

Curriculum Vitae

Derek M. Heeren, Ph.D., P.E.

Associate Professor and Irrigation Engineer

Daugherty Water for Food Global Institute Faculty Fellow

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Section 1 Education and Employment History

Section 1.1 Education History

Ph.D., Biosystems Engineering, Oklahoma State University
July 2012
Dissertation: Subsurface phosphorus transport and scale dependent phosphorus leaching in alluvial floodplains
Advisors: Garey A. Fox and Daniel E. Storm

M.S., Engineering, South Dakota State University
Emphasis: Agricultural and Biosystems Engineering
May 2008
Thesis: Evaluation of deficit irrigation strategies for corn
Advisors: Hal D. Werner and Todd P. Trooien

B.S., Agricultural and Biosystems Engineering, South Dakota State University
Emphasis: Soil and Water Resources Engineering
May 2004

Section 1.2 Engineering Licensure

Professional Engineer in State of Oklahoma, 2012-present (PE No.: 25541)

Section 1.3 Employment History

University of Nebraska – Lincoln

- *Associate Professor and Irrigation Engineer*, Department of Biological Systems Engineering (2018 – present), 58% Research, 40% Teaching, 2% Service
- *Daugherty Water for Food Global Institute (DWF1) Faculty Fellow* (2014 – present)
- *Assistant Professor and Irrigation Engineer*, Department of Biological Systems Engineering (2012 – 2018), 58% Research, 40% Teaching, 2% Service

Oklahoma State University

- *Research Engineer*, Department of Biosystems and Agricultural Engineering (2008 – 2012)

South Dakota State University

- *Graduate Research Assistant*, Department of Agricultural and Biosystems Engineering (2006 – 2008)

SCI Engineering, Inc., St. Charles, MO

- *Laboratory Supervisor* (2005 – 2006)
- *Engineering Field Technician* (2004 – 2005)

Section 1.4 Career Summary

Research

- Overarching objective: Enhance and improve both the sustainability of water resources (water quantity and water quality) and the profitability of agricultural production in Nebraska and internationally
- Current research interests: Irrigation management in the Great Plains, sprinkler irrigation, variable rate irrigation, irrigation management based on remote sensing, international irrigation development, and vadose zone hydrology
- Previous research interests: Subsurface phosphorus transport, streambank erosion, surface water-groundwater interaction, and deficit irrigation management
- Leading variable rate irrigation field research performed on the scale of commercial farm fields, including the adaptation of a remote sensing model (with satellite and unmanned aircraft data) for use in irrigation management
- Developed online map tool estimating the benefits of variable rate irrigation for 49,000 fields (<https://heeren.unl.edu/map>)
- Advanced the science of preferential flow and transport in the vadose zone (infiltration, nutrient leaching) as well as alluvial aquifers
- 44 refereed journal articles published
- 1 textbook

Teaching

- Overarching objective: Prepare students to be wise managers of irrigation, water resources, and agricultural systems
- Focus: Irrigation management in the Great Plains, including undergraduate and graduate programs
- International impact: Partnership Coordinator for DWFI and IHE Delft to provide graduate education in irrigation for students from developing countries
- Courses taught currently: Irrigation Systems Management, Advanced Irrigation Management, Irrigation Laboratory and Field Course, Modeling Vadose Zone Hydrology, and Equipment Systems
- Courses taught previously: Soil Conservation and Watershed Management, Fluvial Hydraulics, and Mechanics of Materials
- Founded and advised the UNL Fountain Wars student club, which won two national championships

Section 2 Research Accomplishments

Section 2.1 Publication Record

The following superscripts are used to indicate student co-authors

1: M.S. student under my supervision

2: Ph.D. student under my supervision

3: Post-Doctoral Research Associate under my supervision

4: Undergraduate Research Assistant under my supervision

Section 2.1.1 Peer-Reviewed Journal Publications in Print

1. Zhang, J., K. Guan, B. Peng, C. Jiang, W. Zhou, Y. Yang, M. Pan, T. E. Franz, D. M. Heeren, D. R. Rudnick, O. Abimbola, H. Kimm, K. Caylor, S. Good, M. Khanna, J. Gates, and Y. Cai. 2021. [Challenges and opportunities in precision irrigation decision-support systems for center pivots](#). *Environmental Research Letters* 16: 053003, doi: 10.1088/1748-9326/abe436.
2. Evett, S. R., P. D. Colaizzi, F. R. Lamm, S. A. O'Shaughnessy, D. M. Heeren, T. J. Trout, W. L. Kranz, and X. Lin. 2020. [Past, present and future of irrigation on the U.S. Great Plains](#). *Transactions of the ASABE* 63(3): 703-729, doi: 10.13031/trans.13620.
3. Chavez, J. L., A. F. Torres-Rua, W. E. Woldt, H. Zhang, C. Robertson, G. W. Marek, D. Wang, D. M. Heeren, S. Taghvaeian, and C. M. U. Neale. 2020. [A decade of unmanned aerial systems in irrigated agriculture in the Western U.S.](#) *Applied Engineering in Agriculture* 36(4): 423-436, doi: 10.13031/aea.13941.
4. Lo, T., D. R. Rudnick, K. C. DeJonge, G. Bai, H. N. Nakabuye, A. Katimbo, Y. Ge, T. E. Franz, X. Qiao, and D. M. Heeren. 2020. [Differences in soil water changes and canopy temperature under varying water × nitrogen sufficiency for maize](#). *Irrigation Science* 38: 519-534, doi: 10.1007/s00271-020-00683-2.
5. Barker³, J. B., W. E. Woldt, B. D. Wardlow, M. S. Maguire, B. C. Leavitt, C. M. U. Neale, and D. M. Heeren. 2020. [Calibration of a common shortwave multispectral camera system for quantitative agricultural applications](#). *Precision Agriculture* 21: 922-935, doi: 10.1007/s11119-019-09701-6.
6. Bhatti¹, S., D. M. Heeren, J. B. Barker³, C. M. U. Neale, W. E. Woldt, M. S. Maguire, and D. R. Rudnick. 2020. [Site-specific irrigation management in a sub-humid climate using a spatial evapotranspiration model with satellite and airborne imagery](#). *Agricultural Water Management* 230, doi: 10.1016/j.agwat.2019.105950.
7. Singh², J., D. M. Heeren, D. R. Rudnick, W. E. Woldt, G. Bai, Y. Ge, and J. D. Luck. 2020. [Soil structure and texture effects on the precision of soil water content measurements with a capacitance-based electromagnetic sensor](#). *Transactions of the ASABE* 63(1): 141-152, doi: 10.13031/trans.13496.
8. Franz, T. E., S. Pokal, J. P. Gibson, Y. Zhou, H. Gholizadeh, F. A. Tenorio, D. R. Rudnick, D. M. Heeren, M. McCabe, M. Ziliani, Z. Jin, K. Guan, M. Pan, J. Gates, and B. D. Wardlow. 2020. [The role of topography, soil, and remotely sensed vegetation condition towards predicting crop yield](#). *Field Crops Research* 252, doi: 10.1016/j.fcr.2020.107788.
9. Lo, T., D. R. Rudnick, J. Singh, H. N. Nakabuye, A. Katimbo, D. M. Heeren, and Y. Ge. 2020. [Field assessment of interreplicate variability from eight electromagnetic soil moisture sensors](#). *Agricultural Water Management* 231, doi: 10.1016/j.agwat.2019.105984.
10. Koehler-Cole, K., R. W. Elmore, H. Blanco-Canqui, C. A. Francis, C. A. Shapiro, C. A. Proctor, S. Ruis, D. M. Heeren, S. Irmak, and R. B. Ferguson. 2020. [Cover crop productivity and subsequent soybean yield in the Western Corn Belt](#). *Agronomy Journal* 112: 2649–2663, doi: 10.1002/agj2.20232.
11. Barker³, J. B., S. Bhatti¹, D. M. Heeren, C. M. U. Neale, and D. R. Rudnick. 2019. [Variable rate irrigation of maize and soybean in West-Central Nebraska under full and deficit irrigation](#). *Frontiers in Big Data* 2(34), doi: 10.3389/fdata.2019.00034.

12. Halihan, T., R. B. Miller, D. Correll, D. M. Heeren, and G. A. Fox. 2019. [Field evidence of a natural capillary barrier in a gravel alluvial aquifer](#). *Vadose Zone Journal* 18:180008, doi:10.2136/vzj2018.01.0008.
13. O'Shaughnessy, S. A., S. R. Evett, P. D. Colaizzi, M. A. Andrade, T. H. Marek, D. M. Heeren, F. R. Lamm, and J. L. LaRue. 2019. [Identifying advantages and disadvantages of variable rate irrigation – an updated review](#). *Applied Engineering in Agriculture* 35(6): 837-852, doi: 10.13031/aea.13128.
14. Lo, T., D. R. Rudnick, B. T. Krienke, D. M. Heeren, Y. Ge, and T. M. Shaver. 2019. [Water effects on optical canopy sensing for late-season site-specific nitrogen management of maize](#). *Computers and Electronics in Agriculture* 162: 154-164, doi: 10.1016/j.compag.2019.04.006.
15. Mendes, W. R., F. M. U. Araújo, R. Dutta, and D. M. Heeren. 2019. [Fuzzy control system for variable rate irrigation using remote sensing](#). *Expert Systems with Applications* 124: 13-24, doi: 10.1016/j.eswa.2019.01.043.
16. Finkenbinder, C. E., T. E. Franz, J. P. Gibson, D. M. Heeren, and J. D. Luck. 2019. [Integration of hydrogeophysical datasets and empirical orthogonal functions for improved irrigation water management](#). *Precision Agriculture*, 20(1): 78-100, doi: 10.1007/s11119-018-9582-5.
17. Barker², J. B., D. M. Heeren, C. M. U. Neale, and D. R. Rudnick. 2018. [Evaluation of variable rate irrigation using a remote-sensing-based model](#). *Agricultural Water Management* 203: 63-74, doi: 10.1016/j.agwat.2018.02.022.
18. Barker², J. B., C. M. U. Neale, D. M. Heeren, and A. E. Suyker. 2018. [Evaluation of a hybrid reflectance-based crop coefficient and energy balance evapotranspiration model for irrigation management](#). *Transactions of the ASABE* 61(2): 533-548, doi: 10.13031/trans.12311.
19. Barker², J. B., D. M. Heeren, K. Koehler-Cole, C. A. Shapiro, H. Blanco-Canqui, R. W. Elmore, C. A. Proctor, S. Irmak, C. A. Francis, T. M. Shaver, and A. T. Mohammed. 2018. [Cover crops have negligible impact on soil water in Nebraska maize-soybean rotation](#). *Agronomy Journal* 110: 1-13, doi: 10.2134/agronj2017.12.0739.
20. Freiburger¹, R. P., D. M. Heeren, D. E. Eisenhauer, A. R. Mittelstet, and G. A. Baigoria. 2018. [Tradeoffs in model performance and effort for long-term phosphorus leaching based on in situ field data](#). *Vadose Zone Journal* 17:170216, doi: 10.2136/vzj2017.12.0216.
21. Miller, K. A., J. D. Luck, D. M. Heeren, T. Lo¹, D. L. Martin, and J. B. Barker². 2018. [A geospatial variable rate irrigation control scenario evaluation methodology based on mining root zone available water capacity](#). *Precision Agriculture*, doi: 10.1007/s11119-017-9548-z.
22. Lo¹, T., D. M. Heeren, L. Mateos, J. D. Luck, D. L. Martin, K. A. Miller, J. B. Barker², and T. M. Shaver. 2017. [Field characterization of field capacity and root zone available water capacity for variable rate irrigation](#). *Applied Engineering in Agriculture* 33(4): 559-572, doi: 10.13031/aea.11963.

