

Laura C. Bowling
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Academic appointments

- Aug. 2016 – present Purdue University, Professor
- Aug. 2010 to Aug. 2016 Purdue University, Associate Professor
- Jan. 2004 to Aug. 2010 Purdue University, Assistant Professor
- Aug. 2002 to Apr. 2003 U. of Washington, Research Scientist
- Aug. 2000 to July 2002 U. Washington, Graduate Research Asst.
- Aug. 1997 to July 2000 U. Washington, NASA Earth System Science Fellow
- Aug. 1996 to July 1997 U. Washington, Graduate Research Asst.
- Aug. 1995 to July 1996 U. Washington, Valle Fellow

Industrial, business and governmental positions

- June 1993 to Aug. 1995 Engineering consultant, ENVIRON Corporation, Princeton, NJ

Licenses, registrations, and certificates.

- Engineer in Training Certification, New Jersey, 1996

Honors and Awards

- 2016 Outstanding Graduate Mentor, Dept. of Agronomy
- 2014 Richard L. Kohls Outstanding Undergraduate Teacher, Dept. of Agronomy
- 2011 Richard L. Kohls Outstanding Early Career Teacher, Dept. of Agronomy
- 2004 Essential Science Indicators, New Hot Paper
- 2003 Seventh Annual ARCUS Award for Arctic Research Excellence, Honorable Mention
- 1998-2001 NASA Earth System Science Fellowship
- 1995 Valle Graduate Fellowship
- 1993 Sigma Xi Undergraduate Research Book Award

Research and Teaching Interests

Dr. Bowling's research interests are focused on water cycle alteration through human intervention across multiple scales and ecosystems and communication of these findings to stakeholders, such as urban planners, conservationists, policy-makers and drainage boards. Specific activities that help her to bridge the gap between research and application, include: (1) Peer-review for several journals and agency proposals, (2) Service on the NSF-sponsored Consortium of Universities for the Advancement of Hydrologic Science, Inc. standing committee for research applications and alternate Purdue University representative, (3) Development of experiential hydrologic learning curriculum for non-engineers, including a field laboratory, lectures and assignments, (4) Guest lectures/presentations for K-12, university and adult learning experiences organized by county extension agents, soil and water conservation districts and Purdue student groups, including the summer research experience for women and under-represented minorities, and (5) Development of algorithms for freely-available hydrologic research models (the Distributed Hydrology-Soil-Vegetation Model and the Variable Infiltration Capacity model). Aid in model support and documentation for other researchers through on-going collaboration with the University of Washington and active contribution to email user-groups. Teaching interests include development of experiential water resources and hydrologic learning curriculum for non-

engineers, including an environmental hydrology field laboratory, on-line learning and interactive case studies as part of an introductory course in water and food security.

Professional Affiliations

Indiana Water Resources Association, American Geophysical Union, American Meteorological Society, American *Society* of Agronomy, Crop Science *Society* of America, and Soil Science *Society* of America

Collaborators

Adam, J.(WSU), Ashfaq, M. (ORNL), Benjamin, G. (Purdue), Bohn, T. (U. Washington), Brouder, S. (Purdue), Campana, M. (Oregon State U.), Chaubey, I. (Purdue), Cherkauer, K. (Purdue), Crawford, M. (Purdue), Diffenbaugh, N. (Stanford), Fekete, B. (U. of New Hampshire), Frankenberger, J. (Purdue), Fuller, P. (USGS), Bowen, G. (Purdue), Ghosh, S.(IIT), Goforth, R. (Purdue), Graf, W. (U. SC), Hopmans, J. (UC Davis), Huang, C. (USDA NSERL), Huber, M. (Purdue), Kao, S. (ORNL), Kladivko, E. (Purdue), Kominsoski, J. (U. Georgia), Kossi Nouwakpo, S. (Purdue), Lammers, R. (U. New Hampshire), Lawford, R. (Goddard Earth Sciences & Technology Center), Lei, M. (Purdue), Murphy, P. (Purdue), Prokopy, L. (Purdue), MacDonald, A. (Woods Hole), Mishra, V. (U. Washington), Mote, P. (Oregon State), Nasonova, O. (RAS), Niyogi, D. (Purdue), Owens, P. (Purdue), Pal, J. (Loyola Marymount U.), Pijanowski, B. (Purdue), Rauscher, S. (LANL), Ray, D. (U. MN), Turco, R. (Purdue), Sabo, J. (ASU), Schoups, G. (Delft), Shmakin, A. (RAS), Sinha, T. (NC State), Taylor, C. (ASU), Trimble, S. (UCLA), Volenec, J. (Purdue), Wallendar, W. (UC Davis), Webb, R. (USGS), Wohl, E. (CSU), Wood, E. (Princeton), Youssef, M. (NC State)

