

Liang Liang
Department of Geography
University of Kentucky
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Lexington, KY 40506-0027

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EDUCATION

- Ph.D. 2009 Geography, Department of Geography, University of Wisconsin-Milwaukee
Dissertation: *Landscape Phenology of Wisconsin's Temperate Mixed Forest*
Advisor: Dr. Mark D. Schwartz
- M.S. 2003 Quaternary Geology, College of Environmental Sciences, Peking University
Thesis: *Mid-Holocene Environmental History of Yiluo River Basin*
Advisor: Dr. Zhengkai Xia
- B.S. 1999 Geochemistry, Department of Earth Sciences, Nanjing University
Thesis: *Geochemical Study of Urban Aerosols in Eastern China*
Advisor: Dr. Junfeng Ji

ACADEMIC APPOINTMENTS

- 2017- Associate Professor, Department of Geography, University of Kentucky
2011-2017 Assistant Professor, Department of Geography, University of Kentucky
2009-2011 Postdoctoral Scholar, Department of Forestry, University of Kentucky
Mentor: Dr. Songlin Fei (now with Purdue University)

RESEARCH

Bioclimatology—focusing on temporal processes and spatial patterns of organisms (especially plant and vegetation) in relation to climatic and ecological changes, using field observations, spatial models, and remote sensing

TEACHING

GEO 130 Earth's Physical Environment
GEO 230 Weather and Climate
GEO 3/609 Introduction to GIS/GIS Fundamentals
GEO 4/619 Introduction to Remote Sensing/Remote Sensing Fundamentals

VISITING SCHOLARSHIPS

Spring 2019, Discipline of Forest Management, Zhejiang A&F University
Fall 2018, Geospatial Sciences Center of Excellence/Department of Geography, South Dakota State University

PUBLICATIONS

Journal articles

- Donnelly, A., Yu, R., Liu, L., Hanes, J., Liang, L., Schwartz, M.D. and Desai, A.R., 2019. Comparing in-situ leaf observations in early spring with flux tower CO₂ exchange, MODIS EVI and modeled LAI in a northern mixed forest. *Agricultural and Forest Meteorology* 278: 107673
- Lang, W., Chen, X., Liang, L., Ren, S., and Qian S. 2019. Geographic and climatic attributions of autumn land surface phenology spatial patterns in the temperate deciduous broadleaf forest of China. *Remote Sensing* 11:1546
- Liang, L. 2019 A spatially explicit modeling analysis of adaptive variation in temperate tree phenology. *Agricultural and Forest Meteorology* 266-267:73-86
- Kujjo, C., Liang, L., Ravat, D. 2018 Mapping hydrothermal alteration zones in the didinga hills, South Sudan. *International Journal of Remote Sensing & Geoscience* 7:2
- Donnelly, A., Yu, R., Caffarra, A., Hanes, J., Liang, L., Desai, A.R., Liu, L., and Schwartz, M.D. 2017. Interspecific and interannual variation in the duration of spring phenophases in a northern mixed forest. *Agricultural and Forest Meteorology* 243: 55-67
- Liang, L. 2016 Beyond the Bioclimatic Law: geographic adaptation patterns of temperate plant phenology. *Progress in Physical Geography* 40: 811-834
- Liang, L., Schwartz, M.D., and Zhang, X. 2016. Mapping temperate vegetation climate adaptation variability using normalized land surface phenology. *Climate* 4:24.
- Liang, L., and Zhang, X. 2016. Coupled spatiotemporal variability of temperature and spring phenology in the eastern U.S. *International Journal of Climatology* 36: 1744-1754
- Yu, R., Schwartz, M.D., Donnelly, A., and Liang, L. 2016. An observation-based progression modeling approach to spring and autumn deciduous tree phenology. *International Journal of Biometeorology* 60:335-349
- Liang, L. 2015. Geographic variations in spring and autumn phenology of white ash in a common garden. *Physical Geography* 36:489-509
- Liu, L.L., Liang, L., Schwartz, M.D., Donnelly, A., Wang, Z., Schaaf, C.B., and Liu, L.Y. 2015. Evaluating the potential of MODIS satellite data to track temporal dynamics of autumn phenology in a temperate mixed forest. *Remote Sensing of Environment* 160:156-165
- Liu, L.L., Liu, L.Y., Liang, L., Donnelly, A., Schwartz, M.D., and Park, I. 2014. Effects of elevation on temperature sensitivity of spring phenology in Tibetan Plateau grasslands. *Chinese Science Bulletin* 59:4856-4863
- Liang, L., Schwartz M.D., Wang Z, Gao F, Schaaf C.B., Tan B, Morissette J.T., and Zhang, X. 2014. A cross comparison of spatiotemporally enhanced springtime phenological measurements from satellites and ground in a northern U.S. mixed forest. *IEEE Transactions on Geoscience and Remote Sensing* 52:7513-7526
- Liang, L., and Schwartz, M.D. 2014. Testing a growth efficiency hypothesis with continental-scale phenological variations of common and cloned plants. *International Journal of Biometeorology* 58:1789-1797