23. Barker², J. B., T. E. Franz, D. M. Heeren, C. M. U. Neale, and J. D. Luck. 2017. [Soil water content monitoring for irrigation management: A geostatistical analysis](#). *Agricultural Water Management* 188: 36-49, doi: 10.1016/j.agwat.2017.03.024.
24. Heeren, D. M., G. A. Fox, C. J. Penn, T. Halihan, D. E. Storm, and B. E. Haggard. 2017. [Impact of macropores and gravel outcrops on phosphorus leaching at the plot scale in silt loam soils](#). *Transactions of the ASABE* 60(3): 823-835, doi: 10.13031/trans.12015.
25. Lo¹, T., D. M. Heeren, D. L. Martin, L. Mateos, J. D. Luck, and D. E. Eisenhauer. 2016. [Pumpage reduction by using variable rate irrigation to mine undepleted soil water](#). *Transactions of the ASABE* 59(5): 1285-1298, doi: 10.13031/trans.59.11773.
26. Miller, R. B., D. M. Heeren, G. A. Fox, T. Halihan, and D. E. Storm. 2016. [Heterogeneity influences on stream water-groundwater interactions in a gravel-dominated floodplain](#). *Hydrological Sciences Journal* 61(4): 741-750, doi: 10.1080/02626667.2014.992790.
27. Heeren, D. M., G. A. Fox, and D. E. Storm. 2015. [Heterogeneity of infiltration rates in alluvial floodplains as measured with a berm infiltration technique](#). *Transactions of the ASABE* 58(3): 733-745, doi: 10.13031/trans.58.11056.
28. Heeren, D. M., G. A. Fox, and D. E. Storm. 2014. [Technical note: Berm method for quantification of infiltration at the plot scale in high conductivity soils](#). *Journal of Hydrologic Engineering* 19(2): 457-461, doi: 10.1061/(ASCE)HE.1943-5584.0000802.
29. Penn, C. J., D. M. Heeren, G. A. Fox, and A. Kumar. 2014. [Application of isothermal calorimetry to the study of phosphorus sorption onto soils in a flow-through system](#). *Soil Science Society of America Journal* 78(1): 147-156, doi: 10.2136/sssaj2013.06.0239.
30. Heeren, D. M., G. A. Fox, A. K. Fox, D. E. Storm, R. B. Miller, and A. R. Mittelstet. 2014. [Divergence and flow direction as indicators of subsurface heterogeneity and stage-dependent storage in alluvial floodplains](#). *Hydrological Processes* 28(3): 1307-1317, doi: 10.1002/hyp.9674.
31. Miller, R. B., D. M. Heeren, G. A. Fox, T. Halihan, D. E. Storm, and A. R. Mittelstet. 2014. [The hydraulic conductivity structure of gravel-dominated vadose zones within alluvial floodplains](#). *Journal of Hydrology* 513: 229-240, doi: 10.1016/j.jhydrol.2014.03.046.
32. Midgley, T. L., G. A. Fox, G. V. Wilson, D. M. Heeren, E. Langendoen, and A. Simon. 2013. [Seepage-induced streambank erosion and instability: In situ constant-head experiments](#). *Journal of Hydrologic Engineering* 18(10): 1200-1210, doi: 10.1061/(ASCE)HE.1943-5584.0000685.
33. Midgley, T. L., G. A. Fox, G. V. Wilson, R. M. Felice, and D. M. Heeren. 2013. [In situ soil pipeflow experiments on contrasting streambank soils](#). *Transactions of the ASABE* 56(2): 479-488, doi: 10.13031/2013.42685.
34. Heeren, D. M., A. R. Mittelstet, G. A. Fox, D. E. Storm, A. T. Al-Madhhachi, T. L. Midgley, A. F. Stringer, K. B. Stunkel, and R. D. Tejral. 2012. [Using rapid geomorphic assessments to assess streambank stability in Oklahoma Ozark streams](#). *Transactions of the ASABE* 55(3): 957-968, doi: 10.13031/2013.41527.

35. Midgley, T. L., G. A. Fox, and D. M. Heeren. 2012. [Evaluation of the Bank Stability and Toe Erosion Model \(BSTEM\) for predicting lateral retreat on composite streambanks](#). *Geomorphology* 145-146: 107-114, doi: 10.1016/j.geomorph.2011.12.044.
36. Penn, C. J., J. M. McGrath, G. A. Fox, E. W. Rounds, and D. M. Heeren. 2012. [Trapping phosphorus in runoff with a phosphorus removal structure](#). *Journal of Environmental Quality* 41(3): 672-679, doi: 10.2134/jeq2011.0045.
37. Heeren, D. M., T. P. Trooien, H. D. Werner, and N. L. Klocke. 2011. [Development of deficit irrigation strategies for corn using a yield ratio model](#). *Applied Engineering in Agriculture* 27(4): 605-614, doi: 10.13031/2013.38207.
38. Heeren, D. M., G. A. Fox, R. B. Miller, D. E. Storm, A. R. Mittelstet, A. K. Fox, C. J. Penn, and T. Halihan. 2011. [Stage-dependent transient storage of phosphorus in alluvial floodplains](#). *Hydrological Processes* 25(20): 3230-3243, doi: 10.1002/hyp.8054.
39. Mittelstet, A. R., D. M. Heeren, D. E. Storm, G. A. Fox, M. J. White, and R. B. Miller. 2011. [Comparison of subsurface and surface runoff phosphorus transport rates in alluvial floodplains](#). *Agriculture, Ecosystems and Environment* 141: 417-425, doi:10.1016/j.agee.2011.04.006.
40. Miller, R. B., D. M. Heeren, G. A. Fox, D. E. Storm, and T. Halihan. 2011. [Design and application of a direct-push vadose zone gravel permeameter](#). *Ground Water* 49(6): 920-925, doi: 10.1111/j.1745-6584.2010.00796.x.
41. Fox, G. A., D. M. Heeren, R. B. Miller, A. R. Mittelstet, and D. E. Storm. 2011. [Flow and transport experiments for a streambank seep originating from a preferential flow pathway](#). *Journal of Hydrology* 403: 360-366, doi: 10.1016/j.jhydrol.2011.04.014.
42. Fox, G. A., D. M. Heeren, and M. A. Kizer. 2011. [Evaluation of a stream-aquifer analysis test for deriving reach-scale streambed conductance](#). *Transactions of the ASABE* 54(2): 473-479, doi: 10.13031/2013.36450.
43. Heeren, D. M., R. B. Miller, G. A. Fox, D. E. Storm, T. Halihan, and C. J. Penn. 2010. [Preferential flow effects on subsurface contaminant transport in alluvial floodplains](#). *Transactions of the ASABE* 53(1): 127-136, doi: 10.13031/2013.29511.
44. Fox, G. A., D. M. Heeren, G. V. Wilson, E. J. Langendoen, A. K. Fox, and M. L. Chu-Agor. 2010. [Numerically predicting seepage gradient forces and erosion: Sensitivity to soil hydraulic properties](#). *Journal of Hydrology* 389(3-4): 354-362, doi: 10.1016/j.jhydrol.2010.06.015.

Section 2.1.2 Peer-Reviewed Journal Publications Accepted for Publication With or Without Revision

1. Liang, W., X. Qiao, I. P. Possignolo, K. C. DeJonge, S. Irmak, D. M. Heeren, and D. R. Rudnick. 2021. [Utilizing digital image processing and two source energy balance model for the estimation of evapotranspiration of dry edible beans in western Nebraska](#). *Irrigation Science*, doi: 10.1007/s00271-021-00721-7.
2. Singh², J., Y. Ge, D. M. Heeren, E. A. Walter-Shea, C. M. U. Neale, S. Irmak, W. E. Woldt, G. Bai, S. Bhatti, and M. M. Maguire. 2021. [Inter-relationships between water](#)

[depletion and temperature differential in row crop canopies in a sub-humid climate](#). *Agricultural Water Management* 256, doi: 10.1016/j.agwat.2021.107061.

3. Zhang, J., K. Guan, B. Peng, M. Pan, W. Zhou, C. Jiang, H. Kimm, T. E. Franz, R. Grant, Y. Yang, D. R. Rudnick, D. M. Heeren, A. Suyker, W. Bauerle, and G. Miner. 2021. Sustainable irrigation based on co-regulation of soil water supply and atmospheric evaporative demand. *Nature Communications*.

Section 2.1.3 Peer-Reviewed Journal Publications in Review or Revisions

1. Zhang, J., K. Guan, B. Peng, M. Pan, W. Zhou, R. Grant, T. E. Franz, D. R. Rudnick, D. M. Heeren, A. Suyker, Y. Yang, and G. Wu. 2021. Assessing different plant-centric water stress metrics for irrigation efficacy using soil-plant-atmosphere-continuum simulation. *Water Resources Research*.

Section 2.1.4 Book

1. Eisenhauer, D. E., D. L. Martin, D. M. Heeren (General Editor), and G. J. Hoffman. 2021. *Irrigation Systems Management* (in press). ASABE: St. Joseph, Mich. Open access, available at: <https://asabe.org/ism>.

Section 2.1.5 Conference Proceedings Papers

1. Wilkening⁴, E., D. M. Heeren, D. Hallum, J. Schellpeper, D. L. Martin. 2021. Impact of irrigation technologies on withdrawals and consumptive use of water. ASABE Annual International Meeting (virtual), Paper No. 2101114. 11 pages.
2. Singh², J., D. M. Heeren, Y. Ge, G. Bai, C. M. U. Neale, M. S. Maguire, and S. Bhatti². 2021. Sensor-based irrigation of maize and soybean in East-Central Nebraska under a sub-humid climate. ASABE Annual International Meeting (virtual), Paper No. 21001044. 12 pages.
3. Banda¹, M. M., D. M. Heeren, D. L. Martin, F. Munoz-Arriola, and L. G. Hayde. 2019. Economic analysis of deficit irrigation in sugarcane farming: Nchalo Estate, Chikwawa District, Malawi. ASABE Annual International Meeting, Paper No. 1900852, Boston, Mass. 19 pages.
4. Martin, D. L., D. M. Heeren, S. R. Melvin, and T. Ingram. 2019. Effect of limited water supplies on center pivot performance. Central Plains Irrigation Association (CPIA) Central Plains Irrigation Conference, Kearney, Nebr. 27 pages.
5. Li¹, J., W. Zang, Y. Li, D. M. Heeren, and H. Yan. 2018. Comparison of nitrogen fertigation management strategies for center-pivot irrigated maize in the sub-humid area of China. ASABE Annual International Meeting, Paper No. 1801036, Detroit, Mich. 9 pages.
6. Woldt, W. E., C. M. U. Neale, D. M. Heeren, E. Frew and G. E. Meyer. 2018. Improving agricultural water efficiency with unmanned aircraft. Association for Unmanned Vehicle Systems International (AUVSI) XPONENTIAL trade show and conference, Denver, Colo. 8 pages.

7. Barker², J. B., D. M. Heeren, and C. M. U. Neale. 2016. Perspectives on VRI prescription map development with satellite imagery. CPIA Central Plains Irrigation Conference, Kearney, Nebr. 9 pages.
8. Lo¹, T., D. M. Heeren, and J. D. Luck. 2016. Spatial mapping of root zone water holding capacity for site-specific management. CPIA Central Plains Irrigation Conference, Kearney, Nebr. 7 pages.
9. Barker², J. B., C. M. U. Neale, and D. M. Heeren. 2015. Evaluation of a hybrid remote sensing evapotranspiration model for variable rate irrigation management – revised. Joint ASABE and Irrigation Association (IA) Irrigation Symposium, Paper No. 2147813, Long Beach, Calif. 10 pages.
10. Lo¹, T. H., D. M. Heeren, L. Mateos, J. D. Luck, D. L. Martin, and D. E. Eisenhauer. 2015. Potential irrigation reductions from increasing precipitation utilization with variable rate irrigation. Joint ASABE and Irrigation Association (IA) Irrigation Symposium, Paper No. 152141446, Long Beach, Calif. 13 pages.
11. Freiberger¹, R. P., D. M. Heeren, G. A. Fox, C. J. Penn, and D. E. Eisenhauer. 2014. Finite element modeling of long-term phosphorus leaching through macropores in the Ozark ecoregion. ASABE Annual International Meeting, Paper No. 141897543, Montreal, Quebec, Canada. 20 pages.
12. Lo¹, T. H., L. Mateos, D. M. Heeren, and J. D. Luck. 2014. The applicability of VRI for managing variability in infiltration capacity and plant-available water: A preliminary discussion and GIS study. ASABE Annual International Meeting, Paper No. 141897710, Montreal, Quebec, Canada. 8 pages.
13. Miller, K. A., T. H. Lo¹, J. D. Luck, and D. M. Heeren. 2014. Combining site specific data with geospatial analysis to identify variable rate irrigation opportunities in irrigated agricultural fields. ASABE Annual International Meeting, Paper No. 141896808, Montreal, Quebec, Canada. 8 pages.
14. Freiberger¹, R. P., D. M. Heeren, and G. A. Fox. 2013. Finite element modeling of phosphorus leaching through floodplain soils dominated by preferential flow pathways. ASABE Annual International Meeting, Paper No. 1583250, Kansas City, Mo. 9 pages.
15. Heeren, D. M., G. A. Fox, D. E. Storm, B. E. Haggard, C. J. Penn, and T. Halihan. 2013. Impact of Measurement Scale on Infiltration and Phosphorus Leaching in Ozark Floodplains. ASABE Annual International Meeting, Paper No. 1621213, Kansas City, Mo. 16 pages.
16. Penn, C. J., D. M. Heeren, and G. A. Fox. 2013. Phosphorus sorption and desorption from soils under flow-through conditions: An investigation of the use of thermal heat patterns as indicators of the degree, mechanisms, and kinetics of sorption reactions. ASABE Annual International Meeting, Paper No. 1621201, Kansas City, Mo. 14 pages.
17. Heeren, D. M., G. A. Fox, D. E. Storm, P. Q. Storm, B. E. Haggard, T. Halihan, and R. B. Miller. 2012. Quantification and heterogeneity of infiltration and transport in alluvial floodplains. ASABE Annual International Meeting, Paper No. 121337097, Dallas, Tex. 20 pages.