Published work

Full articles in refereed publications

1. Storck, P., **L. Bowling**, P. Wetherbee and D. Lettenmaier, 1998, Application of a GIS-based distributed hydrology model for prediction of forest harvest effects on peak stream flow in the Pacific Northwest, *Hydrological Processes*, 12, 889-904.
2. **Bowling, L.C.**, P. Storck and D.P. Lettenmaier, 2000, Hydrologic effects of logging in Western Washington, United States, *Water Resources Research*, 36 (11), 3223-3240.
3. **Bowling, L.C.**, D.L. Kane, R.E. Gieck, L.D. Hinzman and D.P. Lettenmaier, 2003, The role of surface storage in a low-gradient arctic watershed, *Water Resources Research*, 39(4), 1087-1099, doi:10.1029/2002WR001466.
4. **Bowling, L.C.**, D.P. Lettenmaier, B. Nijssen, L.P. Graham, D.B. Clark, M. El Maayar, R. Essery, S. Goers, Y.M. Gusev, F. Habets, B. van den Hurk, J. Jin, D. Kahan, D. Lohmann, X. Ma, S. Mahanama, D. Mocko, O. Nasonova, G.Y. Niu, P. Samuelsson, A.B. Shmakin, K. Takata, D. Verseghy, P. Viterbo, Y. Xia, Y. Xue, Z.L. Yang, 2003, Simulation of high latitude hydrological processes in the Torne-Kalix basin, PILPS Phase 2e, 1: Experiment description and summary intercomparisons, *Journal of Global and Planetary Change*, 38(1-2), 1-30.
5. Nijssen, B., **L.C. Bowling**, D.P. Lettenmaier, D.B. Clark, M. El Maayar, R. Essery, S. Goers, Y.M. Gusev, F. Habets, B. van den Hurk, J. Jin, D. Kahan, D. Lohmann, X. Ma, S. Mahanama, D. Mocko, O. Nasonova, G.Y. Niu, P. Samuelsson, A.B. Shmakin, K. Takata, D. Verseghy, P. Viterbo, Y. Xia, Y. Xue, and Z.L. Yang, 2003, Simulation of high latitude hydrological processes in the Torne-Kalix basin: PILPS Phase 2(e) 2: Comparison of model results with observations, *Journal of Global and Planetary Change*, 38(1-2), 31-53.
6. **Bowling, L.C.**, D.P. Lettenmaier, B. Nijssen, J. Polcher, R.D. Koster and D. Lohmann, 2003, Simulation of high latitude hydrological processes in the Torne-Kalix basin: PILPS Phase 2(e) 3: Equivalent model representation and sensitivity experiment, *Journal of Global and Planetary Change*, 38(1-2), 55-71.
7. Cherkauer, K. A., **L. C. Bowling** and D. P. Lettenmaier, 2003, Variable Infiltration Capacity