- Schwartz, M.D., Hanes, J., and Liang, L. 2014. Separating temperature from other factors in phenological measurements. *International Journal of Biometeorology* 58:1699-1704
- Liang, L., and Fei, S. 2014. Divergence of the potential invasion range of emerald ash borer and its host distribution in North America under climate change. *Climatic Change* 122:735-746
- Gosling, S.M., Bryce, E.K., Dixon, P.G., Gabriel, K., Gosling, E.Y., Hanes, J., Hondula, D.M., Liang, L., Mac-Lean, P. A.B., Muthers, S., Nascimento, S.T., Petralli, M., Vanos, J.K., and Wanka, E.R. 2014. A glossary for biometeorology. *International Journal of Biometeorology* 58:277-308
- Liang, L., Clark, J.T., Kong, N., Rieske, L.K., and Fei, S. 2014. Spatial analysis facilitates invasive species risk assessment. *Forest Ecology and Management* 315:22-29
- Liang, L., Fei, S., Ripy, J. B., Blandford, B. L., and Grossardt, T. 2013. Stream habitat modelling for conserving a threatened headwater fish in the Upper Cumberland River, Kentucky. *River Research and Applications* 29: 1207-1214
- Schwartz, M.D., Hanes, J., and Liang, L. 2013. Comparing carbon flux and high-resolution spring phenological measurements in a northern mixed forest. *Agricultural and Forest Meteorology* 169:136-147
- Shouse, M., Liang, L., and Fei, S. 2013. Identification of understory invasive exotic plants with remote sensing in urban forests, *International Journal of Applied Earth Observation and Geoinformation* 21:525-534
- Fei, S., Liang, L., Paillet, F. L., Steiner K.C., Fang, J., Shen, Z., Wang Z., and Hebard, F.V. 2012. Modelling chestnut biogeography for American chestnut restoration, *Diversity and Distributions* 18: 754-768
- Liang, L., Schwartz, M. D., and Fei, S. 2012. Photographic assessment of temperate forest understory phenology in relation to springtime meteorological drivers, *International Journal of Biometeorology* 56: 343-355
- Clark, J. T, Fei, S., Liang, L., and Rieske, L. K. 2012. Mapping eastern hemlock: Comparing classification techniques to evaluate susceptibility of a fragmented and valued resource to an exotic invader, the hemlock woolly adelgid, *Forest Ecology and Management* 266: 216-222
- Liang, L., Schwartz, M. D., and Fei, S. 2011. Validating satellite phenology through intensive ground observation and landscape scaling in a mixed seasonal forest, *Remote Sensing of Environment* 115: 143-157
- Liang, L., and Schwartz, M. D. 2009. Landscape phenology: an integrative approach to seasonal vegetation dynamics. *Landscape Ecology* 24: 465-472
- Henebry, G., Richardson, A., Breshears, D., Abatzoglou, J., Fisher, J., Graham, E., Hanes, J., Knapp, A., Liang, L., Wilson, B., and Morisette, J. 2009. Phenological trend estimation: a reply to Sagarin. *Frontiers in Ecology and the Environment* 7: 296
- Morisette, J., Richardson, A., Knapp, A., Fisher, J., Graham, E., Abatzoglou, J., Wilson, B., Breshears, D. D., Henebry, G., Hanes, J., and Liang, L. 2009. Tracking the rhythm of the seasons in the face of global change: phenological research in the 21st century. *Frontiers in Ecology and the Environment* 7: 253-260