18. Heeren, D. M., G. A. Fox, and D. E. Storm. 2012. New berm method to quantify infiltration and transport rates at the plot scale for high hydraulic conductivity soils. ASABE Annual International Meeting, Dallas, Tex. 10 pages.
19. Midgley, T. L., G. A. Fox, G. V. Wilson, D. M Heeren, A. Simon, and E. J. Langendoen. 2011. Stream bank erosion and instability induced by groundwater seepage: Little Topashaw Creek watershed field experiments. ASABE Annual International Meeting, Louisville, Ky. 21 pages.
20. Heeren, D. M., A. R. Mittelstet, G. A. Fox, and D. E. Storm. 2011. Assessing streambank stability of Oklahoma Ozark streams with rapid geomorphic assessments. ASCE World Environmental and Water Resources Congress, Palm Springs, Calif. 10 pages.
21. Midgley, T. L., G. A. Fox, and D. M. Heeren. 2011. Evaluation of the Bank Stability and Toe Erosion Model (BSTEM) for predicting lateral streambank retreat in Ozark streams. ASCE World Environmental and Water Resources Congress, Palm Springs, Calif. 10 pages.
22. Al-Madhhachi, A. T., S. N. Hamad, and D. M. Heeren. 2011. A new technique to improve the emission uniformity for trickle irrigation systems. ASCE World Environmental and Water Resources Congress, Palm Springs, Calif. 10 pages.
23. Mittelstet, A. R., D. M. Heeren, D. E. Storm, G. A. Fox, M. J. White, and R. B. Miller. 2010. Comparison of subsurface and surface runoff phosphorus transport capacities in alluvial floodplains. ASABE TMDL Meeting, Baltimore, Md. 9 pages.
24. Heeren, D. M., R. B. Miller, G. A. Fox, D. E. Storm, A. R. Mittelstet, and C. J. Penn. 2010. Impact of preferential flow paths on alluvial groundwater flow patterns and phosphorus transport. ASABE Annual International Meeting, Paper No. 1008729, Pittsburgh, Pa. 16 pages.
25. Miller, R. B., D. M. Heeren, G. A. Fox, D. E. Storm, T. Halihan, and A. R. Mittelstet. 2010. Geophysical mapping of preferential flow paths across multiple floodplains. ASABE Annual International Meeting, Paper No. 1008730, Pittsburgh, Pa. 22 pages.
26. Heeren, D. M., R. B. Miller, G. A. Fox, D. E. Storm, A. K. Fox, and A. R. Mittelstet. 2010. Impact of preferential flow paths on stream and alluvial groundwater interaction. ASCE World Environmental and Water Resources Congress, Providence, R.I. 12 pages.
27. Miller, R. B., D. M. Heeren, G. A. Fox, T. Halihan, D. E. Storm, and A. R. Mittelstet. 2010. Use of multi-electrode resistivity profiling to estimate saturated- and vadose-zone hydraulic properties of preferential flow paths in alluvial floodplains. ASCE World Environmental and Water Resources Congress, Providence, R.I. 11 pages.
28. Fox, G. A., D. M. Heeren, and M. A. Kizer. 2010. Evaluation of alluvial well depletion analytical solutions from a stream-aquifer analysis test along the North Canadian River in Oklahoma. ASCE World Environmental and Water Resources Congress, Providence, R.I. 10 pages.
29. Heeren, D. M., R. B. Miller, G. A. Fox, D. E. Storm, C. J. Penn, and T. Halihan. 2009. Preferential flow path effects on subsurface contaminant transport in alluvial floodplains. ASABE Annual International Meeting, Paper No. 095995, Reno, Nev. 10 pages.

30. Heeren, D. M., G. A. Fox, M. Chu-Agor, and G. V. Wilson. 2009. Predicting streambank seepage flows: Sensitivity to soil properties and layering. ASCE EWRI World Environmental and Water Resources Congress, Kansas City, Mo. 10 pages.
31. Heeren, D. M., H. D. Werner, and T. P. Trooien. 2008. Evaluation of deficit irrigation strategies for corn. IA Show, Anaheim, Calif. 15 pages.
32. Heeren, D. M., H. D. Werner and T. P. Trooien. 2007. Evaluation of irrigation strategies with the DSSAT Cropping System Model. ASABE North Central Intersectional Conference, Paper No. RRV-07132, Fargo, N.D. 13 pages.

Section 2.1.6 Conference Presentations without a Proceedings Paper

1. Bhatti², S., D. M. Heeren, S. A. O'Shaughnessy, C. M. U. Neale, N. Dorsey, Y. Ge, W. E. Woldt, and M. S. Maguire. 2021. Comparison of stationary and mobile canopy sensing systems for irrigation management of corn and soybean in Nebraska. ASABE Annual International Meeting (virtual).
2. Singh², J., Y. Ge, D. M. Heeren, G. Bai, C. M. U. Neale, W. E. Woldt, M. S. Maguire, and S. P. Kashyap¹. 2021. Unmanned aerial vehicle data mule over a sensor node station network in maize and soybean. ASABE Annual International Meeting (virtual).
3. Wilkening⁴, E., D. M. Heeren, T. Ingram, S. R. Melvin, A. Nygren, D. L. Martin, D. R. Rudnick, C. Burr, and M. Mamo. July 13-15, 2020. Analyzing operating pressure and application uniformity of center pivot irrigation systems. ASABE Annual International Meeting (virtual). Poster presentation.
4. Singh², J., Y. Ge, G. Bai, D. M. Heeren, E. A. Walter-Shea, C. M. U. Neale, S. Irmak, S. Bhatti², W. E. Woldt, and M. S. Maguire. July 13-15, 2020. Capturing variability in maize and soybean stress using infrared thermometers and soil water content sensors. ASABE Annual International Meeting (virtual).
5. Bhatti², S., I. Z. Goncalves, C. M. U. Neale, and D. M. Heeren. July 13-15, 2020. Forecasting irrigation management using spatial evapotranspiration model in maize fields in Nebraska. ASABE Annual International Meeting (virtual). Poster presentation.
6. Richardson, J. L., D. E. Eisenhauer, A. L. Boldt, D. M. Heeren, D. L. Martin, M. S. Maguire, E. Wilkening, S. Bhatti², L. Hayde, and J. Singh². July 13-15, 2020. Comparing uniform and variable catch can spacing for uniformity tests on center pivot sprinkler systems. ASABE Annual International Meeting (virtual). Poster presentation.
7. Chandra¹, A., N. Brozovic, L. Odhiambo, and D. M. Heeren. July 13-15, 2020. Water-energy linkage in smallholder shared center pivot irrigation: A case study in Rwanda. ASABE Annual International Meeting (virtual).
8. Abimbola, O., T. E. Franz, D. M. Heeren, and D. R. Rudnick. July 13-15, 2020. Developing a scalable real-time sensing and decision-support cyber-physical system for irrigation management. ASABE Annual International Meeting (virtual).
9. Abimbola, O., T. E. Franz, D. M. Heeren, D. R. Rudnick, and A. Wolf. July 13-15, 2020. Simulating maize yield response to irrigation and nitrogen using crop modeling. ASABE Annual International Meeting (virtual).

10. Nakabuye, H. N., D. R. Rudnick, T. Lo, A. Katimbo, D. M. Heeren, K. C. DeJonge, T. E. Franz, and X. Qiao. July 13-15, 2020. Canopy temperature based irrigation scheduling for maize in West Central Nebraska. ASABE Annual International Meeting (virtual).
11. Uwase, E., D. M. Heeren, L. Odhiambo, and A. Chandra. February 18-19, 2020. Evaluating evapotranspiration values in Rwanda while using the Turc and Hargreves-Samani equations. CPIA Central Plains Irrigation Conference, Burlington, Colo. Poster presentation.
12. Bhatti², S., D. M. Heeren, J. B. Barker³, C. M. U. Neale, W. E. Woldt, M. S. Maguire, and D. R. Rudnick. December 9-13, 2019. Site-specific irrigation management in a sub-humid climate using a spatial evapotranspiration model with satellite and airborne imagery. American Geophysical Union (AGU) Fall Meeting, San Francisco, Calif.
13. Kantarama, D., J. Singh, S. Bhatti, D. M. Heeren, and T. E. Franz. August 23, 2019. Arable Mark: A solution to managing weather risks and crop health. CUSP Experiential Learning Expo, Lincoln, Nebr. Poster presentation.
14. Guertault, L., G. A. Fox, R. Munoz-Carpena, T. Halihan, D. M. Heeren, and B. Gao. July 7-10, 2019. Preferential flow in vegetative filter strips and riparian buffers: Experimentation and numerical modeling. ASABE Annual International Meeting, Boston, Mass.
15. Bhatti², S., A. Kumari, A. Sarangi, R. Kaur, D. M. Heeren, M. Singh, C. M. U. Neale, and D. L. Martin. July 7-10, 2019. Integrated soil moisture and canopy temperature sensing system for irrigation scheduling. ASABE Annual International Meeting, Boston, Mass.
16. Singh², J., D. M. Heeren, Y. Ge, J. B. Barker, W. E. Woldt, C. M. U. Neale, G. Bai, D. R. Rudnick, J. D. Luck, G. E. Meyer. July 7-10, 2019. Soil structure and soil texture effects on soil water content measurements by a capacitance based electromagnetic sensor. ASABE Annual International Meeting, Boston, Mass.
17. Banda¹, M. M., D. M. Heeren, F. Munoz-Arriola, D. L. Martin, and L. G. Hayde. April 29-30, 2019. Economic analysis of deficit irrigation of sugarcane farming: A case study of Nchalo Estate, Chikwawa District in Malawi. DWFI Water for Food Global Conference, Lincoln, Nebr. Poster presentation.
18. Bhatti², S., A. Kumari, A. Sarangi, R. Kaur, D. M. Heeren, M. Singh, C. M. U. Neale, and D. L. Martin. April 29-30, 2019. Integrated soil moisture and canopy temperature sensing system for irrigation scheduling. DWFI Water for Food Global Conference, Lincoln, Nebr. Poster presentation.
19. Singh, J., Y. Ge, G. Bai, J. B. Barker³, D. M. Heeren, and C. M. U. Neale. April 29-30, 2019. In-field soil and plant sensor network to improve variable rate irrigation decision-making. DWFI Water for Food Global Conference, Lincoln, Nebr. Poster presentation.
20. Guertault, L., G. A. Fox, R. Munoz-Carpena, and D. M. Heeren. December 12, 2018. Meso-scale infiltration experiments and modeling of preferential flow in macroporous soils. AGU Fall Meeting, Washington, D.C.

21. Bhatti¹, S., J. B. Barker³, D. M. Heeren, C. M. U. Neale, D. R. Rudnick, W. E. Woldt, and A. L. Boldt. October 24-26, 2018. Variable rate irrigation with spatial evapotranspiration model using imagery from satellite and unmanned aerial systems. Nebraska Water Center (NWC) Great Plains Regional Water Symposium, Lincoln, Nebr. Poster presentation.
22. Li¹, J., J. B. Barker³, S. Bhatti¹, I. P. Possignolo, D. M. Heeren, A. L. Boldt, and H. Yan. October 24-26, 2018. Comparison of methods for calculating deep percolation. NWC Great Plains Regional Water Symposium, Lincoln, Nebr. Poster presentation.
23. Singh, J., Y. Ge, G. Bai, J. B. Barker³, D. M. Heeren, and C. M. U. Neale. October 24-26, 2018. In-field soil and plant sensor network to improve variable rate irrigation decision-making. NWC Great Plains Regional Water Symposium, Lincoln, Nebr. Poster presentation.
24. Banda¹, M. M., D. M. Heeren, F. Munoz-Arriola, D. L. Martin, and L. G. Hayde. October 24-26, 2018. Economic analysis of deficit irrigation of sugarcane farming: A case study of Nchalo Estate, Chikwawa District in Malawi. NWC Great Plains Regional Water Symposium, Lincoln, Nebr. Poster presentation.
25. Bhatti¹, S., D. M. Heeren, J. B. Barker³, C. M. U. Neale, D. R. Rudnick, W. E. Woldt, Y. Ge, J. D. Luck, G. E. Meyer, F. Munoz-Arriola, A. L. Boldt, and M. S. Maguire. July 29-August 1, 2018. Variable rate irrigation management using a spatial evapotranspiration model. ASABE Annual International Meeting, Detroit, Mich.
26. Barker³, J. B., M. S. Maguire, C. M. U. Neale, W. E. Woldt, B. D. Wardlow, B. C. Leavitt, and D. M. Heeren. July 29-August 1, 2018. Calibration of an unmanned-aircraft-mounted shortwave multispectral camera system for use in evapotranspiration modeling. ASABE Annual International Meeting, Detroit, Mich.
27. Guertault, L., G. A. Fox, R. Munoz-Carpena, B. Gao, and D. M. Heeren. June 7, 2018. Meso-scale experiments and modeling of macropore flow. ASCE World Environmental and Water Resources Congress, Minneapolis, Minn.
28. Li¹, J., J. B. Barker³, I. P. Possignolo, D. M. Heeren, A. L. Boldt, S. Bhatti¹, and H. Yan. June 6, 2018. Comparison of methods for calculating deep percolation. Marena Oklahoma In Situ Sensor Testbed (MOISST) Workshop, Lincoln, Nebr. Poster presentation.
29. Barker³, J. B., S. Bhatti¹, D. M. Heeren, and C. M. U. Neale. May 8, 2018. Irrigation management using remote-sensing-based spatial evapotranspiration modeling in maize and soybean in Nebraska, USA. International Association of Hydrological Sciences (IAHS) Remote Sensing and Hydrology Symposium, Cordoba, Spain.
30. Bhatti¹, S., J. B. Barker³, D. M. Heeren, C. M. U. Neale, D. R. Rudnick, W. E. Woldt, J. D. Luck, Y. Ge, G. E. Meyer, A. L. Boldt, and M. S. Maguire. October 26-27, 2017. Water and crop response to variable rate irrigation using remote sensing model and soil moisture content monitoring. NWC Nebraska Water Symposium, Lincoln, Nebr. Poster presentation. Placed second in the graduate student poster contest.
31. Koehler-Cole, K., R. W. Elmore, H. Blanco-Canqui, C. A. Shapiro, C. Proctor, D. M. Heeren, J. B. Barker², C. A. Francis, T. M. Shaver, and M. Stockton. October 22-25, 2017. Management and implications of cover crops in Nebraska. American Society of Agronomy (ASA) International Annual Meeting, Tampa, Fla.