- (VIC) Cold Land Process Model Updates, *Journal of Global and Planetary Change*, 38(1-2), 151-159.
8. **Bowling, L.C.**, J.W. Pomeroy and D.P. Lettenmaier, 2004. Parameterization of blowing snow sublimation in a macroscale hydrology model, *Journal of Hydrometeorology*, 5(5), 745-762.
 9. Su, F., J.C. Adam, **L.C. Bowling**, and D.P. Lettenmaier, 2005, Streamflow Simulations of the Terrestrial Arctic Domain, *Journal of Geophysical Research*, 110, D08112, doi:10.1029/2004JD005518.
 10. Doten, C.O., **L.C. Bowling**, E.P. Maurer, J.S. Lanini and D.P. Lettenmaier, 2005, A spatially distributed model for the dynamic prediction of sediment erosion and transport in mountainous forested watersheds, *Water Resources Research*, 42(4), DOI: 10.1029/2004WR003829.
 11. Bohn, T.J., D.P. Lettenmaier, K. Sathulur, **L.C. Bowling**, E. Podest, K.C. McDonald and T. Friborg, 2007: Methane emissions from western Siberian wetlands: heterogeneity and sensitivity to climate change, *Env. Res. Lett.*, 2(4), doi:10.1088/1748-9326/2/4/045015.
 12. Naz, B. and **L.C. Bowling**, 2008, Automated identification of tile lines from remotely sensed data. *Trans. of ASABE*, 51(6): 1937-1950.
 13. MacDonald, A.M., **L.C. Bowling**, B.M. Fekete, R.B. Lammers and R. Lawford, 2009: U.S. River Discharge for 2008 [in "State of the Climate in 2008"]. *Bulletin of the American Meteorological Society*, 90 (8), S129.
 14. MacDonald, A.M., B.M. Fekete, **L.C. Bowling**, R.B. Lammers and R. Lawford, 2009: River Discharge [in "State of the Climate in 2008"]. *Bulletin of the American Meteorological Society*, 90 (8), S30-S31.
 15. Ale, S., **L.C. Bowling**, S.M. Brouder, J.R. Frankenberger and M. Youssef, 2009, The simulated effect of drainage water management operational strategy on hydrology and crop yield for Drummer soil in the Midwestern United States. *Ag. Water Mngmnt*, 96(4), 653-665.
 16. Naz, B., S. Ale and **L.C. Bowling**, 2009, Detecting subsurface drainage and estimating drain spacing in intensively managed agricultural landscapes, 2009, *Ag. Water Mngmnt*, 96(4), 627-637.
 17. Fekete, B.M., R.B. Lammers, A. MacDonald, **L.C. Bowling** and R. Lawford, 2010: River Discharge [in "State of the Climate in 2009"]. *Bulletin of the American Meteorological Society*, 91 (7), S35.
 18. Mishra, V., K. Cherkauer and **L. Bowling**, 2010: Are small lakes becoming ice free in the Great Lakes Region, *Bulletin of the American Meteorological Society* v. 91 no. 7 (July 2010) p. 857-858.
 19. Sabo, J. L., T. Sinha, **L.C. Bowling**, G.H.W. Schoups, W.W. Wallender, M.E. Campana, K.A. Cherkauer, P.L. Fuller, W.L. Graf, J.W. Hopmans, J.S. Kominoski, C. Taylor, S.W. Trimble, R.H. Webb and E.E. Wohl, 2010, Reclaiming freshwater sustainability in the Cadillac Desert. *Proceedings of the National Academy of Sciences of the United States*, 107(50), 21263-21269.
 20. Mishra, V., K.A. Cherkauer and **L.C. Bowling**, 2010, Parameterization of Lakes and Wetlands for Energy and Water Balance Studies in the Great Lakes Region, *Journal of Hydrometeorology*, 11(5), 1057-1082, doi: 10.1175/2010JHM1207.1.
 21. Bowling, L.C. and D.P. Lettenmaier, 2010, Modeling the effects of lakes and wetlands on the water balance of Arctic environments. *Journal of Hydrometeorology*, 11(2), 276-295, doi: 10.1175/2009JHM1084.1.
 22. Ashfaq, M., **L. C. Bowling**, K. Cherkauer, J. S. Pal, and N. S. Diffenbaugh, 2010: Influence of climate model biases and daily-scale temperature and precipitation events on hydrological impacts assessment: A case study of the United States, *J. Geophys. Res.*, 115, D14116, doi:10.1029/2009JD012965.
 23. Nouwakpo, K., C. Huang, **L.C. Bowling**, and P.R. Owens, 2010, Impact of Vertical Hydraulic

