Soil Biology and Biochemistry*** (2019– ).
- **Review editor** for ***Frontiers in Microbiology*** (2019– ).
- **Review editor** for ***Frontiers in Environmental Science*** (2020– ).
- Journal peer review (83 manuscripts verified by publons):
    - Agronomy Journal (1)
    - Applied Soil Ecology (6)
    - Earth-Science Reviews (1)
    - Environmental Microbiology (1)
    - European Journal of Soil Science (7)
    - Frontiers in Microbiology (2)
    - Geoderma (1)
    - GCB Bioenergy (1)
    - ISME Communications (1)
    - Journal of Visualized Experiments (1)
    - Plant and Soil (2)
    - PLOS One (9)
    - Science of the Total Environment
    - ***Soil Biology and Biochemistry (48)***
    - Soil Research (1)

## TEACHING EXPERIENCE

- Graduate teaching assistant for "**Fundamental techniques and experiments in microbiology (BIO 205L)**" in spring and fall 2016, and spring 2017 at Northern Arizona University.
- Graduate teaching assistant for "**Fundamentals of Environmental Science (ENSC 3604)**" in fall 2012 at Virginia Tech.

**INVITED SEMINARS**

1. School of Natural Resources, University of Missouri, Columbia, MO. May, 2020.
2. School of Agriculture, University of Massachusetts, Amherst, MA. February, 2020.
3. Department of Biology, Austin Peay State University, Clarksville, TN. January, 2020.
4. Department of Environmental Science, Westfield State University, Westfield, MA. November, 2019.
5. Department of Agricultural Science, Truman State University, Kirksville, MO. November, 2019.
6. Department of Biology, Rhodes College, Memphis, TN. October, 2019.
7. Biosciences Division, Oak Ridge National Laboratory, Oak Ridge, TN. April, 2019.
8. Department of Agronomy and Horticulture, University of Nebraska, Lincoln, NE. March, 2019.
9. Department of Environmental Science and Ecology, University of Texas, San Antonio, TX. December, 2018.
10. Department of Biosystems Engineering and Soil Science, University of Tennessee, Knoxville, TN. November, 2018.
11. Department of Microbiology, University of Massachusetts, Amherst, MA. February, 2017.
12. Department of Ecology and Evolutionary Biology, University of California, Irvine, CA. February, 2017.
13. Department of Biology, Indiana University, Bloomington, IN. March, 2017.
14. Department of Plant Pathology, North Carolina State University, Raleigh, NC. March, 2013.

**PROFESSIONAL AFFILIATIONS**

- American Geophysical Union
- American Society of Agronomy
- American Society for Microbiology
- Crop Science Society of America
- Ecological Society of America
- Soil Science Society of America

**AWARDS**

- ***Best Dissertation Award*** in Biology Department, Northern Arizona University (2017).
- Travel awards for attending AGU Meetings in San Francisco, CA (2014-2016).
- ***1st Place of presentation*** in the Graduate Research Symposium at Virginia Tech (2012).
- Travel awards for attending "ASA, CSSA, and SSSA" Meetings (2011-2012).

**PROFESSIONAL SERVICES AND OUTREACH ACTIVITIES**

- Convenor for Biogeosciences Session (B045) at the 2020 AGU Fall meeting: Advances in understanding and predicting microbial functions in earth system processes under climate change.
- Committee member of the Microbial Technical Working Group at National Ecological Observatory Network (NEON, 2019–), supported by the NSF.
- Mentor for high school students – 2018/2019 Student Spaceflight Experiments Program (SSEP) sponsored by NASA and International Space Station: microgravity and microbiology.
- Presider for ESA 2018 meeting: 1) Session COS 55: Biogeochemistry: Biogeo Patterns Along Environmental Gradients, and 2) Session COS 108: Agriculture.
- Judge for the best student research talk of Biogeosciences Section at ESA 2018 meeting.
- Proposal reviewer for ASM Microbe 2018: Late-breaker.
- Science cheerleader (microbiology, soil science) at Flagstaff Science Festival in 2015 and 2016.
- Departmental Representative, Virginia Tech in 2013 and Northern Arizona University in 2014.
- Reviewer for the Graduate Student Symposium at Virginia Tech in 2011 and 2012.

**PRESENTATIONS IN PROFESSIONAL CONFERENCES**

1. Chen N.A., **Liu X.J.A.**, Domeignoz-Horta L.A., DeAngelis K.M., Keiluweit M. Manganese availability controls microbial-mediated organic matter degradation across redox interfaces. ***AGU Fall meeting***, New Orleans, LA, Dec. 13-17, 2021.