32. Barker², J. B., D. M. Heeren, C. M. U. Neale, D. L. Martin, T. E. Franz, and W. R. Kranz. July 16-19, 2017. Variable rate irrigation management of corn and soybean using a remote-sensing-based water balance. ASABE Annual International Meeting, Spokane, Wash.
33. Barker², J. B., T. E. Franz, D. M. Heeren, C. M. U. Neale, and J. D. Luck. July 16-19, 2017. Number of soil water monitoring locations required for irrigation management: A geostatistical analysis. ASABE Annual International Meeting, Spokane, Wash.
34. Barker², J. B., D. M. Heeren, C. A. Shapiro, K. Koehler-Cole, S. Irmak, A. T. Mohammed, R. W. Elmore, H. Blanco-Canqui, T. M. Shaver, C. A. Francis, and R. B. Ferguson. July 16-19, 2017. Impact of a multiple species cover crop on soil water content in corn and soybean rotations in Nebraska. ASABE Annual International Meeting, Spokane, Wash.
35. Mwape¹, M. R., and D. M. Heeren. May 11, 2017. Selection and design of irrigation systems in Zambia. DWFI Research Forum, Lincoln, Nebr.
36. Bhatti¹, S., J. B. Barker², and D. M. Heeren. May 11, 2017. Water and crop response to variable rate irrigation using remote sensing based models. DWFI Research Forum, Lincoln, Nebr.
37. Mwape¹, M. R., D. M. Heeren, D. E. Eisenhauer, L. G. Hayde, and A. R. Mittelstet. April 10-12, 2017. Design and development of community irrigation systems in Zambia. DWFI Water for Food Global Conference, Lincoln, Nebr. Poster presentation.
38. Bhatti¹, S., J. B. Barker², D. M. Heeren, C. M. U. Neale, M. S. Maguire, W. E. Woldt, and D. R. Rudnick. April 10-12, 2017. Water and crop response to variable rate irrigation. DWFI Water for Food Global Conference, Lincoln, Nebr. Poster presentation.
39. Mwape¹, M. R., D. M. Heeren, D. E. Eisenhauer, L. G. Hayde, and A. R. Mittelstet. January 25, 2017. Design and development of community irrigation systems in Zambia. Nebraska Association of Resource Districts (NARD) Legislative Conference, Lincoln, Nebr. Poster presentation.
40. Koehler-Cole, K., R. W. Elmore, H. Blanco, C. A. Francis, C. A. Shapiro, T. M. Shaver, M. Stockton, R. Ferguson, S. Irmak, and D. M. Heeren. January 2017. Cover crops – an update. UNL Extension Crop Production Clinics.
41. Finkenbiner, C. E., T. E. Franz, D. M. Heeren, J. P. Gibson, and M. Russell. December 12-16, 2016. Integration of hydrogeophysical datasets for improved water resource management in irrigated systems. American Geophysical Union (AGU) Fall Meeting, San Francisco, Calif. Poster presentation.
42. Barker², J. B., D. M. Heeren, and C. M. U. Neal. October 12, 2016. Variable rate irrigation management using a remote sensing water balance model. U.S. Committee on Irrigation and Drainage (USCID) International Conference, Fort Collins, Colo.
43. Finkenbiner, C. E., T. E. Franz, D. M. Heeren, J. P. Gibson, and M. Russell. October 12, 2016. Integration of hydrogeophysical datasets for improved water resource management in irrigated systems. U.S. Committee on Irrigation and Drainage (USCID) International Conference, Fort Collins, Colo.

44. Neale, C. M. U., J. B. Barker², D. M. Heeren, W. Woldt, and M. S. Maguire. September 26-29, 2016. Remote sensing assisted modeling of soil water content for center pivot variable rate irrigation prescriptions. SPIE Remote Sensing Conference, Edinburgh, Scotland.
45. Barker², J. B., D. M. Heeren, and C. M. U. Neale. July 17-20, 2016. Irrigation management using a remote sensing water balance model and spatial soil moisture mapping with application in variable rate irrigation. ASABE Annual International Meeting, Orlando, Fla.
46. Barker², J. B., D. M. Heeren, and C. M. U. Neale. April 24-26, 2016. Remote sensing-based irrigation management with application in site-specific irrigation. DWFI Water for Food Global Conference, Lincoln, Nebr. Poster presentation.
47. Han, J. C., H. S. Yang, K. G. Hubbard, P. Grassini, D. M. Heeren, M. D. Shulski, S. Cooper, J. Rees, G. R. Kruger, K. G. Cassman, and J. E. Specht. April 24-26, 2016. Use machine learning to optimize the simulation of soil moisture by *CornSoyWater* app. DWFI Water for Food Global Conference, Lincoln, Nebr. Poster presentation.
48. Finkenbinder, C. E., T. E. Franz, W. A. Avery, and D. M. Heeren. April 17-22, 2016. Integration of soil moisture and geophysical datasets for improved water resource management in irrigated systems. European Geosciences Union, Vienna, Austria. Poster presentation.
49. Barker², J. B., A. T. Mohammed, D. M. Heeren, R. W. Elmore, C. A. Shapiro, S. Irmak, K. Koehler-Cole, T. M. Shaver, H. Blanco-Canqui, and C. A. Francis. April 12, 2016. Impact of cover crops on soil moisture available for the primary crop. UNL Spring Research Fair, Lincoln, Nebr. Poster presentation.
50. Heeren, D. M., J. D. Luck, T. Lo¹, and J. B. Barker². March 16, 2016. Variable rate irrigation: Spatial variability in water holding capacity and quantifying the benefits of VRI. Eureka! 2016 Conference, UNL Extension, Lincoln, Nebr.
51. Proctor, C., R. W. Elmore, H. Blanco, R. B. Ferguson, C. A. Francis, D. M. Heeren, C. A. Shapiro, T. M. Shaver, M. Stockton, and K. Koehler-Cole. November 16, 2015. Implementation of cover crops in Nebraska corn and soybean cropping systems. American Society of Agronomy (ASA) Annual Meeting, Minneapolis, Minn. Poster presentation.
52. Lo¹, T. H., D. M. Heeren, L. Mateos, D. L. Martin, and J. D. Luck. April 14, 2015. Preliminary quantification of variable rate irrigation's benefits. UNL Research Fair Graduate Poster Session, Lincoln, Nebr. Poster presentation.
53. Miller, K. A., T. H. Lo¹, J. D. Luck, and D. M. Heeren. April 14, 2015. Managing available water differences with increasing levels of variable rate irrigation. UNL Research Fair Graduate Poster Session, Lincoln, Nebr. Poster presentation.
54. Barker², J. B., C. M. U. Neale, and D. M. Heeren. March 19, 2015. Managing variable rate irrigation with a hybrid remote sensing evapotranspiration model. Nebraska Water Symposium, Lincoln, Nebr. Poster presentation. Placed second in the graduate student poster contest.
55. Bosch-Rubia, G., D. E. Eisenhauer, J. Deck, A. Volkmer, S. Irmak, D. M. Heeren, J. Gates, J. P. Gibson, and H. Blanco-Canqui. March 19, 2015. Land use and water

- management impacts in potential groundwater recharge. Nebraska Water Symposium, Lincoln, Nebr. Poster presentation.
56. Lo¹, T. H., K. A. Miller, J. D. Luck, and D. M. Heeren. February 4-5, 2015. Variable rate irrigation (VRI) research opportunities. Nebraska Agriculture Technologies Association (NeATA) Conference, Grand Island, Nebr. Poster presentation.
 57. Miller, K. A., J. D. Luck, D. M. Heeren, and T. H. Lo¹. April 15, 2014. Analyzing topographic wetness index values with soil moisture throughout the 2013 growing season. UNL Research Fair Graduate Poster Session, Lincoln, Nebr. Poster presentation.
 58. Lo¹, T. H., L. Mateos, J. D. Luck, D. M. Heeren, and K. A. Miller. April 15, 2014. To VRI or not to VRI: Informing variable rate irrigation investment decisions. UNL Research Fair Graduate Poster Session, Lincoln, Nebr. Poster presentation.
 59. Miller, K. A., T. H. Lo¹, D. M. Heeren, J. D. Luck, D. L. Martin, R. B. Ferguson, and T. M. Shaver. February 5-6, 2014. Analyzing topographic wetness index values with soil moisture throughout the 2013 growing season. Nebraska Agriculture Technologies Association (NeATA) Conference, Grand Island, Nebr. Poster presentation.
 60. Lo¹, T. H., J. D. Luck, D. M. Heeren, and K. A. Miller. February 5-6, 2014. How much variability in soil and terrain is within Nebraska's center pivot irrigated fields? Nebraska Agriculture Technologies Association (NeATA) Conference, Grand Island, Nebr. Poster presentation.
 61. Yang, H. S., K. G. Hubbard, M. D. Shulski, J. Rees, G. R. Kruger, G. L. Zoubek, P. Grassini, J. A. Torrion, D. M. Heeren, K. G. Cassman, J. E. Specht, and S. Irmak. November, 2013. Effects of Deficit Irrigation on Corn Root Distribution, Water Uptake and Yield: A Combined Study of Field Experiment and Modeling. ASA-CSSA-SSSA International Meetings, Tampa, Fla.
 62. Heeren, D. M., G. A. Fox, and D. E. Storm. May 19-22, 2013. Scale analysis of infiltration measurements in heterogeneous soils. ASCE EWRI World Environmental and Water Resources Congress, Cincinnati, Ohio.
 63. Heeren, D. M., J. D. Luck, D. L. Martin, R. B. Ferguson, and T. M. Shaver. May 5-8, 2013. Improving irrigation water and energy use efficiency through accurate spatial and temporal management. DWFI Water for Food Global Conference, Lincoln, Nebr. Poster presentation.
 64. Han, C., H. S. Yang, G. A. Baigorria, K. G. Hubbard, M. D. Shulski, S. Cooper, J. Rees, G. R. Kruger, G. L. Zoubek, P. Grassini, J. A. Torrion, D. M. Heeren, K. G. Cassman, and J. E. Specht. May 5-8, 2013. Developing CornSoyWater: a web-based irrigation decision aid for corn and soybean in Nebraska. DWFI Water for Food Global Conference, Lincoln, Nebr. Poster presentation.
 65. Correll, D. A., D. M. Heeren, G. A. Fox, D. E. Storm, C. J. Penn, and T. Halihan. April 4-5, 2013. Transient resistivity imaging of a phosphorous tracer test. Geological Society of America South-Central Regional Meeting, Austin, Tex. Poster presentation.

66. Freiburger¹, R. P., D. M. Heeren, and G. A. Fox. April 4-5, 2013. Finite element modeling of phosphorus leaching through floodplain soils dominated by preferential flow pathways. OSU Student Water Conference, Stillwater, Okla.
67. Correll, D. A., D. M. Heeren, G. A. Fox, D. E. Storm, and T. Halihan. November 13-14, 2012. Transient resistivity imaging of a phosphorous tracer test. Oklahoma Water Resources Research Institute (OWRRI) Oklahoma Water Research Symposium, Tulsa, Okla. Poster presentation.
68. Lovern, S. B., G. A. Fox, R. B. Miller, A. T. Al-Madhhachi, and D. M. Heeren. July 29-31, 2012. Predicting erodibility of cohesive alluvial soils following streambank modification. ASABE Annual International Meeting, Dallas, Tex.
69. Storm, P. Q., G. A. Fox, and D. M. Heeren. April 4-5, 2012. Plot-scale leaching of phosphorous in an alluvial floodplain in the Ozark ecoregion. OSU Student Water Conference, Stillwater, Okla. Poster presentation.
70. Heeren, D. M., G. A. Fox, D. E. Storm, P. Q. Storm, D. A. Correll, B. E. Haggard, T. Halihan, C. J. Penn, and R. B. Miller. April 4-5, 2012. Quantification and heterogeneity of infiltration and phosphorus leaching in alluvial floodplains. OSU Student Water Conference, Stillwater, Okla.
71. Heeren, D. M., D. E. Storm, and G. A. Fox. February 22-24, 2012. New berm method to quantify infiltration and transport rates at the plot scale for high hydraulic conductivity soils. OSU Research Symposium, Stillwater, Okla.
72. Midgley, T. L., G. A. Fox, and D. M. Heeren. September 18-21, 2011. Evaluation of the Bank Stability and Toe Erosion Model (BSTEM) for predicting lateral streambank retreat in Ozark streams. ASABE International Symposium on Erosion and Landscape Evolution. Anchorage, Alaska. Poster presentation.
73. Miller, R. B., D. M. Heeren, G. A. Fox, D. E. Storm, T. Halihan, and A. R. Mittelstet. August 7-10, 2011. Direct push borehole permeameter for gravel floodplains: Design and application. ASABE Annual International Meeting, Louisville, Ky. Poster presentation.
74. Fox, G. A., D. M. Heeren, R. B. Miller, A. R. Mittelstet, and D. E. Storm. August 7-10, 2011. Flow and transport experiments for a streambank seep originating from a preferential flow pathway. ASABE Annual International Meeting, Louisville, Ky.
75. Heeren, D. M., G. A. Fox, R. B. Miller, D. E. Storm, and A. R. Mittelstet. August 7-10, 2011. Groundwater phosphorus preferential transport in alluvial floodplains. ASABE Annual International Meeting, Louisville, Ky.
76. Mittelstet, A. R., D. E. Storm, G. A. Fox, D. M. Heeren, S. Phillips, C. DuBois, A. T. Al-Madhhachi, T. L. Midgley, A. F. Stringer, K. B. Stunkel, and R. D. Tejral. August 7-10, 2011. Using rapid geomorphic assessments and bank stability indices to assess Oklahoma Ozark streams. ASABE Annual International Meeting, Louisville, Ky.
77. Fox, G. A., D. M. Heeren, R. B. Miller, A. R. Mittelstet, and D. E. Storm. April 7-8, 2011. Streambank seeps from preferential flow pathways in alluvial floodplains of Eastern Oklahoma. Oklahoma Clean Lakes and Watersheds Association Conference, Edmond, Okla.

