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Professor and Department Head
The Pennsylvania State University
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Research/Education Programs: Soil-water resources/irrigation engineering; measurement and modeling of surface energy balance, evapotranspiration, transpiration, evaporation and water productivity; impact of change in climate variables on water resources and agro-ecosystem productivity; water use efficiency; variable rate irrigation and fertigation; water and nitrogen management and impacts on water and soil quality; spatio-temporal plant water extraction; agro-meteorology; impact of tillage practices on water and energy balance; water productivity performance of drought-tolerant hybrids; cover crop impact on soil quality and energy balance; plant abiotic stresses vs productivity; plant phenotyping; measurement and modeling of soil moisture dynamics and soil physical properties; specialty crops; agricultural IoTs.

1. EDUCATION AND EMPLOYMENT HISTORY

1.1. EDUCATION HISTORY

Ph.D.	Agricultural and Biological Engineering	University of Florida, Gainesville, FL
MS	Soil and Water Resources and Irrigation Engineering	Mediterranean University, Antalya/Turkey
BSc	Agricultural Structures and Irrigation Engineering	Cukurova University, Adana/Turkey

1.2. EMPLOYMENT HISTORY

- Professor and Department Head, The Pennsylvania State University (July 1, 2021-current).
- Harold W. Eberhard Distinguished Professor, University of Nebraska (01/01/2013-June 30, 2021).
- Courtesy Full Professor, Department of Earth and Atmospheric Sciences, UNL (07/01/2017-current).
- Courtesy Full Professor, Department of Agronomy and Horticulture, UNL (07/22/2014-current).
- Leadership Resources-Leadership Program Graduate (08-2020)
- LEAD-21 Leadership Program Class 13 Graduate (02/2018).
- Interim Director, Nebraska Water Center, UNL (01/01/2012-07/31/2013).
- Promoted to Full Professor, Department of Biological Systems Engineering, UNL (07/01/2012).
- Granted Tenure and Promoted to Associate Professor, Dept. of Biol. Syst. Engineering, UNL (06/30/2008).
- Assistant Professor, Department of Biological Systems Engineering, UNL (01/01/2004-06/30/2008).
- Research Engineer, Civil and Coastal Engineering Department and Agricultural and Biological Engineering Department, University of Florida, Gainesville, Florida (05/2002-12/2003).
- Graduate Res. Assistant, Agric. and Biol. Eng. Dept., Univ. of Florida, Gainesville, FL (09/1998-05/2002).
- Volunteer Worker, Hourly Helper and Temporary Field Technician, Agricultural and Biological Engineering Department, University of Florida (06/1996- 09/1998).
- Research and Teaching Assistant, Agricultural Structures and Irrigation Engineering Dept., Mediterranean University. Antalya-Turkey (09/1993-04/1996).
- Temporary Research Technician, Agric. Research and Education Center, Tarsus-Turkey (06/1992-12/1993).

2. RESEARCH AND SCIENTIFIC ACCOMPLISHMENTS

2.1. PUBLICATION RECORD

2.1.1. PUBLISHED REFEREED JOURNAL ARTICLES

1. **Irmak, S.**, V. Sharma, A. Haghverdi, A. Jhala, J.O. Payero and M. Drudik. 2021. Alfalfa- and grass-reference crop coefficients for maize under variable and fixed (uniform) rate irrigation and variable rate, fixed rate and pre-plant fertilizer management in three soil types. *Agricultural Water Management* 243(2021):106489. <https://doi.org/10.1016/j.agwat.2020.106489>.