2. **Liu X.J.A.**, DeAngelis K.M. Microbial functional responses to long-term warming in different soil aggregates. ***AGU Fall meeting***, San Francisco, CA, Dec. 7-11, 2020.
3. Stone B.W., Blazewicz S.J., Koch B.J., Dijkstra P., Hayer M., **Liu X.J.A.**, Mau R.L., Pett-Ridge J., Schwartz E., Hungate B.A. Nutrients strengthen density dependence of per-capita growth and mortality rates across all major phyla of soil bacteria. ***Ecological Society of America***, Salt Lake City, UT, Aug. 5-10, 2020.
4. **Liu X.J.A.**, Pold G., Domeignoz-Horta L., Frey S.D., Melillo J.M., DeAngelis K.M. Physical protection enhances acclimation of microbial efficiency to chronic soil warming. ***AGU Fall meeting***, San Francisco, CA, Dec. 9-13, 2019.
5. **Liu X.J.A.**, Pold G., Domeignoz-Horta L., Frey S.D., Kemner K.M., Melillo J.M., Mishra B., DeAngelis K.M. Adaptation of microbial physiology in a warming world. The 14th Annual DOE Joint Genome Institute – ***Genomics of Energy and Environment Meeting***, San Francisco, CA, Apr. 2-5, 2019.
6. Waring B., Creamer C., Cotrufo F., Hall S.J., Jastrow J.D., Kleber M., **Liu X.J.A.**, Pett-Ridge J., Reed S.C., Smith A.P., Salman B.N. ***Soil Carbon Meeting*** *at Utah State University*, Logan, UT, Jan. 21-23, 2019.
7. **Liu X.J.A.**, Frey S.D., Kemner K.M., Melillo J.M., Mishra B., DeAngelis K.M. Microbial carbon efficiency but not soil physical protection creates a negative climate feedback over long-term warming. ***AGU Fall meeting***, Washington, D.C., Dec. 9-14, 2018.
8. **Liu X.J.A.**, Frey S.D., Melillo J.M., DeAngelis K.M. Responses of microbial carbon use efficiency to soil physical protection over long-term warming. ***Ecological Society of America,*** New Orleans, LA, Aug. 5-10, 2018 *(invited).*
9. **Liu X.J.A.**, Frey S.D., Kemner K.M., Melillo J.M., Mishra B., DeAngelis K.M. Resolving conflicting physical and biochemical feedbacks to climate in response to long-term warming. ***Environmental System Science PI Meeting,*** Potomac, MD, May 1-2, 2018.
10. **Liu X.J.A.**, Mau RL, Hayer M, Finley B, Schwartz E, Dijkstra P and Hungate BA. Responses of microbial communities and soil organic matter decomposition following labile carbon and nitrogen inputs. ***Multi-omics for Microbiomes-EMSL Integration Conference,*** Pasco, WA, Aug. 1-3, 2017.
11. **Liu X.J.A.**, Mau RL, Hayer M, Finley B, Schwartz E, Dijkstra P and Hungate BA. Carbon and nitrogen inputs affect soil microbial community structure and function. ***AGU Fall meeting***, San Francisco, CA, Dec. 12-16, 2016.
12. **Liu X.J.A.**, Sun J, Finley B, Dijkstra P, Schwartz E and Hungate BA. Amounts of substrate carbon and nitrogen control the decomposition of soil organic matter. ***AGU Fall meeting***, San Francisco, CA, Dec. 14-18, 2015.
13. **Liu X.J.A.**, Sun J, Mau RL, Finley B, Compson ZG, Dijkstra P, Schwartz E and Hungate BA. A threshold of substrate addition rate predicts the direction of soil organic matter priming in different ecosystems. ***AGU Fall meeting***, San Francisco, CA, Dec. 14-19, 2014.
14. **Liu X.J.**, Fike J., Galbraith J., Evanylo G. 2013. Management considerations for biofuel production systems. ***American Forage and Grassland Council National Meeting***, Covington, KY. Jan. 6-8, 2013.
15. **Liu X.J.**, Fike J., Galbraith J., Evanylo G. 2012. Effects of biosolids application and harvest management on switchgrass biomass production and biofuel feedstock quality. 187-10. ***ASA, CSSA and SSSA International Annual Meetings***, Cincinnati, OH. Oct.20-24, 2012.
16. **Liu X.J.**, Fike J., Galbraith J., Evanylo G. 2012. Effects of biosolids application and harvest management on soil carbon and nitrogen in biofuel production systems. 297-7. ***ASA, CSSA and SSSA International Annual Meetings***, Cincinnati, OH. Oct.20-24, 2012.
17. **Liu X.J.**, Fike J., Galbraith J., Starner D. 2011. Effects of biosolids rates and harvest frequency on switchgrass yield and biomass feedstock quality. 326-10. ***ASA, CSSA and SSSA International Annual Meetings***, San Antonio, TX. Oct. 16-19, 2011.

**PAST AND ONGOING AMERICAN COLLABORATORS**

- Drs. Blazewicz, Pett-Ridge (LLNL).
- Drs. Creamer, Reed (USGS).
- Dr. Cusack (Colorado State University).
- Dr. DeAngelis (University of Massachusetts Amherst).
- Drs. Dijkstra, Hungate, Schwartz, Bowker (Northern Arizona University).
- Drs. Fike, Galbraith, Evanylo, Strahm (Virginia Tech).
- Dr. Frey (University of New Hampshire).
- Dr. Hall (Iowa State University).
- Dr. Hofmockel (PNNL).
- Drs. Jastrow, Kemner (ANL).
- Dr. Kleber (Oregon State University).
- Dr. Melillo (Marine Biological Lab).
- Dr. Morrissey (West Virginia University).
- Dr. Rasmussen (University of Arizona).
- Drs. Schachtman, Alvarez (University of Nebraska Lincoln).
- Dr. Smith (Texas A&M University).
- Dr. Sulman (ORNL).
- Dr. Schulz (USGS).
- Dr. van Gestel (Texas Tech University).
- Dr. Zhou (University of Oklahoma).

**PAST AND ONGOING INTERNATIONAL COLLABORATORS**

- Dr. Averill, ETH Zürich, Switzerland.
- Dr. Compson, University of New Brunswick, Canada.
- Dr. Kalbitz, Dresden University of Technology, Germany.
- Dr. Mishra, University of Leeds, UK.
- Dr. Powlson, Rothamsted Research, UK.
- Dr. van Groenigen, University of Exeter, UK.
- Dr. Waring (Imperial College, UK).
- Dr. Zhou, Northwest A&F University, China.