Other publications

- Liang, L., 2019. Phenology, *Reference Module in Earth Systems and Environmental Sciences*, Elsevier
- Schwartz, M.D., and Liang, L. 2019. Finding and analysing long-term climate data. 2nd Editoin. Dunn, P.O., and Møller A.P. (ed.), *Effects of Climate Change on Birds*, Oxford, pp 29-36
- Hanes, J., Liang, L., Morisette, J. 2014. Land surface phenology. Hanes, J. (ed.), *Biophysical Applications of Satellite Remote Sensing*, Springer, pp 99-126
- Schwartz, M.D., and Liang, L. 2013. High-resolution phenological data. Schwartz, M.D. (ed.), *Phenology: An Integrative Environmental Science*, Springer, pp 351-365
- Liang, L. 2013. Central China loess plateau mixed forests, Howarth, R.W. and Mohan, J.E. (ed.) *Biomes and Ecosystems: An Encyclopedia*, Salem Pr Inc Vol. 2, pp 463-464
- Liang, L., Schwartz, M. D., and Fei, S. 2010. Examining spring phenology of forest understory using digital photography, *Proceedings of the 17th Central Hard Wood Conference*, April 5-7, Lexington, KY
- Liang, L., Xia, Z., and Liu, D. 2003. Reconstruction of the paleoenvironment in Central North China during 5,000 aBP to 4,000 aBP: evidence from mollusks fossils. *Acta Scientiarum Naturalium Universitatis Pekinensis*, 39(4): 532-537 (in Chinese)
- Liang, L., and Xia, Z. 2003. Geomorphological estimation of soil erosion in Chan River area since 10,000 aBP. *Research of Soil and Water Conservation*, 10(3): 77-79 (in Chinese)

PRESENTATIONS***Conference presentations***

- Liang, L. 2018. Observation and applications of climate adaptation in temperate plant phenology, Phenology 2018, Melbourne, Australia
- Liang, L. 2018. A spatially-explicit analysis of the impact of genotypic variations on plant phenology models, AAG Annual Meeting, New Orleans, LA
- Liang, L. 2017. Modelling the spatial variations of white ash phenology, International Congress of Biometeorology, Durham, UK
- Liang, L. 2016. Developing a spatially-explicit phenological model using common garden observations, AAG Annual Meeting, San Francisco, CA
- Liang, L. 2015. Towards modeling inherent geographic patterns of temperate plant phenology, SEDAAG Annual Meeting, Pensacola, FL
- Liang, L. 2015. Detecting the geographic paradigms of plant phenology, AAG Annual Meeting, Chicago, IL
- Liang, L. 2014. Exploring geographically variant climatic requirements of plant phenology through common garden observations, International Congress of Biometeorology, Cleveland, OH
- Liang, L. 2014. Developing a standardized spring index for tracking geographically variant phenological response to climate change, US-IALE Symposium, Anchorage, AK
- Liang, L. 2014. Explaining geographically variant phenological sensitivities to climate change, AAG Annual Meeting, Tampa, FL