78. Heeren, D. M., G. A. Fox, and M. A. Kizer. February 23-25, 2011. Stream-aquifer analysis tests for quantifying alluvial well depletion. OSU Research Symposium, Stillwater, Okla.
79. Mittelstet, A. R., D. M. Heeren, G. A. Fox, and D. E. Storm. February 23-25, 2011. Evaluating the ability of rapid geomorphic assessments to predict streambank retreat in Oklahoma Ozark streams. OSU Research Symposium, Stillwater, Okla.
80. Heeren, D. M., R. B. Miller, A. R. Mittelstet, G. A. Fox, D. E. Storm, C. J. Penn, and T. Halihan. November 3-5, 2010. Impact of preferential flow paths on subsurface phosphorus transport in floodplains with coarse gravel subsoils. North American Lake Management Society International Symposium, Oklahoma City, Okla.
81. Heeren, D. M., R. B. Miller, G. A. Fox, D. E. Storm, A. R. Mittelstet, C. J. Penn, and T. Halihan. October 26-27, 2010. Impact of preferential flow paths on subsurface phosphorus transport in Ozark floodplains. Oklahoma Water Resources Research Institute (OWRRI) Oklahoma Water Research Symposium, Norman, Okla.
82. Fox, G. A., D. M. Heeren, and M. A. Kizer. October 26-27, 2010. Stream-aquifer analysis tests for quantifying alluvial well depletion. Oklahoma Water Resources Research Institute (OWRRI) Oklahoma Water Research Symposium, Norman, Okla.
83. Storm, D. E., G. A. Fox, D. M. Heeren, A. R. Mittelstet, S. Phillips, C. DuBois, A. T. Al-Madhhachi, T. L. Midgley, A. F. Stringer, K. B. Stunkel, and R. D. Tejral. October 26-27, 2010. Use of Rapid Geomorphic Assessments in Ozark streams for determining streambank stability. Oklahoma Water Resources Research Institute (OWRRI) Oklahoma Water Research Symposium, Norman, Okla.
84. Mittelstet, A. R., D. M. Heeren, G. A. Fox, and D. E. Storm. October 26-27, 2010. Quantifying subsurface phosphorus transport at two field sites in northeast Oklahoma. Oklahoma Water Resources Research Institute (OWRRI) Oklahoma Water Research Symposium, Norman, Okla. Poster presentation.
85. Miller, R. B., D. M. Heeren, G. A. Fox, D. E. Storm, and T. Halihan. October 26-27, 2010. Interpolated preferential flow paths from geophysical data in Oklahoma Ozark floodplains. Oklahoma Water Resources Research Institute (OWRRI) Oklahoma Water Research Symposium, Norman, Okla. Poster presentation.
86. Midgley, T. L., G. A. Fox, and D. M. Heeren. October 26-27, 2010. Evaluation of the Bank Stability and Toe Erosion Model (BSTEM) for predicting lateral streambank retreat in Ozark streams. Oklahoma Water Resources Research Institute (OWRRI) Oklahoma Water Research Symposium, Norman, Okla. Poster presentation.
87. Heeren, D. M., R. B. Miller, G. A. Fox, D. E. Storm, T. Halihan, and C. J. Penn. February 26, 2010. Advances in understanding flow and phosphorus transport in alluvial, gravel systems of Eastern Oklahoma. ASABE Oklahoma Section Annual Meeting, Stillwater, Okla.
88. Fox, G. A., D. M. Maronek, G. O. Brown, M. D. Smolen, J. R. Vogel, S. B. Lovern, R. A. Chavez, and D. M. Heeren. February 26, 2010. The Cow Creek streambank stabilization and restoration project. ASABE Oklahoma Section Annual Meeting, Stillwater, Okla.
89. Fox, G. A., D. E. Storm, D. M. Heeren, R. B. Miller, T. Halihan, and C. J. Penn. February 21-25, 2010. Progress toward characterizing alluvial preferential flow paths

- in Ozark floodplains. Land Grant and Sea Grant National Water Conference, Hilton Head Island, S.C.
90. Miller, R. B., D. M. Heeren, G. A. Fox, D. E. Storm, and T. Halihan. February 17-19, 2010. Geophysical mapping of preferential flow paths across multiple floodplains. OSU Research Symposium, Stillwater, Okla.
 91. Heeren, D. M., R. B. Miller, G. A. Fox, D. E. Storm, and C. J. Penn. November 4-5, 2009. Long-term monitoring of alluvial groundwater and subsurface phosphorus transport. Oklahoma Water Resources Research Institute (OWRRI) Oklahoma Water Research Symposium, Midwest City, Okla. Poster presentation.
 92. Miller, R. B., D. M. Heeren, G. A. Fox, D. E. Storm, and T. Halihan. November 4-5, 2009. Geophysical subsurface mapping of potential preferential flow paths in Oklahoma Ozark floodplains. Oklahoma Water Resources Research Institute (OWRRI) Oklahoma Water Research Symposium, Midwest City, Okla. Poster presentation.
 93. Fox, G. A., D. E. Storm, D. M. Heeren, R. B. Miller, T. Halihan, and C. J. Penn. November 4-5, 2009. Subsurface transport of phosphorus in alluvial floodplains. Oklahoma Water Resources Research Institute (OWRRI) Oklahoma Water Research Symposium, Midwest City, Okla.
 94. Miller, R. B., D. M. Heeren, G. A. Fox, D. E. Storm, and T. Halihan. June 21-24, 2009. Use of electrical resistivity to map potential preferential flow paths in Illinois River floodplain, Oklahoma. ASABE Annual International Meeting, Reno, Nev.
 95. Miller, R. B., D. M. Heeren, G. A. Fox, D. E. Storm, and T. Halihan. May 17-21, 2009. Use of geophysical techniques to map subsurface preferential flow paths in riparian floodplains. ASCE EWRI World Environmental and Water Resources Congress, Kansas City, Mo.
 96. Heeren, D. M., J. W. Fuchs, R. B. Miller, G. A. Fox, D. E. Storm, T. Halihan, C. J. Penn, and G. O. Brown. February 18-20, 2009. Subsurface transport of phosphorus in alluvial floodplains. OSU Research Symposium, Stillwater, Okla. Poster presentation.
 97. Heeren, D. M., J. W. Fuchs, R. B. Miller, G. A. Fox, D. E. Storm, T. Halihan, C. J. Penn, and G. O. Brown. February 8-12, 2009. Subsurface transport of phosphorus in alluvial floodplains. USDA Cooperative State Research, Education, and Extension Service (CSREES) National Water Conference, St. Louis, Mo. Poster presentation.
 98. Heeren, D. M., G. A. Fox, and M. Chu-Agor. October 28-30, 2008. Evaluating the role of groundwater mechanisms in streambank failures with the BSTEM model. Oklahoma Water Resources Research Institute (OWRRI) Oklahoma Water Research Symposium, Midwest City, Okla. Poster presentation.
 99. Heeren, D. M., H. D. Werner, and T. P. Trooien. October 30-31, 2007. Alternative irrigation water management strategies to conserve water. Eastern South Dakota Water Conference and 52nd Annual Midwest Groundwater Conference, Sioux Falls, S.D.

Section 2.1.7 Invited Talks or Keynote Speeches

1. Heeren, D. M., J. B. Barker³, S. Bhatti², D. R. Rudnick, and F. Munoz-Arriola. February 26-27, 2019. Impact of variable rate irrigation (VRI) on consumptive use of water resources. CPIA Central Plains Irrigation Conference, Kearney, Nebr.
2. Heeren, D. M., S. R. Melvin, and T. Ingram. January 29, 2019. Trends in technology for irrigation scheduling. Nebraska Crop Management Conference, Kearney, Nebr.
3. Heeren, D. M., J. B. Barker³, S. Bhatti¹, M. S. Maguire, W. E. Woldt, and C. M. U. Neale. September 14, 2018. Variable rate irrigation (VRI): Benefits, limitations, and management practices. Delegation from Irrigation New Zealand, Lincoln, Nebr.
4. Neale, C. M. U., R. Kaur, M. J. Hayes, D. M. Heeren, A. Kilic, M. Khanna, A. Sarangi, V. K. Sehgal, and R. N. Sahoo. July 29-August 1, 2018. Improving water management, agricultural production and food security in drought-prone areas. ASABE Annual International Meeting, Detroit, Mich.
5. Barker³, J. B., S. Bhatti¹, D. M. Heeren, and C. M. U. Neale. June 6, 2018. VRI irrigation scheduling. Marena Oklahoma In Situ Sensor Testbed (MOISST) Workshop, Lincoln, Nebr.
6. Heeren, D. M., J. B. Barker³, S. Bhatti¹, M. S. Maguire, W. E. Woldt, and C. M. U. Neale. April 4, 2018. Variable rate irrigation (VRI): Benefits, limitations, and management practices. Nebraska Water Center (NWC) Water Seminar, Lincoln, Nebr.
7. Heeren, D. M. March 7, 2018. Vadose zone modeling with HYDRUS. Nebraska Association of Resource Districts (NARD) Workshop, Kearney, Nebr.
8. Barker³, J. B., C. M. U. Neale, and D. M. Heeren. February 21, 2018. Using remote sensing to improve irrigation uniformity. CPIA Central Plains Irrigation Conference, Colby, Kans.
9. Heeren, D. M., J. B. Barker³, M. S. Maguire, W. E. Woldt, and C. M. U. Neale. January 15, 2018. Drones are buzzing toward increased crop production. IHE Delft Lunch Seminar, Delft, Netherlands.
10. Heeren, D. M. October 4, 2017. Variable rate irrigation (VRI): Potential benefits and management practices. Department Colloquium, Biological Systems Engineering Department, Lincoln, Nebr.
11. Heeren, D. M., D. R. Rudnick, F. Munoz-Arriola, and J. B. Barker². August 29, 2017. Impact of variable rate irrigation on consumptive use of water resources. NWC Advisory Board, Lincoln, Nebr.
12. Heeren, D. M., and J. B. Barker². June 8, 2017. Variable rate irrigation (VRI): Principles, example problems, and current research. Irrigation Association (IA) Irrigation Faculty Academy, Grand Island, Nebr.
13. Barker², J. B., D. M. Heeren, K. Koehler-Cole, R. W. Elmore, C. A. Shapiro, A. T. Mohammed, S. Irmak, T. M. Shaver, H. Blanco-Canqui, and C. A. Francis. April 10-12, 2017. Impact of cover crops on soil water content in irrigated and rainfed corn-soybean systems. DWFI Water for Food Global Conference, Lincoln, Nebr.
14. Heeren, D. M. March 28, 2017. Variable rate irrigation systems. Nebraska Ag Sustainability / Field to Market Advisory Group meeting. Field site tour, Mead, Nebr.