2. Sharma, V., and **S. Irmak**. 2021. Comparative analyses of variable and fixed rate irrigation and nitrogen management for maize in different soil types: Part I. Impact on soil-water dynamics and crop evapotranspiration. *Agricultural Water Management* 246(1):106653 <https://doi.org/10.1016/j.agwat.2020.106644>.
3. Sharma, V., and **S. Irmak**. 2021. Comparative analyses of variable and fixed rate irrigation and nitrogen management for maize in different soil types: Part II. Plant growth, grain yield, evapotranspiration, production functions and water productivity. *Agricultural Water Management* 246 (2021):106653. <https://doi.org/10.1016/j.agwat.2020.106653>.
4. Sharma, K., **S. Irmak** and M.S. Kukal. 2021. Propagation of soil moisture sensing uncertainty into estimation of total soil water, evapotranspiration and irrigation decision-making. *Agricultural Water Management* 243 (2021):106454. <https://doi.org/10.1016/j.agwat.2020.106454>.
5. Lena, B., M. Folegatti, D. Flumignan, **S. Irmak**, J. Francisco, A. Diotto, O. Santos, I. Andrade, E. Junior, P. Marques and C. Junior. 2021. Water requirement and crop coefficients of young jatropha (*Jatropha curcas* L.) trees in a subtropical humid environment. *J. Irrigation and Drainage Engineering* 2021, 147(7): 04021020. doi:10.1061/(ASCE)IR.1943-4774.0001557.
6. Wei-Zhen, L., I. Possignolo, X. Qiao, K. DeJonge **S. Irmak**, D. Heeren and D. 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* <https://doi.org/10.1007/s00271-021-00721-7>.
7. Singh, J., Y. Ge, D. Heeren, E. Walter-Shea, C. Neale, **S. Irmak**, W. Woldt, G. Bai, S. Bhatti and M. Maguire. 2021. Inter-relationships between water depletion and temperature differential in row crop canopies in a sub-humid climate. *Agricultural Water Management* 256 (2021) 107061. <https://doi.org/10.1016/j.agwat.2021.107061>.
8. Sharma, K., **S. Irmak**, M.S. Kukal, M.C. Vuran, A. Jhala and X. Qiao. 2021. Evaluating soil moisture sensing technologies in silt loam and loamy sand soils: Assessment of performance, temperature sensitivity and site- and sensor-specific calibration functions. *Transactions of the ASABE* 64(4): 1123-1139. <https://doi.org/10.13031/trans.14112>.
9. Safa, B., T. Arkebauer, Q. Zhu, A. Suyker and **S. Irmak**. 2021. Gap filling of net ecosystem CO₂ exchange (NEE) above rainfed maize using Artificial Neural Networks (ANNs). *Journal of Software Engineering and Applications* 14(5):150-171. <https://doi.org/10.4236/jsea.2021.145010>.
10. Singh, A., M. Kukal, C. Shapiro, D. Snow, **S. Irmak** and J. Iqbal. 2021. Growth phase-specific evaporative demand and nighttime temperatures determine maize (*Zea mays* L.) yield deviations as revealed from a long-term field experiment. *Agricultural and Forest Meteorology* 308-309 (2021) 108543. <https://doi.org/10.1016/j.agrformet.2021.108543>.
11. Djaman, K., **S. Irmak**, K. Koudahe and S. Allen. 2021. Irrigation management in potato (*Solanum tuberosum* L.) production: A review. *Sustainability* 2021, 13, 1504. <https://doi.org/10.3390/su13031504>.
12. Djaman, K., **S. Irmak**, K. Koudahe, S. Allen. 2021. Chilling and heat accumulation of fruit and nut trees and flower bud vulnerability to early spring low temperatures in New Mexico: Meteorological approach. *Sustainability* 2021, 13, 2524. <https://doi.org/10.3390/su13052524>.
13. Porter, D., **S. Irmak**, F. Lamm, T. Marek and Bradley Rein. 2020. Challenges and opportunities for education in irrigation engineering. *Transactions of the ASABE* 63(5):1289-1294. <https://doi.org/10.13031/trans.13943>.
14. Kukal, M.S., and **S. Irmak**. 2020. Interrelationships among water use efficiency and light use efficiency in four row crop canopies. *Agrosystems, Geosciences and Environment* 2020;3:e20110. <https://doi.org/10.1002/agg2.20110>.
15. Kukal, M.S., and **S. Irmak**. 2020. Canopy light interactions, use and efficiency in four row crops under optimal growth conditions. *Agricultural and Forest Meteorology* 284:107887. <https://doi.org/10.1016/j.agrformet.2019.107887>.
16. Sharma, V., and **S. Irmak**. 2020. Economic comparisons of variable rate irrigation and fertigation with fixed (uniform) rate irrigation and fertigation and pre-plant fertilizer management for maize in three soils. *Agricultural Water Management* 240 (2020) 106307. <https://doi.org/10.1016/j.agwat.2020.106307>.
17. Ale, S., R.D. Harmel, A.P. Nejadhashemi, K.C. DeJonge, **S. Irmak**, I. Chaubey and K.R. Douglas-Mankin. 2020. Global Water Security: Current research and priorities for action. *Transactions of the ASABE* 63(1):49-55. <https://doi.org/10.13031/trans.13839>.