- Gradient on Rill Erodibility and Critical Shear Stress. *Soil Science Society of America Journal*, 74(6), 1914-1921.
24. Yang, G., **L.C. Bowling**, K.A. Cherkauer, B. Pijanowski and D. Niyogi, 2009, Hydroclimatic Response of Watersheds to Urban Intensity- An Observational and Modeling Based Analysis for the White River Basin, Indiana. *Journal of Hydrometeorology*, 11(1), 122-138.
 25. Ale, S., **L. Bowling**, J. Frankenberger, S. Brouder and E. Kladivko, 2009, Climate variability and drain spacing influence on drainage water management operation *Vadose Zone*, 9(1), 43-52, doi:10.2136/vzj2008.0170.
 26. Mishra, V., K.A. Cherkauer, D. Niyogi, M. Lei, B.C. Pijanowski, D.K. Ray and **L.C. Bowling**, 2010, A Regional Scale Assessment of Land use/land cover and Climatic Changes on Surface Hydrologic Processes, *International Journal of Climate*, 30(13), 2025-2044, DOI: 10.1002/joc.2095.
 27. Yang, G., **L.C. Bowling**, K.A. Cherkauer and B.J. Pijanowski, 2011, The impact of urban development on hydrologic regime from catchment to basin scales, *Landscape and Urban Planning*, 103 (2), 237-247.
 28. Mishra, V., K. A. Cherkauer, and **L. C. Bowling**, 2011, Changing thermal dynamics of lakes in the Great Lakes region: Role of ice cover feedbacks, *Global and Planetary Change*, 75,(3-4) 155-172.
 29. Mishra, V., K. A. Cherkauer, **L. C. Bowling** and M. Huber (2011), Lake ice phenology of small lakes: impacts of climate variability in the Great Lakes Region, *Global and Planetary Change*, 76 (3-4), doi:10.1016/j.gloplacha.2011.01.004.
 30. Adeuya, R.; Utt, N.; Frankenberger, J., L.C. Bowling, E. Kladivko, S. Brouder and B. Carter, 2012, Impacts of drainage water management on subsurface drain flow, nitrate concentration, and nitrate loads in Indiana, *Journal of Soil and Water Conservation*, 67 (6), 474-484. DOI: 10.2489/jswc.67.6.474.
 31. Ale, S., L.C. Bowling, M. Youssef, and S.M. Brouder, 2012, Evaluation of simulated strategies for reducing nitrate-N losses through subsurface drainage systems. *J. Environmental Quality*, 2012 41 (1), 217-228 doi:10.2134/jeq2010.0466.
 32. Kennedy, C. D., C. Bataille, Z. Liu, et al., 2012, Dynamics of nitrate and chloride during storm events in agricultural catchments with different subsurface drainage intensity (Indiana, USA), *Journal of Hydrology*, 466, 1-10. DOI: 10.1016/j.jhydrol.2012.05.002
 33. Ale, S., L.C. Bowling, P.R. Owens, S.M. Brouder and J.R. Frankenberger, 2012, Development and application of a distributed modeling approach to assess the watershed-scale impact of drainage water management, *Agricultural Water Management*, 107, 23-33. DOI: 10.1016/j.agwat.2012.01.003.
 34. Liu, YL, Zhuang, QL, Chen, M, Pan, ZH, Tchebakova, N, Sokolov, A, Kicklighter, D, Melillo, J, Sirin, A, Zhou, GS, He, YJ, Chen, JQ, Bowling, L, Miralles, D, Parfenova, E, 2013, Response of evapotranspiration and water availability to changing climate and land cover on the Mongolian Plateau during the 21st century, *Global and Planetary Change*, 108, 85-99, DOI: 10.1016/j.gloplacha.2013.06.008.
 35. Ashfaq, M. ; Subimal Ghosh ; Kao, S. C. ; Bowling, L. C. ; Mote, P. ; Touma, D. ; Rauscher, S. A. ; Diffenbaugh, N. S., 2013, Near-term acceleration of hydroclimatic change in the western U.S., *Journal of Geophysical Research: Atmospheres*, 118 (19), 10676-10693. DOI: 10.1002/jgrd.50816.
 36. Kladivko, E.J., M.J. Helmers, L.J. Abendroth, D. Herzmann, R. Lal, M.J. Castellano, D.S. Mueller, J.E. Sawyer, R.P. Anex, R.W. Arritt, B. Basso, J.V. Bonta, L.C. Bowling, R.M. Cruse, N.R. Fausey, J.R. Frankenberger, P.W. Gassman, A.J. Gassmann, C.L. Kling, A. Kravchenko, J.G. Lauer, F.E. Miguez, E.D. Nafziger, N. Nkongolo, M. O'Neal, L.B. Owens, P.R. Owens, P. Scharf, M.J. Shipitalo, J.S. Strock, and M.B. Villamil, 2014, Standardized research protocols enable transdisciplinary research of climate variation