15. Lo², T., D. R. Rudnick, D. M. Heeren, J. D. Luck, and T. M. Shaver. February 21-22, 2017. Fundamentals of variable rate irrigation (VRI). CPIA Central Plains Irrigation Conference, Burlington, Colo.
16. Heeren, D. M., J. B. Barker², and C. M. U. Neale. February 2, 2017. Managing variable rate irrigation for spatial variability in evapotranspiration using remote sensing. Nebraska Agriculture Technologies Association (NeATA) Conference, Lincoln, Nebr.
17. Heeren, D. M., T. Lo¹, J. D. Luck, J. B. Barker², D. L. Martin, and L. Mateos. November 8, 2016. Variable rate irrigation for mining undepleted soil water. International Committee on Irrigation and Drainage (ICID) World Irrigation Forum, Chiang Mai, Thailand.
18. Lo¹, T., D. R. Rudnick, D. M. Heeren, J. D. Luck, and T. M. Shaver. October 19, 2016. Variable rate irrigation (VRI): An introduction. Seminar regarding potential cost-share for VRI. Natural Resources Conservation Service, Grand Island, Nebr.
19. Heeren, D. M., T. Lo¹, J. D. Luck, and J. B. Barker². September 15, 2016. Dynamic prescription maps for variable rate irrigation. Invited presentation to Lindsay Corporation delegation from South America, Lincoln, Nebr.
20. Lo¹, T., D. M. Heeren, J. D. Luck, A. Haghverdi, and D. R. Rudnick. September 8, 2016. Developing management zones for variable rate irrigation (VRI). Technologies for Irrigation Management Field Day, Elgin, Nebr.
21. Heeren, D. M., J. D. Luck, T. Lo¹, and J. B. Barker². September 7, 2016. Variable rate irrigation: Spatial variability in water holding capacity and quantifying the benefits of VRI. Invited presentation to delegation from the Ghana Commercial Agriculture Project, Lincoln, Nebr.
22. Heeren, D. M., J. D. Luck, T. Lo¹, and J. B. Barker². February 5, 2016. Introduction to variable rate irrigation; Developing irrigation prescription maps; Precision irrigation scheduling. Invited lecture for online precision agriculture course, Purdue University.
23. Heeren, D. M., J. D. Luck, and T. H. Lo¹. August 20, 2014. Variable rate irrigation (VRI): Evaluating opportunities to improve water use efficiency. Center for Food Integrity (CFI) and DWFJ Forum for Sustainable Water Management, Lincoln, Nebr.
24. Heeren, D. M., J. D. Luck, D. L. Martin, R. B. Ferguson, and T. M. Shaver. December 13, 2013. Improving irrigation water use efficiency through accurate spatial and temporal management. Nebraska Department of Natural Resources and NWC seminar, Lincoln, Nebr.
25. Heeren, D. M., R. P. Freiburger¹, G. A. Fox, D. E. Storm, C. J. Penn, T. Halihan, B. E. Haggard, R. B. Miller, A. R. Mittelstet, and D. A. Correll. September, 2013. Subsurface phosphorus transport and scale dependent phosphorus leaching in alluvial floodplains. Seminar, U.S. EPA National Center for Environmental Research, Arlington, Va.
26. Heeren, D. M., H. D. Werner, and T. P. Trooien. February 26-27, 2013. Optimizing cropping systems under limited water conditions. CPIA Central Plains Irrigation Conference, Kearney, Nebr.

27. Heeren, D. M., G. A. Fox, D. A. Correll, R. B. Miller, B. E. Haggard, C. J. Penn, D. E. Storm, T. Halihan, P. D. Hays, and A. N. Sharpley. October 18-19, 2011. Quantification and heterogeneity of phosphorus leaching in Ozark floodplains. Oklahoma Water Resources Research Institute (OWRRI) Oklahoma Water Research Symposium, Norman, Okla.
28. Heeren, D. M., G. A. Fox, R. B. Miller, D. E. Storm, B. E. Haggard, T. Halihan, C. J. Penn, P. D. Hays, A. N. Sharpley, D. A. Correll. July 6-7, 2011. Influence of scale on quantifying phosphorus leaching in Ozark floodplains. Arkansas Water Resources Center Annual Watershed and Research Conference, Fayetteville, Ark.

Section 2.1.8 Extension Publications: Peer-Reviewed

1. Lo, T., D. R. Rudnick, Y. Ge, D. M. Heeren, S. Irmak, J. B. Barker, X. Qiao, T. M. Shaver. 2018. [Ground-based thermal sensing of field crops and its relevance to irrigation management](#). NebGuide G2301, Nebraska Extension.
2. Lo¹, T., D. M. Heeren, J. D. Luck, D. L. Martin, L. Mateos, and D. E. Eisenhauer. 2016. Map for VRI pumping reduction: Potential pumping reductions by using VRI to mine undepleted soil water. Extension website, available at <http://heeren.unl.edu/map>.

Section 2.1.9 Extension Publications: Other than Peer-Reviewed

1. Heeren, D. M., S. R. Melvin, A. Nygren, and E. Wilkening. 2020. [Now is the time of year to check pivot performance](#). Online extension article, UNL Water.
2. Ingram, T., D. M. Heeren, S. R. Melvin, E. Wilkening, A. Nygren, D. L. Martin, D. R. Rudnick, C. Burr, and M. Mamo. 2019. [Problems regarding operating pressure and uniformity](#). Online extension article, UNL Water.
3. Melvin, S. R., D. M. Heeren, T. Ingram, A. Nygren, D. L. Martin, M. Mamo, E. Wilkening, and S. Pitla. 2019. [Safety concerns with center pivot irrigation systems](#). Online extension article, UNL Water.
4. Heeren, D. M., J. B. Barker³, T. H. Lo, S. R. Melvin, D. L. Martin, and J. D. Luck. 2017. [Considerations in adopting variable rate irrigation](#). Online extension article, UNL Water.
5. Koehler-Cole, K., R. W. Elmore, H. Blanco, C. A. Francis, C. A. Shapiro, T. M. Shaver, M. Stockton, R. B. Ferguson, S. Irmak, and D. M. Heeren. 2016. [Implementation of cover crops in corn and soybean systems in Nebraska](#). Online extension article, UNL CropWatch.
6. Koehler-Cole, K., R. W. Elmore, H. Blanco, C. A. Francis, D. M. Heeren, S. Irmak, C. Proctor, C. A. Shapiro, T. M. Shaver, and M. Stockton. 2016. [Biomass production of winter annual cover crops in corn and soybean](#). Online extension article, UNL CropWatch.
7. Fox, G. A., D. M. Heeren, and M. A. Kizer. 2010. Oklahoma Stream Depletion Factor (OSDF) Worksheet. Documented use in N.H., Nebr., Minn., Mont., Okla., Wash., and Scotland.

Section 2.2 Grantsmanship Record

Section 2.2.1 Internally Funded Research Grants

1. Near Earth Sensing of Crop Canopy at Production Field Scale Enabled by Unmanned Aircraft (2020-2021)
Sponsor: Daugherty Water for Food Global Institute (DWFI) Grad Student Research Support
PI: D. M. Heeren; *Collaborator:* W. E. Woldt
Sponsor Amount: \$17,500
2. Sensor-Based Irrigation Management for Maize and Soybean in the Great Plains (2018-2021)
Sponsor: Daugherty Water for Food Global Institute (DWFI) Grad Student Research Support
PI: D. M. Heeren; *Collaborators:* J. B. Barker, C. M. U. Neale, D. L. Martin, D. R. Rudnick, and X. Qiao
Sponsor Amount: \$51,000
3. Integrated Crop and Soil Water Sensor Network to Assist Unmanned Aircraft Systems (UAS) and Soil Water Simulation Modeling in Variable Rate Irrigation (2017-2020)
Sponsor: Daugherty Water for Food Global Institute (DWFI) Grad Student Research Support
PI: Y. Ge; *Collaborators:* C. M. U. Neale, D. M. Heeren
Sponsor Amount: \$51,000
4. Impact of Variable Rate Irrigation on Consumptive Use of Water Resources (2017-2019)
Sponsor: Nebraska Water Center, U.S. Geological Survey (USGS) 104(b) program
PI: D. M. Heeren; *Co-PIs:* D. R. Rudnick and F. Munoz-Arriola; *Collaborator:* J. B. Barker
Sponsor Amount: \$20,000
5. Field Testing Variable Rate Irrigation (VRI) for Managing Spatial Variability in Soils and Evapotranspiration (2016-2018)
Sponsor: Daugherty Water for Food Global Institute (DWFI) Grad Student Research Support
PI: D. M. Heeren; *Collaborator:* J. B. Barker
Sponsor Amount: \$33,500
6. Predictability of Water Distribution and Transport Across Spatial and Temporal Scales: An Application on Cropland Management (2016-2020)
Sponsor: Approved Hatch project (UNL Agricultural Research Division and USDA National Institute of Food and Agriculture)
Co-PIs: T. Franz, D. M. Heeren, J. D. Luck, F. Munoz-Arriola, and H. Yang
Sponsor Amount: n/a (USDA formula funding for faculty salaries)

Section 2.2.2 Externally Funded Research Grants

1. Towards Pivot Automation with Proximal Sensing for Maize and Soybean in the Great Plains (2020-2021)
Sponsor: Irrigation Innovation Consortium
PI: D. M. Heeren; *Co-PIs:* C. M. U. Neale, Y. Ge, W. E. Woldt, and G. Bai;
Collaborators: N. Dorsey (Valmont Industries), S. A. O’Shaughnessy (USDA ARS), J. A. Kastl (Valmont Industries), D. R. Rudnick, S. R. Evett (USDA ARS), T. E. Franz, and S. Bhatti
Sponsor Amount: \$50,000
2. Building NRCS Technical Capacity in Irrigation Water Management for Variable Rate Irrigation (2020-2023)
Sponsor: North Dakota State University, which is the lead institution on the overall proposal to the USDA Natural Resources Conservation Service
PI: C. M. U. Neale; *Co-PIs:* T. E. Franz, D. M. Heeren; *Collaborator:* A. Masih
Sponsor Amount: \$64,640
3. Row Unit Evaluation in Wet Soils (2020)
Sponsor: John Deere
PI: J. D. Luck; *Co-PI:* D. M. Heeren
Sponsor Amount: \$35,000
4. A Scalable Real-Time Sensing and Decision-Making System for Field-Level Row-Crop Irrigation Management (2019-2022)
Sponsor: University of Illinois, which is the lead institution on the overall proposal to the USDA and National Science Foundation (NSF) Cyber-Physical Systems program
PI: T. E. Franz; *Co-PIs:* D. M. Heeren and D. R. Rudnick
Sponsor Amount: \$319,994
5. SENSE Nitrogen Management: Promoting Adoption of Sensor-Based Nitrogen Fertilization of Corn through the Nebraska On-Farm Research Network (2019-2021)
Sponsor: Nebraska Corn Board
PI: J. D. Luck; *Co-PIs:* L. Thompson, B. Krienke, L. Puntel, T. Ingram, N. Mueller, D. Krull, T. Mieno, D. R. Rudnick, D. M. Heeren, Y. Shi, M. Taylor, and S. R. Melvin
Sponsor Amount: \$277,785
6. Irrigation Innovation Consortium (2018-2023)
Sponsor: Foundation for Food and Agricultural Research, which provided a grant of \$5,000,000 to the overall consortium (Colorado State University, University of Nebraska-Lincoln, Kansas State University, Texas A&M University, and Fresno State University)
PI: C. M. U. Neale; *Co-PIs:* D. M. Heeren, D. R. Rudnick
Sponsor Amount: \$675,000

7. Improving Variable Rate Irrigation Efficiency Using a Real-Time Soil Water Adaptive Control Model Informed by Sensors Deployed on Unmanned Aircraft Systems (2017-2020)
Sponsor: U.S. Department of Agricultural (USDA) Foundational Program:
Agriculture Systems and Technology
PI: C. M. U. Neale; *Co-PIs:* W. E. Woldt, D. M. Heeren, Y. Ge, E. Frew (University of Colorado), G. E. Meyer, J. D. Luck; *Collaborator:* D. R. Rudnick
Sponsor Amount: \$499,978
UNL Cost Share: \$0
8. Improving Water Management, Agricultural Production and Food Security in Drought-Prone Areas (2016-2020)
Sponsor: Indo-U.S. 21st Century Knowledge Initiative
PI: C. M. U. Neale; *Co-PIs:* R. Kaur (Indian Agricultural Research Institute), M. J. Hayes, D. M. Heeren, T. Clemente, M. D. Svoboda, T. Tadesse, and H. Walia
Sponsor Amount: \$182,804
9. Influence of Preferential Flow on Coupled Colloid, Nitrogen, and Phosphorus Transport through Riparian Buffers (2016-2020)
Sponsor: U.S. Department of Agricultural (USDA) Foundational Program:
Renewable Energy, Natural Resources, and Environment (RENRE)
PI: G. A. Fox (North Carolina State University); *Co-PIs:* T. Halihan (Oklahoma State University), D. M. Heeren, B. Gao (University of Florida), and R. Munoz-Carpena (University of Florida)
Sponsor Amount: \$499,200 (multiple institutions)
10. Selection and Design of Irrigation Systems in Zambia (2016-2017)
Sponsors: Zambia Agricultural Research Institute (ZARI) and World Bank
PI: D. E. Eisenhauer; *Co-PI:* D. M. Heeren; *Collaborators:* L. G. Hayde (IHE Delft Institute for Water Education, Delft, the Netherlands) and A. R. Mittelstet
Sponsor Amount: \$36,074
11. Sustainable Corn and Soybean Production (2014-2018)
Sponsors: Nebraska Soybean and Corn Boards
PIs: R. W. Elmore and H. Blanco; *Co-PIs:* T. M. Shaver, R. B. Ferguson, C. A. Francis, M. Stockton, D. M. Heeren, C. A. Shapiro, C. Proctor, D. Beck (SDSU), R. Archuleta, and K. Koehler-Cole
Sponsor Amount: \$600,000
12. Improving Irrigation Water and Energy Use Efficiency through Accurate Spatial and Temporal Management (2013-2015)
Sponsor: Nebraska Center for Energy Sciences Research (NCESR) Water, Energy and Agricultural Initiative (WEAI)
PI: J. D. Luck; *Co-PIs:* D. L. Martin and R. B. Ferguson; *Collaborators:* D. M. Heeren and T. M. Shaver
Sponsor Amount: \$129,200