- Liang, L. 2013. Geographically variable response of land surface phenology to 2012 anomalous spring warming, AGU Fall Meeting, San Francisco, CA (poster)
- Liang, L. and Schwartz, M. D. 2013. Validation of spatiotemporally dense springtime land surface phenology with intensive and upscaled in-situ observations, AAG Annual Meeting, Los Angeles, CA
- Liang, L. 2012. Geographic variation of spring plant phenology at the continental scale in response to inter-annual weather fluctuations, Phenology 2012 Conference, Milwaukee, WI
- Liang, L. and Schwartz, M. D. 2012. Exploring geographic variations of plant phenology plasticity, US-IALE Symposium, Newport, RI
- Liang, L. and Fei, S. 2011. Continental-scale bioclimatic modeling of Emerald Ash Borer invasion, 2nd Kentucky Invasive Species Conference and the 13th Annual Southeast Exotic Pest Plant Council Conference, Lexington, KY
- Liang, L. and Fei, S. 2011. Climatic limits of worldwide chestnut distribution, AAG Annual Meeting, Seattle, WA
- Liang, L., and Fei, S. 2010. Prediction of climatic limits of emerald ash borer invasion in North America (poster), SAF 2010 National Convention, Albuquerque, NM
- Liang, L., Schwartz, M. D., and Fei, S. 2010. Examining spring phenology of forest understory using digital photography, 17th Central Hard Wood Conference, Lexington, KY
- Schwartz, M. D., Hanes, J., and Liang, L. 2010. An approach to high-resolution spatial and temporal surface phenological observations. AAG Annual Meeting, Washington D.C. (Schwartz presented)
- Schwartz, M. D., Hanes, J., Liang, L., and Yu, R. 2009. Applications of High-resolution Spring and Autumn Surface Phenology Observations. AAG Annual Meeting, Las Vegas, NV (Schwartz presented)
- Liang, L., and Schwartz, M. D. 2009. Landscape phenology: an integrative approach to seasonal vegetation dynamics. US-IALE Symposium, Snowbird, UT
- Schwartz, M. D., and Liang, L. 2008. Bridging surface observations and remote sensing data for landscape-level phenological studies. ESA Annual Meeting, Milwaukee, WI (Schwartz presented)
- Liang, L., and Schwartz, M. D. 2008. Plant phenology study in a mixed temperate forest of northern Wisconsin (poster). ESA Annual Meeting, Milwaukee, WI
- Liang, L., and Schwartz, M. D. 2008. Tracking satellite phenology with intensive surface observations. AAG Annual Meeting, Boston, MA
- Liang, L., and Schwartz, M. D. 2007. Intensive landscape phenology—from trees to the forest (poster). AGU Fall Meeting, San Francisco, CA
- Schwartz, M. D., and Liang, L. 2007. Applications of spatially concentrated phenological measurements. AAG Annual Meeting, San Francisco, CA (Schwartz presented)
- Liang, L., and Schwartz, M. D. 2006. Integrating in-situ and remote sensing phenological observations at the landscape level. AAG Annual Meeting, Chicago, IL
- Schwartz, M. D., and Liang, L. 2006. Separating climate from other factors influencing spring's onset. AAG Annual Meeting, Chicago, IL (Schwartz presented)

Other presentations

- Liang, L. 2018 Climatic adaptation of temperate plant phenology: patterns and models, South Dakota State University, Brookings, SD