- impacts in corn production systems, *Journal of Soil and Water Conservation*, 69(6), 532-542;doi:10.2489/jswc.69.6.532.
37. Jiang, Y., J.R. Frankenberger, Y.H. Sui and L.C. Bowling, 2014, Estimation of nonpoint source nitrate concentrations in Indiana rivers based on agricultural drainage in the watershed, *J. American Water Resources Association*, 50(6), 1501-1514.
 38. Jiang, Y., J.R. Frankenberger, L.C. Bowling and Z. Sun, 2014, Quantification of uncertainty in estimated nitrate-n loads in agricultural watersheds, *J. Hydrology*, 519, 106-116.
 39. Yang, G.X., and L.C. Bowling, 2014, Detection of changes in hydrologic system memory associated with urbanization in the Great Lakes region, *Water Resources Research*, 50 (5), 3750-3763.
 40. Khan, A., B.S. Naz., and L.C. Bowling, , 2015, Separating snow, clean and debris covered ice in the Upper Indus Basin, Hindukush-Karakoram-Himalayas, using Landsat images between 1998 and 2002, *J. Hydrology*, 521, Pages: 46-64.
 41. Kalcic, M., J.R. Frankenberger, I. Chaubey, L.S. Prokopy and L.C. Bowling, 2015, Adaptive targeting: engaging farmers to improve targeting and adoption of agricultural conservation practices, *Journal of the American Water Resources Association*, in press.
 42. Naz, B.S., S.C. Kao, M. Ashfaq, D. Rastogi, R. Mei, and L.C. Bowling, 2016, Regional hydrologic response to climate change in the conterminous United States using high-resolution hydroclimate simulations, *Global and Planetary Change*. 143, 100-117.
 43. Muenich, R.L., S. Peel, L. Bowling, M. Heller Haas, R. Turco, J. Frankenberger and I. Chaubey, 2016, The Wabash Sampling Blitz: A Case Study on the Effectiveness of Citizen Science, *Citizen Science: Theory and Practice*, 1(1), 3.
 44. Wang, R., L.C. Bowling, and K.A. Cherkauer, 2016, Estimation of the effects of climate variability on Crop yield in the Midwest USA. *Agricultural and Forest Meteorology*, 216, 141–156. doi:10.1016/j.agrformet.2015.10.001.
 45. Wang, R., K. A. Cherkauer and L. C. Bowling, 2016, Corn response to climate stress detected with satellite-based NDVI time series. *Remote Sensing*, 8(4), 269; doi:[10.3390/rs8040269](https://doi.org/10.3390/rs8040269).
 46. Alvarenga, L., C. Mello, L.C. Bowling, A. Colombo and A. Cuartas, 2016, Assessment of land cover change on the hydrology of a Brazilian headwater watershed using the Distributed Hydrology-Soil-Vegetation model, *Catena*, p. 7-17, DOI: 10.1016/j.catena.2016.04.001.