13. Developing CornSoyWater: A Web-based Irrigation Decision Aid for Corn and Soybean in Nebraska (2013-2015)

Sponsor: Nebraska Center for Energy Sciences Research (NCESR) Water, Energy and Agricultural Initiative (WEAI)

PI: H. S. Yang; *Co-PIs:* G. R. Kruger and J. Rees; *Collaborators:* K. G. Hubbard, J. A. Torrion, P. Grassini, G. L. Zoubek, M. D. Shulski, D. M. Heeren, G. A. Baigorria, K. G. Cassman, and J. E. Specht

Sponsor Amount: \$122,000

14. Phosphorus Leaching in Riparian Floodplains: Preferential Flow and Scale Effects (2011-2012)

Sponsor: U.S. Environmental Protection Agency (EPA) Science to Achieve Results (STAR) Fellowship

PI: D. M. Heeren (Oklahoma State University)

Sponsor Amount: \$42,000

15. Cow Creek Streambank Stabilization Project (2009-2012)

Sponsor: American Recovery and Reinvestment Act

PI: D. M. Maronek (Oklahoma State University); *Co-PIs:* G. A. Fox (Oklahoma State University), G. O. Brown (Oklahoma State University), M. D. Smolen (Oklahoma State University), S. B. Lovern (Oklahoma State University), R. A. Chavez (Oklahoma State University), and D. M. Heeren (Oklahoma State University)

Sponsor Amount: \$2,000,000

Section 2.3 Research Awards

Section 2.3.1 National and International Research Awards and Recognition

1. ASABE Superior Paper Award, 2016, for the refereed journal article: Heeren, D. M., G. A. Fox, and D. E. Storm. 2015. Heterogeneity of infiltration rates in alluvial floodplains as measured with a berm infiltration technique. *Transactions of the ASABE* 58(3): 733-745.
2. U.S. EPA Science to Achieve Results (STAR) Fellow. 2011-2012.
3. New Faces of Engineering. 2012. ASABE.
4. Second place, Boyd-Scott Graduate Research Award. 2011. ASABE Annual International Meeting, Louisville, Ky.

Section 2.3.2 Regional and Local Research Awards and Recognition

1. Honoree, recognized for performing highly impactful research. 2017. UNL College of Engineering. Research Recognition Reception, Lincoln, Nebr.
2. Outstanding Graduate Student Presentation. 2012. OSU Student Water Conference.
3. First place, Graduate Paper Presentation Contest. 2011. OSU Research Symposium.

Section 2.4 Other Research Accomplishments

Section 2.4.1 International Activities

1. Research partnership with the DWFI and the Indian Agricultural Research Institute (IARI), Delhi, India. 2012-2019. Sensor-operated precision irrigation for smallholders. Funded by the Indo-U.S. 21st Century Knowledge Initiative.
2. Invited presentation at the International Committee on Irrigation and Drainage (ICID) World Irrigation Forum. Chiang Mai, Thailand, November 2016.

Section 3 Teaching Accomplishments

Section 3.1 Postdoctoral Researchers

Section 3.1.1 Post-Doctoral Researchers Supervised

1. J. Burdette Barker. Start date: June 2017. Completion date: November 2018. Co-supervisors: Christopher Neale and Derek Heeren. Research focus: Irrigation management using a real-time soil water adaptive control model informed by sensors deployed on unmanned aircraft systems. Currently consultant, Natural Resources Consulting Engineers in Fort Collins, CO.

Section 3.2 PhD Students

Section 3.2.1 PhD Students Supervised

1. Tsz Him Lo. Major: Biological Engineering. Dissertation: Water and nitrogen interactions in maize production. Graduated: December 2018. Research advisor: Daran Rudnick; academic advisor: Derek Heeren. Currently Assistant Extension/Research Professor, Mississippi State University, Stoneville, MS.
2. J. Burdette Barker. Major: Biological Engineering. Dissertation: Spatial irrigation management using remote sensing water balance modeling and soil water content monitoring. Graduated: May 2017. Co-advisors: Derek Heeren and Christopher Neale. Recipient of the 2016-2017 University of Nebraska Presidential Fellowship (awarded to only three students at UNL). Currently consultant, Natural Resources Consulting Engineers in Fort Collins, CO.

Section 3.2.2 PhD Students Currently in Progress

1. Jamie Duan. Major: Biological Engineering. Expected graduation: July 2023. Co-advisors: Daran Rudnick and Derek Heeren.
2. Sandeep Bhatti. Major: Biological Engineering. Dissertation: Towards pivot automation with thermal sensing for maize and soybean in the Great Plains. Expected graduation: May 2022. Advisor: Derek Heeren.
3. Jasreman Singh. Major: Biological Engineering. Expected graduation: August 2021. Co-advisors: Yufeng Ge and Derek Heeren.

Section 3.2.3 PhD Student Committees

1. Abia Katimbo. Major: Biological Engineering. Expected graduation: December 2021. Advisor: Daran Rudnick.
2. Hope Nakabuye. Major: Biological Engineering. Expected graduation: July 2021. Advisor: Daran Rudnick.
3. Mitchell S. Maguire. Major: Biological Engineering. Expected graduation: July 2021. Co-advisors: Wayne Woldt and Christopher Neale.
4. Chuyang Liu. Major: Civil Engineering. Expected graduation: May 2021. Co-advisors: Yusong Li and Shannon Bartelt-Hunt.
5. Justin P. Gibson. Major: Natural Resources Sciences. Dissertation: Groundwater recharge response to reduced irrigation pumping in western Nebraska. Graduation: December 2018. Advisor: Trenton Franz.
6. Amit Timilsina. Major: Natural Resources Sciences. Dissertation: Assessment of climate change impacts on major crops in the United States of America. Graduated: August 2017. Advisor: Guillermo Baigorria.
7. James Chengchou Han. Major: Agronomy and Horticulture. Dissertation: Development of CornSoyWater, a web-based irrigation app for corn and soybean. Graduated: December 2016. Advisor: Haishun Yang.

Section 3.3 MS Students

Section 3.3.1 MS Students Supervised (Option I)

1. Ankit Chandra. Major: Agricultural and Biological Systems Engineering. Thesis: Water-energy-food linkages in shared smallholder irrigation schemes. Graduated: August 2020. Co-advisors: Nick Brozovic and Derek Heeren. Currently a Program Associate at the Daugherty Water for Food Global Institute.
1. Jingjing Li. Major: Hydraulic Engineering, China Agricultural University, including a one-year visit at UNL. Thesis: Effect of different nitrogen fertigation managements on crop growth, water and nitrogen movement for center pivot irrigated maize in the sub-humid area of Northeast China. Graduated: June 2019. Co-advisors: Haijun Yan (CAU Advisor) and Derek Heeren (UNL Advisor). Currently at Intellectual Property Office, Henan Province, China.
2. Sandeep Bhatti. Major: Agricultural and Biological Systems Engineering. Thesis: Variable rate irrigation using a spatial evapotranspiration model with remote sensing imagery and soil water content measurements. Graduated: December 2018. Advisor: Derek Heeren. Currently PhD student, UNL.
3. Tsz Him Lo. Major: Agricultural and Biological Systems Engineering. Thesis: Preliminary quantification of variable rate irrigation benefits. Graduated: August 2015. Advisor: Derek Heeren. Currently Assistant Extension/Research Professor, Mississippi State University, Stoneville, MS.
4. Ryan P. Freiburger. Major: Agricultural and Biological Systems Engineering. Thesis: Single- and dual-porosity calibration and long-term modeling of highly conductive

floodplain soils in the Ozark ecoregion. Graduated: December 2014. Advisor: Derek Heeren. Currently Environmental Engineer, AECOM, Omaha, Nebr.

Section 3.3.2 MS Students Supervised (Option III)

1. Mavuto M. Banda. Major: Mechanized Systems Management. Applied research thesis: Economic analysis of deficit irrigation in sugarcane farming: Nchalo Estate, Chikwawa District in Malawi. Graduated: May 2019. Advisor: Derek Heeren. Double degree program with the DWFI and IHE Delft. Currently Ph.D. Student, Cranfield University, England.
2. Mumba R. Mwape. Major: Mechanized Systems Management. Applied research thesis: Selection and design of irrigation systems in Zambia. Graduated: May 2017. Advisor: Derek Heeren. Double degree program with the DWFI and IHE Delft. Currently Agricultural Research Officer, Ministry of Agriculture, Lusaka, Zambia.

Section 3.3.3 MS Students Currently in Progress (Option I)

2. Suresh Pradhyun Kashyap. Major: Agricultural and Biological Systems Engineering. Expected graduation: August 2021. Co-advisors: Derek Heeren and Wayne Woldt.

Section 3.3.4 MS Students Currently in Progress (Option III)

1. None at this time.

Section 3.3.5 MS Student Committees

1. Isabella P. Possignolo. Major: Mechanized Systems Management. Thesis: Using infrared radiometry thermometer for irrigation management of dry edible beans in western Nebraska. Graduated: May 2020. Advisor: Xin Qiao.
2. Mitchell S. Maguire. Major: Agricultural and Biological Systems Engineering. Thesis: An evaluation of unmanned aerial system multispectral and thermal infrared data as information for agricultural crop and irrigation management. Graduated: July 2018. Co-advisors: Wayne Woldt and Christopher Neale.
3. Moussa Guira. Major: Earth and Atmospheric Sciences. Thesis: Numerical modeling of the effects of land use change and irrigation on streamflow depletion of Frenchman Creek, Nebraska. Graduated: July 2018. Advisor: Vitaly Zlotnik.
4. Xiaochen Dong. Major: Natural Resources Sciences. Thesis: Improving the accuracy of Cosmic-Ray Neutron Probe estimate of soil water content using multiple detectors and remote sensing estimates of vegetation. Graduated: December 2017. Advisor: Trenton Franz.
5. Catie E. Finkenbiner. Major: Natural Resources Sciences. Thesis: Integration of hydrogeophysical datasets for improved water resource management in irrigated systems. Graduated: May 2017. Advisor: Trenton Franz.
6. Keith A. Miller. Major: Agricultural and Biological Systems Engineering. Thesis: Estimating potential water pump reductions based on soil water content, geospatial

data layers, and variable rate irrigation (VRI) pivot control resolution. Graduated: December 2015. Advisor: Joe Luck.

7. Gustavo Bosch-Rubia. Major: Mechanized Systems Management. Thesis: Land use and water and soil management practices impacts on potential groundwater recharge in loess regions of South Central Nebraska. Graduated: August 2015. Advisor: Dean Eisenhauer.
8. Evordius Rulazi. Major: Agricultural and Biological Systems Engineering. Applied Research Thesis: Irrigation water requirements and groundwater sustainability of shared centre pivot system for smallholder farmers in Babati Tanzania. Graduated: May 2015. Advisor: Dean Eisenhauer. Double degree program with the DWFI and IHE Delft.

Section 3.4 Undergraduate Students

Section 3.4.1 Undergraduate Students Supervised in Research Study

1. Eric Wilkening. 2019-current. Undergraduate Research Assistant.
2. Elizabeth Uwase. 2019-2021. Undergraduate Creative Activities and Research Experiences (UCARE) Scholar.
3. Divine Kantarama. 2019-2020. CASNR Undergraduate Scholars Program (CUSP) Scholar.
4. Jacob Richardson. 2019. Undergraduate Research Assistant.
5. Troy Nelson. 2018. Undergraduate Research Assistant.
6. Joviale Uwase. 2018. CUSP Scholar.
7. Tonny Ruhinda. 2018. CUSP Scholar.
8. Isabella Possignolo. 2017. Research Intern. From Luiz de Queiroz College of Agriculture (ESALQ), University of São Paulo, Brazil.
9. Julienne Irihose. 2017. CUSP Scholar.
10. Francis Mvuyekure. 2017. CUSP Scholar.
11. Aaron Steckly. 2016. Undergraduate Research Assistant.
12. Clayton Blagburn. 2016. Undergraduate Research Assistant.
13. Christian Uwineza. 2016. CUSP Scholar.
14. Rodrigo Dal Sasso Lourenço. 2015. Undergraduate Research Assistant.
15. Natalie Howery. 2013-2014. UCARE Scholar. Co-advisor.
16. Julia Alves Araujo. 2013. Undergraduate Research Assistant. Co-advisor.
17. Peter Storm. 2012. Undergraduate Research Assistant. Co-advisor.
18. Mikayla Marvin. 2011. Wentz Scholar. Co-advisor.
19. Laura Merriman. 2011. Wentz Scholar. Co-advisor.
20. Rachel Carson. 2009. Woolpert Scholar. Co-advisor.

Section 3.4.2 Academic Advising

Average of 12 undergraduate academic advisees per semester in Mechanized Systems Management, beginning in spring of 2014.