18. Kukal, M.S., and **S. Irmak**. 2020. Characterization of water use and efficiency dynamics across four C3 and C4 row crops under optimal growth conditions. *Agricultural Water Management* 227:105840. <https://doi.org/10.1016/j.agwat.2019.105840>.
19. Harmel, R.D., I. Chaubey, S. Ale, A.P. Nejadhashemi, **S. Irmak**, K. DeJonge, S. Evett, E.M. Barnes, M. Catley-Carlson, S. Hunt and I. Mani. 2020. Perspectives on Global Water Security. *Transactions of the ASABE* 63(1): 69-80. <https://doi.org/10.13031/trans.13524>.
20. Sandhu, R., and **S. Irmak**. 2020. Performance of Hybrid-Maize model in simulating maize growth, grain yield, soil water and evapotranspiration under rainfed, limited and full irrigation using long-term field data. *Agricultural Water Management* 242 (2020) 106402. <https://doi.org/10.1016/j.agwat.2020.106402>.
21. Koehler-Cole, K., R. Elmore, H. Blanco-Canqui, C. Francis, C. Shapiro, C. Proctor, S. Ruis, D. Heeren, **S. Irmak** and R. Ferguson. 2020. Cover crop productivity and subsequent soybean yield in the Western Corn Belt. *Agronomy Journal* 112(4):2649–2663. doi:10.1002/agj2.20232.
22. Kukal, M., and **S. Irmak**. 2020. Impact of irrigation on interannual variability in United States agricultural productivity. *Agricultural Water Management* 234:106141. doi.org/10.1016/j.agwat.2020.106141.
23. Salam, A., M.C. Vuran and **S. Irmak**. 2020. A statistical impulse response model based on empirical characterization of wireless underground channel. *IEEE Transactions on Wireless Communications* 2020. doi:10.1109/TWC.2020.2998762.
24. Taghvaeian, S., A. Andales, L. Allen, I. Kisekka, S. O'Shaughnessy, D. Porter, R. Sui, **S. Irmak**, A. Fulton and J. Aguilar. 2020. Irrigation scheduling for agriculture in the United States: The progress made and the path forward. *Transactions of the ASABE* 63(5):1603-1618. <https://doi.org/10.13031/trans.14110>.
25. Barnes, E.R., N.C. Lawrence, S.Z. Knezevic, O. Rodrigues, **S. Irmak** and A.J. Jhala. 2020. Weed control and response of yellow and white popcorn hybrids to herbicides. *Agronomy Journal* 112(1):458-469. <https://doi.org/10.1002/agj2.20029>.
26. Barnes, E., N. Lawrence, S. Knezevic, **S. Irmak**, O. Rodriguez and A. Jhala. 2020. Dose response of white and yellow popcorn hybrids to glyphosate, a premix of 2,4-D choline/glyphosate, or dicamba. *Agronomy Journal* 112:2956–2967. <https://doi.org/10.1002/agj2.20190>.
27. **Irmak, S.**, A.T. Mohammed, W.L. Kranz, C.D. Yonts and S. van Donk. 2020. Irrigation-yield production functions and irrigation water use efficiency response of drought-tolerant and non-drought-tolerant maize hybrids under different irrigation levels, population densities and environments. *Sustainability* 12(358):1-28. doi:10.3390/su12010358.
28. Kukal, M., **S. Irmak**, H. Walia and L. Odhiambo. 2020. Spatial and temporal performance, calibration and validation of Hargreaves-Samani equation for quantification of grass-reference evapotranspiration in the USA Great Plains. *Agronomy Journal* 112:4232–4248. <https://doi.org/10.1002/agj2.20325>.
29. Barnes, E., S. Knezevic, N. Lawrence, **S. Irmak**, O. Rodriguez and A. Jhala. 2020. Control of Velvetleaf (*Abutilon theophrasti*) at two heights with post-emergence herbicides in Nebraska popcorn. *Weed Technology* 34:560-567. doi:10.1017/wet.2020.14.
30. Kukal, M., and **S. Irmak**. 2020. Evidence of arithmetical uncertainty in estimates of light and water use efficiency in four row crops. *Sustainability* 12(2271):1-9. doi:10.3390/su12062271.
31. Kukal, M.S., **S. Irmak** and K. Sharma. 2020. Development and application of a performance and operational feasibility guide to facilitate adoption of soil moisture sensors. *Sustainability* 12(321):1-20. doi:10.3390/su12010321.
32. Sharma, V., C. Nichololson, A. Bergantino, **S. Irmak** and D. Peck. 2020. Temporal analysis of meteorological variables and reference evapotranspiration in inter-mountain region of Wyoming. *Water* 12(2159):1-35. doi:10.3390/w12082159.
33. **Irmak, S.**, and M. Kukal. 2019. Disk-till vs. no-till maize grass- and alfalfa-reference single (normal) and basal crop coefficients. *Agricultural Water Management* 226:105815. <https://doi.org/10.1016/j.agwat.2019.105815>.
34. Kukal, M., and **S. Irmak**. 2019. Irrigation-limited yield gaps: Trends and variability in the United States post-1950. *Environmental Research Communications* 1:061005. <https://doi.org/10.1088/2515-7620/ab2aee>.
35. **Irmak, S.**, M.S. Kukal, A.T. Mohammed and K. Djaman. 2019. Disk-till vs. no-till maize evapotranspiration, microclimate, grain yield, production functions and water productivity. *Agricultural Water Management* 26(5):177-195. <https://doi.org/10.1016/j.agwat.2019.02.006>.
36. **Irmak, S.**, A.T. Mohammed and W.L. Kranz. 2019. Grain yield, crop and basal evapotranspiration, production functions and water productivity response of drought-tolerant and non-drought-tolerant maize hybrids under different irrigation levels, population densities and environments: Part II. In