- Liang, L. 2017 Geographic adaptation patterns in plant phenology: observations and applications, Murray State University, Murray, KY
- Liang, L. 2016 Developing spatially-explicit plant phenological models, USA-National Phenology Network, Tucson, AZ
- Liang, L. 2015 Geographically variable climate change impacts on temperate plant phenology, Department of Plant and Soil Sciences, for class IPS 625-Transdisciplinary Research, University of Kentucky, Lexington, KY
- Liang, L. 2015 Phenological study at a white ash common garden in the Daniel Boone National Forest, Department of Forestry, University of Kentucky, Lexington, KY
- Fei, S., and Liang, L. 2013. American chestnut restoration, a biogeographic perspective, 5th World Conference on Ecological Restoration, Madison, WI (Fei presented)
- Liang, L. 2012. Varying plant phenology plasticity in response to climate gradient, Department of Biology, University of Kentucky, Lexington, KY
- Liang, L. 2010. Exploring the spring onset across multiple scales through landscape phenology, Department of Geography, University of Kentucky, Lexington, KY
- Liang, L., and Fei, S. 2010. Biomass and species composition dynamics of central Appalachian forests, Spring Research Symposium, Center for Ecology, Evolution and Behavior, University of Kentucky, Lexington, KY
- Liang, L., Schwarz, M. D., and White, M. 2008. Assessing land surface growth efficiency variation using a climate-calibrated phenological index, UCGIS Summer Assembly, Minneapolis, MN
- Liang, L., and Schwartz, M. D. 2008. Forest phenology study in northern Wisconsin. Sino-Ecologists Association Overseas Symposium, Milwaukee, WI
- Liang, L., and Schwartz, M. D. 2008. Comparing surface and satellite phenology through landscape upscaling. ChEAS Annual Research Meeting, University of Notre Dame Research Center-East, Gogebic County, MI
- Liang, L., and Schwartz, M. D. 2007. Intensive study of landscape phenology. USA National Phenology Network Annual Meeting, Milwaukee, WI
- Liang, L., and Schwartz, M. D. 2007. Spring landscape phenology near the WLEF tower: preliminary report from 2007 field campaign. ChEAS Annual Research Meeting, Kemp Nature Resources Station, Woodruff, WI
- Liang, L., and Schwartz, M. D. 2006. Intensive monitoring of spring phenology near the WLEF tower: preliminary results from 2006 field campaign. ChEAS Annual Research Meeting, Kemp Nature Resources Station, Woodruff, WI

FUNDING

Doctoral Dissertation Research Improvement Grant, \$9,260, National Science Foundation, BCS-0703360, Geography and Regional Science Program, 2007-2008

AWARDS

NASA-MSU Professional Enhancement Award, NASA/Michigan State Univ., 2009
 Best Student GIS Project, First Place, UWM/WLIA, 2008
 UCGIS Student Scholar Presentation/Travel Award, UCGIS/USGS, 2008
 Graduate School Travel Award, UWM, 2008

Mary Jo Read Travel and Field Work Awards, Geography Dept., UWM, 2006 and 2008
 Mary Jo Read Awards, Geography Dept., UWM, 2003-2008

ACADEMIC MEMBERSHIPS

Association of American Geographers
 American Geophysical Union
 International Society of Biometeorology