Section 3.4.3 Engineering Senior Design Projects Advised

1. Grant Gaspers, Jack Moore, Zhenghao Pan, Kevin Sousek, and Yifei Zhang. 2019-2020. BSE Hydraulics Lab renovation design. Coadvisors: Derek Heeren and Alan Boldt.
2. Paulina Guzek, Ben Everswick, Conner Christensen, and Gabe Cohen. 2017-2018. Fountain Wars. Coadvisors: Derek Heeren and David Mabie.
3. Trevor Hinn, Max Hjernstad, Jeff Ostermiller, and Tony Zach. 2016-2017. Fountain Wars. Coadvisors: Derek Heeren and David Mabie.
4. Mitch Maguire, Julia Franck, Justin Herting, and Karissa Brehm. 2015-2016. Fountain Wars. Coadvisors: Derek Heeren and David Mabie.
5. Bethany Brittenham, Mitchell Goedeken, Mallory Morton, James Sinclair. 2014-2015. Fountain Wars. Coadvisors: Derek Heeren and Dean Eisenhauer.
6. Katy Conroy, Charlie Hinds, Rebecca Nelson, Riley Smith, and Emily Waring. 2013-2014. Fountain Wars. Coadvisors: Derek Heeren and Dean Eisenhauer. First place team (of 44 entries), College of Engineering Senior Design Competition.
7. Sarah Gardels and Adam Emanuel. 2012-2013. Fountain Wars. Coadvisors: Derek Heeren and Dean Eisenhauer.

Section 3.4.4 Mechanized Systems Management Senior Capstone Project

1. Cody Kneifl, Mitch Herbig, and Turner Hagen. 2017. Cost analysis of variable rate irrigation for center pivot irrigated systems. Faculty consultant.

Section 3.5 Staff Supervision

1. Alan Boldt. Research Engineer II and Laboratory Manager. 2015-present.

Section 3.6 Courses Taught

1. AGEN/BSEN 957, Modeling Vadose Zone Hydrology. 2021, 2018 (co-taught with Tiffany Messer), 2016, 2014 (co-taught with Dean Eisenhauer).
2. MSYM 462, Equipment Systems. 2021, 2020, 2019, 2018. Co-taught with Rick Stowell.
3. MSYM 855, Advanced Irrigation Management. 2020, 2019, 2017, 2015.
4. MSYM 452/852, Irrigation Systems Management. 2019, 2018, 2017, 2016, 2015.
5. AGEN/MSYM 854, Irrigation Lab and Field Course. 2018, 2016, 2014. Co-taught with Dean Eisenhauer.
6. MSYM 354, Soil Conservation and Watershed Management. 2014, 2013, 2012.

7. BAE 6333, Fluvial Hydraulics. 2010. OSU.
8. EM 321, Mechanics of Materials. 2007. SDSU.

Section 3.7 Teaching Awards and Recognition

Section 3.7.1 International and National Teaching Awards and Recognition

1. A. W. Farrall Young Educator Award. 2018. ASABE Annual International Meeting, Detroit, Mich.

Section 3.7.2 Regional, Local and University Teaching Awards and Recognition

1. Distinguished Alumnus Award. 2017. SDSU Department of Agricultural and Biosystems Engineering. In recognition of significant contributions to society and accomplishments which have brought credit to the department. Banquet of Excellence, Brookings, S.D.

Section 3.8 Other Teaching Accomplishments

Section 3.8.1 Presentations Related to Teaching and Advising

1. Heeren, D. M. May 16, 2016. Increasing student attentiveness and engagement in growing MSYM courses. UNL CASNR Instructional Improvement Plan. Final report presented at the BSE Annual Undergraduate Curriculum Workshop, Lincoln, Nebr.
2. Heeren, D. M. April 5, 2013. Perspectives on different phases of a water career. OSU Student Water Conference, Stillwater, Okla. Keynote address (invited).

Section 3.8.2 Grants Related to Teaching

1. Publication of Irrigation Systems Management Textbook (2020-2021)

Sponsor: Harold Pinches and Glenn Schwab Teaching Materials Fund, ASABE Foundation

PI: D. M. Heeren; *Co-PIs:* D. E. Eisenhauer, and D. M. Martin; *Collaborator:* G. J. Hoffman

Sponsor Amount: \$9,000

UNL Cost Share: \$3,000

DWFI Cost Share: \$3,000

Estimated percent credit: 40%

Section 3.8.3 Guest Lectures (since 2012)

1. Lecture and lab. Irrigation data techniques. MSYM 892 Technologies and Techniques in Digital Agriculture. 2020.
2. Lecture. Soil and water resources engineering. AGEN 100 Introduction to Biological Engineering and Agricultural Engineering. 2020, 2019, 2018.
3. Lecture and lab. Soil hydraulic conductivity. AGEN/BSEN 225 Engineering Properties of Biological Materials. 2019, 2018, 2017, 2016.
4. Lecture and lab. Pumping systems. MSYM 162 Introduction to Mechanized Systems Management. 2018, 2017, 2016, 2015.

5. Lecture. Variable rate irrigation. AGRO/MSYM 431 Site-Specific Crop Management. 2017, 2015, 2014.
6. Lab. Pipeline hydraulics. AGEN/BSEN 100 Introduction to Biological Engineering and Agricultural Engineering. 2017, 2016.
7. Lecture. Field methods in groundwater quality. GEOL 870 Field Techniques in Hydrogeology. 2017, 2015.
8. Lecture. Nitrate leaching. AGEN/BSEN 344 Biological and Environmental Transport Processes. 2016.
9. Lecture. Applications of physics in irrigation. MSYM 109 Physical Principles in Agricultural and Life Sciences. 2015, 2014, 2013.
10. Panel discussion. Irrigation in agronomic systems. AGRO 405 Crop Management Strategies. 2015, 2013.
11. Lecture. Soil and water courses and opportunities. MSYM 162 Introduction to Mechanized Systems Management. 2014, 2013, 2012.
12. Seminar. Nutrient leaching, spatial variability and scale. ENVE 990 Environmental Engineering Seminar. 2014.
13. Lecture. Variable rate irrigation. MSYM/HORT 452 Irrigation Systems Management. 2014, 2013.

Section 3.7.4 International Activities

1. Partnership Coordinator, DWFI and the IHE Delft Institute for Water Education, Delft, the Netherlands (2019-current). Partnership includes a double degree program (M.S.), Advanced Water Management for Food Production, focused on students from developing countries.
2. Advised two M.S. students in the double degree program.
3. Co-teach summer field course for graduate students from both UNL and IHE Delft (AGEN/MSYM 854 Irrigation Laboratory and Field Course).

Section 4 Service Accomplishments

Section 4.1 Professional Service

Section 4.1.1 Proposal Review Panels

1. Research Steering Committee, Irrigation Innovation Consortium (2019-current)

Section 4.1.2 Associate Editor Positions

1. Guest Associate Editor, *Transactions of the ASABE* and *Applied Engineering in Agriculture* (2020-2021)
 - Special collection on Preferential Flow and Piping in Riparian Buffers

Section 4.1.3 Journal Manuscripts Reviewed

1. *Computers and Electronics in Agriculture* (2021[2])

2. *Hydrology and Earth System Sciences* (2021, 2020)
3. *Transactions of the ASABE* (2020[2], 2019 [3], 2018 [2], 2016 [2], 2013, 2012, 2011)
4. *Agricultural Water Management* (2020, 2019 [2], 2018 [2])
5. *Soil Science Society of America Journal* (2020)
6. *Journal of Hydrology* (2019, 2018, 2016 [2], 2014)
7. *Journal of Irrigation and Drainage Engineering* (2019 [2], 2014)
8. *Water Resources Research* (2019 [2])
9. *Sensors* (2018 [2])
10. *Agriculture and Environment Letters* (2018)
11. *Applied Engineering in Agriculture* (2017 [2], 2010, 2009 [4])
12. *Journal of Hydrologic Engineering* (2017 [3], 2016)
13. *Water* (2016 [2])
14. *Polish Journal of Environmental Studies* (2015)
15. *Sedimentary Geology* (2015)
16. *Groundwater* (2013)
17. *Environmental Monitoring and Assessment* (2013)
18. *Irrigation Science* (2011)
19. *Ecological Engineering* (2011)

Section 4.1.4 Leadership Positions in International and National Organizations

American Society of Agricultural and Biological Engineers (ASABE)

1. NRES-24 Irrigation Group
 - Chair (2020-present)
 - Vice Chair (2018-2020)
2. Fellowship of Christian Agricultural and Biological Engineers
 - Program Coordinator, Prayer Breakfast (2013-present)
3. M-162 Heermann Sprinkler Irrigation Award Committee
 - Past Chair (2019-2021)
 - Chair (2017-2019)
4. M-115 Farrall Young Educator Award Committee
 - Past Chair (2020-2021)
 - Chair (2019-2020)
5. NRES-241 Sprinkler Irrigation Committee
 - Past Chair (2017-2019)
 - Chair (2015-2017)
 - Vice Chair (2013-2015)
6. NRES-253 Riparian Zones, Floodplains, and Wetlands Committee
 - Past Chair (2014-2016)

- Chair (2012-2014)
- Vice Chair (2011-2012)

Section 4.1.5 Leadership Positions in Regional and Local Organizations

1. Nebraska Section of the ASABE
 - Program Chair (2020-2021)
 - Secretary-Treasurer / Membership Chair (2019-2020)
 - Publications Chair (2018-2019)
2. Junior Advisor to UNL Mechanized Systems Management (MSYM) Student Club (2018-present)
3. Founder and Faculty Advisor of the UNL Fountain Wars Student Club (2013-2018)
 - Placed 1st (2014), 2nd (2015), 1st (2016), 2nd (2017), and 2nd (2018) at the national Fountain Wars competition (held at the ASABE Annual International Meeting)
4. Junior Advisor to UNL Mechanized Systems Management (MSYM) Student Club (2013-2014)

Section 4.1.6 Memberships in Professional Organizations

1. Central Plains Irrigation Association
Member (2019 – present)
2. Nebraska Section of the ASABE
Member (2013 – present)
3. Soil Science Society of America (SSSA)
Member (2010 – present)
4. American Society of Agricultural and Biological Engineers (ASABE)
Member (2006 – present)
 - i. P-515 Textbooks and Monographs (2021-present)
 - ii. EOPD-205 Engineering Technology & Management Education (2021-present)
 - iii. NRES-02 Steering Committee (2019-present)
 - iv. NRES-21 Hydrology Group (2010-2013, 2019-present)
 - v. M-162 Heermann Sprinkler Irrigation Award Committee (2016-present)
 - vi. NRES-24 Irrigation Group (2014-present)
 - vii. NRES-241 Sprinkler Irrigation Committee (2011-present)
 - viii. M-115 Farrall Young Educator Award Committee (2018-2021)
 - ix. NRES-253 Riparian Zones, Floodplains, and Wetlands Committee (2011-2016)
5. American Society of Civil Engineers (ASCE)
Member (2005 – 2017)
 - i. River Restoration Committee (2009-2011)

Section 4.2 College Service

Section 4.2.1 Leadership Positions

1. Irrigation and Water Resources Education Coordinator, Daugherty Water for Food Global Institute, University of Nebraska (2019-present)

Section 4.2.2 Membership Positions on College-Wide Committees

1. UNL College of Engineering (CoE) Environmental Engineering Graduate Committee (2014-present)
2. UNL Institute of Agriculture and Natural Resources (IANR) Search Advisory Committee for two hydrologist faculty positions (2014-2015)

Section 4.3 Unit Service

Section 4.3.1 Leadership Positions on Unit Committees

1. UNL Department of Biological Systems Engineering (BSE) Soil and Water Curriculum Committee
 - Co-chair (2019-present)

Section 4.3.2 Membership Positions on Unit Committees

1. UNL BSE Promotion and Tenure Committee (2020-present)
2. UNL BSE Graduate Education Committee (2019-present)
3. UNL BSE Facilities, Infrastructure, and Technology Committee (2019-present)
4. UNL BSE Undergraduate Education Committee (2019-2020)
5. UNL BSE Facilities Committee (2018-2019)
6. UNL BSE Curriculum Committee (2015-2019)
7. UNL BSE Scholarship Committee (2013-2019)
8. UNL BSE Website Oversight Committee (2013-2016)

Section 4.4 Other Service Accomplishments

Section 4.4.1 Professional Outreach Activities (since 2012)

1. External reviewer for a dossier for promotion to associate professor with tenure. 2019.
2. External reviewer for USGS 104(g) proposal. 2019.
3. External reviewer for United States-Israel Binational Agricultural Research and Development Fund proposal. 2018.
4. Judge for ASABE Fountain Wars undergraduate competition. 2018, 2017, 2016, 2015, 2012.
5. Judge for graduate student poster contest, Water for Food Global Conference. 2017.
6. Judge for elementary student poster contest, Lincoln Christian School, Lincoln, Nebr. 2017.
7. Judge for graduate student poster contest, ASABE Annual International Meeting. 2016.

8. Judge for posters for Department of Biological Systems Engineering (BSE) edible car competition, Lincoln, Nebr. 2016, 2015.
9. Internal reviewer for Hatch proposal. 2015.
10. External reviewer for USGS 104(b) proposal. 2014.
11. Judge for student oral and poster presentations, OSU Student Water Conference. 2013.

Section 4.4.2 Community Service

1. Co-leader, small group Bible study. 2017-present. Lincoln, Nebr.
2. Sunday school teacher. 2013-2015. St. John's Reformed Church, Lincoln, Nebr.
3. Sunday school teacher. 2009-2011. Stillwater Reformed Presbyterian Church, Stillwater, Okla.
4. Sunday school teacher. 2006-2008. Calvary Presbyterian Church, Volga, S.D.