Book Chapters Written

1. Cherkauer, K. A., L. C. Bowling and Naz, B. S. (accepted), 8.15 Fluvial systems in glacial and periglacial geomorphology | Watershed hydrology in periglacial environments, in *Treatise on Geomorphology*, editors J. Harbor and R. Giardino, Elsevier Inc, San Diego, CA.

Edited Monographs (peer-reviewed)¹

47. Storck, P. *, **L. Bowling**, P. Wetherbee and D. Lettenmaier, 1999, Application of a GIS-based distributed hydrology model for prediction of forest harvest effects on peak stream flow in the Pacific Northwest, in *Hydrological Applications of GIS*, A.M. Gurnell and D.R. Montgomery (eds.), John Wiley and Son.
48. **Bowling, L.C.***, D.P. Lettenmaier* and B.V. Matheussen, 2000, Hydroclimatology of the Arctic drainage basins, in *The Freshwater Budget of the Arctic Ocean*, E.L. Lewis et al. (eds), Kluwer Academic Publishers, The Netherlands, 57-90.
49. **Bowling, L.C.*** and D.P. Lettenmaier*, 2001, The effect of forest roads and harvest on catchment hydrology in a mountainous maritime environment, in *Land Use and Watersheds: Human Influence on Hydrology and Geomorphology in Urban and Forest Areas*, Water Science and Application, The American Geophysical Union, 2, 145-164.

Conference or symposium proceedings

¹ Asterisk(s) designate the primary author(s) and names underlined indicate graduate students for which Dr. Bowling is the graduate committee chair or co-chair.

1. **Bowling, L.C.**, D.P. Lettenmaier, and D.L. Kane, 2000, Macroscale hydrology model predictions for the Arctic drainage basin, Proceedings, AWRA Conference on Water Resources in Extreme Environments, May 1-3, Anchorage, AK.
2. Kane, D.L.*, R.E. Gieck and **L.C. Bowling**, 2003, Impacts of Surficial Permafrost Landforms on Surface Hydrology. Permafrost, International Conference on Permafrost 2003, Phillips, M., Springman, S. and L.U. Arenson, eds., A.A. Balkema Publishers, London, UK.
3. Frankenberger, J. E. Kladivko, J. Gutwein, R. Adeuya, **L. Bowling**, B. Carter, S. Brouder, J. Lowenberg-DeBoer and J. Brown, 2005, On-farm monitoring to assess the impacts of drainage water management, Paper No. 052027, Tampa, Florida: ASABE Annual International Meeting.
4. Goss, A. M., **L. Bowling**, J. Harbor. Assessing the Historical Impacts of Landscape Transformation on Water Fluxes. Manuscript accepted for Proceeding of American Water Resources Association Spring Specialty Conference: Geographic Information Systems and Water Resources IV, Houston, TX, May 2006.
5. Ale, S., L.C. Bowling, S. Brouder, and J.R. Frankenberger, 2006, Simulating the effects of drainage water management using DRAINMOD, ASABE Paper Number: 062313, presented in Portland, OR. St. Joseph, MI: ASABE.
6. Frankenberger, J.R., E. Kladivko, R. Adeuya, **L. Bowling**, B. Carter, S. Brouder, J. Lowenberg-DeBoer, and J. Brown. 2006. Drainage water management impacts on nitrate load, soil quality, and crop yield. Proc. Innovations in Reducing Nonpoint Source Pollution Conf., Nov. 28-30, Indianapolis, Indiana.
7. Ale, S., B.S. Naz, and **L.C. Bowling** (2007), Mapping of Tile Drains in Hoagland Watershed for Simulating the Effects of Drainage Water Management, Paper number 072144, 2007 ASAE Annual Meeting.
8. **Bowling, L.C.**, K.A. Cherkauer and J.C. Adam, Current capabilities in regional scale simulations of surface water dynamics in regions of continuous permafrost, Proceedings, Ninth International Conference on Permafrost, June 2008.
9. Kladivko, E., Bowling, L. C., & Poole, V. (2010). Nitrate-N loads to subsurface drains as affected by drainage intensity and agronomic management practices. Proc. ASABE 9th Intl. Drainage Symposium.