- south-central and northeast Nebraska's transition zone and sub-humid environments. *Applied Engineering in Agriculture* 35(1):83-102. <https://doi.org/10.13031/aea.12871>.
37. Sandhu, R., and **S. Irmak**. 2019. Performance of AquaCrop model in simulating maize growth, yield, and evapotranspiration under rainfed, limited and full irrigation. *Agricultural Water Management* 223:105687. <https://doi.org/10.1016/j.agwat.2019.105687>.
 38. Sandhu, R., and **S. Irmak**. 2019. Assessment of AquaCrop model in simulating maize canopy cover, soil-water, evapotranspiration, yield and water productivity for different planting dates and densities under irrigated and rainfed conditions. *Agricultural Water Management* 224, 105753. <https://doi.org/10.1016/j.agwat.2019.105753>.
 39. Kukal, M., and **S. Irmak**. 2019. Comparative canopy growth dynamics in four row crops and their relationships with allometric and environmental determinants. *Agronomy Journal* 111(4):1799-1816. doi:10.2134/agronj2019.01.0017.
 40. Mohammed, A.T., **S. Irmak**, W.L. Kranz, S. van Donk and C.D. Yonts. 2019. Grain yield, crop and basal evapotranspiration, production functions and water productivity response of drought-tolerant and non-drought-tolerant maize hybrids under different irrigation levels, and population densities: Part I. In western Nebraska's semi-arid environments. *Applied Engineering in Agriculture* 35(1):65-81. <https://doi.org/10.13031/aea.12870>.
 41. Zhu, Y., **S. Irmak**, A.J. Jhala, M.C. Vuran and A. Diotto. 2019. Time-domain and frequency-domain reflectometry type soil moisture sensor performance and soil temperature effect in fine- and coarse-textured soils. *Applied Engineering in Agriculture* 35(2):117-134. <https://doi.org/10.13031/aea.12908>.
 42. Salam, A., M. Vuran, X. Dong, C. Argyropoulos and **S. Irmak**. 2019. A theoretical model of underground Dipole Antennas for communications in internet of underground things. *IEEE Transactions on Antennas and Propagation* 67(6):3996. doi:10.1109/TAP.2019.2902646.
 43. Salam, A., M.C. Vuran and **S. Irmak**. 2019. Di-Sense: In situ real-time permittivity estimation and soil moisture sensing using wireless underground communications. *Computer Networks* 151:31-41. <https://doi.org/10.1016/j.comnet.2019.01.001>.
 44. Vuran, M.C., A. Salam, R. Wong and **S. Irmak**. 2019. Internet of underground things in precision agriculture: Architecture and technology aspects. *Ad Hoc Networks* 81:160-173. <https://doi.org/10.1016/j.adhoc.2018.07.017>.