PROFESSIONAL SERVICES

Journal article peer review

- 2019: *Journal of Advances of Modeling Earth Systems* (1), *New Phytology* (1), *Oikos* (1), *Remote Sensing of environment* (1), *Science of the Total Environment* (1), *Physical Geography* (1), *Agricultural and Forest Meteorology* (2), *International Journal of Biometeorology* (2)
- 2018: *Agricultural and Forest Meteorology* (1), *Journal of Geophysical Research* (1), *Remote Sensing of Environment* (3), *Scientific Report* (1), *Urban Science* (1), *International Journal of Biometeorology* (1), *Journal of Systematics and Evolution* (1)
- 2017: *Ecosphere* (1), *Landscape Ecology* (1), *Agricultural and Forest Meteorology* (1), *International Journal of Biometeorology* (2), *ISPRS Journal of Photogrammetry and Remote Sensing* (1), *Remote Sensing of Environment* (1), *Remote Sensing in Ecology and Conservation* (1), *Physical Geography* (1)
- 2016: *Remote Sensing* (1), *Computers and Electronics in Agriculture* (1), *Environmental Research Letter* (1), *Remote Sensing of Environment* (2), *Earth Interactions* (1), *International Journal of Applied Earth Observation and Geoinformation* (1), *Environmental Monitoring and Assessment* (1), *International Journal of Biometeorology* (1)
- 2015: *Remote Sensing of Environment* (1), *Remote Sensing* (1), *International Journal of Digital Earth* (1), *Ecosphere* (1), *PLoS ONE* (1), *Environmental Research Letter* (1), *Journal of Basic & Applied Sciences* (1), *OIKOS* (1), *International Journal of Biometeorology* (2), *International Journal of Applied Earth Observation and Geoinformation* (1)
- 2014: *International Journal of Biometeorology* (2), *International Journal of Climatology* (1), *Ecological Processes* (1), *New Phytologist* (1), *Global Change Biology* (1)
- 2013: *Remote Sensing of Environment* (2), *International Journal of Biometeorology* (3), *PLoS ONE* (1), *Journal of Geology & Geosciences* (1), *Advanced Space Research* (1), *International Journal of Remote Sensing* (1), *Soil and Tillage Research* (1), *New Phytologist* (1), *Environmental Management* (1), *Global Change Biology* (1), *Remote Sensing* (1)
- 2012: *Remote Sensing Letters* (2), *African Journal of Plant Science* (1), *Environmental Engineering and Management Journal* (1), *Environmental Management* (1), *Environmental Science and Pollution Research* (1), *New Phytologist* (1), *International Journal of Biometeorology* (3), *Journal of Arid Land* (1), *Remote Sensing* (1), *Earth Interactions* (1), *PLoS ONE* (1)

2009-2011: *Plant Ecology and Diversity* (1), *Ecological Applications* (1), *International Journal of Biometeorology* (2), *Northern Journal of Applied Forestry* (2), *Global Change Biology* (1), *Applied Vegetation Science* (1), *Central Hardwood Conference Proceedings* (1), *Remote Sensing* (1), *Remote Sensing of Environment* (2), *Molecular Ecology* (1)

Editorial advisory board member of *International Journal of Biometeorology*

Grant proposal review

Belgium Federal Science Policy (2018)
Czech Science Foundation (2017)
Fonds de recherche du Québec – Nature et technologies (2017)
USA National Science Foundation (2013, 2017, 2019)
Netherlands Organisation for Scientific Research (2011, 2012, 2015)
Murdock College Research Program for Life Sciences (2012)

Book/chapter review

Oxford Bibliographies (2017)
Essential Physical Geography by H. J. de Blij et al. (2017)
The Physical Environment by Michael E. Ritter (2017)
Essential Physical Geography by H. J. de Blij et al. (2015)
Geosystems Core by R. W. Christopherson et al. (2015)
Weather and Climate by S. L. Ross (2014)
Living Physical Geography by B. R. Gervais (2014, 2018)
Phenology: An Integrative Environmental Science, 2nd Ed. (2012)
Aspiring Academics and Teaching College Geography (2009)

Other synergistic activities

Observer, United Nations Climate Change Conference (COP 24), Katowice, Poland, 2018
Session chair, Remote Sensing II: Phenology Conference 2018, Melbourne, Australia, 2018
Session co-chair, and science committee member, 21st Int. Congress of Biometeorology, Durham, UK, 2017
Session chair, Phenology II: Modeling, 20th Int. Congress of Biometeorology, Cleveland, OH, 2014
Session chair, Phenology II: Remote Sensing, AAG Annual Meeting, Los Angeles, CA, 2013
Moderator, The 2nd Kentucky Invasive Species Conference and the 13th Annual Southeast Exotic Pest Plant Council Conference, Lexington, KY, 2011
Moderator, The 17th Central Hard Wood Conference, Lexington, KY, 2010
Local host for the Sino-Eco Annual Symposium, Milwaukee, WI, 2008

PERSONAL DATA

Birth year: 1976

Birth place: Xining, Qinghai, China

Marital status: married, with four children

(Updated 8/19/2019)