 45. Brar, D., W.L. Kranz, T. Lo, **S. Irmak** and D.L. Martin. 2019. Conservation of energy using variable frequency drive for center pivot irrigation: Systems equipped with corner watering attachments. *Transactions of the ASABE* 62(5):1395-1408. <https://doi.org/10.13031/trans.13312>.
 46. Sharma, V., and **S. Irmak**. 2019. Spatio-temporal magnitudes and trends of cover-crop evapotranspiration in Nebraska, Iowa and Kansas. *J. Irrigation and Drainage Engineering* 145(2):04018040. doi:10.1061/(ASCE)IR.1943-4774.0001367.
 47. Safa, B., T.J. Arkebauer, Q. Zhu, A. Suyker and **S. Irmak**. 2019. Net ecosystem exchange (NEE) simulation in maize using artificial neural networks. *Journal of Systems and Control* 7(100036):1-10. doi.org/10.1016/j.ifacsc.2019.100036.
 48. Bai, G., Y. Ge, D. Scoby, B. Leavitt, V. Stoerger, N. Kirchgessner, **S. Irmak**, G. Graef, J. Schnable and T. Awada. 2019. NU-Spidercam: A large-scale, cable-driven, integrated sensing and robotic system for precision phenotyping, remote sensing, and agronomic research. *Computers and Electronics in Agriculture* 160(5):71-81. <https://doi.org/10.1016/j.compag.2019.03.009>.
 49. Barnes, E.R., S.Z. Knezevic, N.C. Lawrence, **S. Irmak**, O. Rodriguez and A. Jhala. 2019. Pre-emergence herbicide delays the critical time of weed removal in popcorn. *Weed Technology* 33:785-793. doi:10.1017/wet.2019.58.
 50. Djaman, K., D. Rudnick, Y. Moukoumbi, A. Sow and **S. Irmak**. 2019. Actual evapotranspiration and crop coefficients of irrigated lowland rice (*Oryza sativa* L.) under semiarid climate. *Ital. J. Agronomy* 14(1059):19-25. doi:10.4081/ija.2019.1059.
 51. Rudnick, D., **S. Irmak**, C. West, I. Kisekka, T.H. Marek, J.P. Schneekloth, D. Mitchell, D. McCallister, V. Sharma, K. Djaman, J. Aguilar, J.L. Chávez, M.E. Schipanski, D.H. Rogers and A. Schlegel. 2019. Deficit irrigation management of maize in the High Plains Aquifer region: A Review. *J. American Water Resources Association* 55(1):38-55. doi.org/10.1111/1752-1688.12723.
 52. Singh, J., T. Lo, D. Rudnick, **S. Irmak** and H. Blanco-Canqui. 2019. Quantifying and correcting for clay content effects on soil water measurement by reflectometers. *Agricultural Water Management* 216(5):390-399. <https://doi.org/10.1016/j.agwat.2019.02.024>.

53. Kukal, M.S., and **S. Irmak**. 2018. U.S. Agro-climatology in 20th Century: Growing degree days, first and last frost, growing season length, and impacts on crop yields. *Nature Scientific Reports* 8(1):6977. doi:10.1038/s41598-018-25212-2.
54. Kukal, M.S., and **S. Irmak**. 2018. Climate-driven crop yield and yield variability and climate change impacts on the U.S. Great Plains agricultural production. *Nature Scientific Reports* 8(1):3450. doi:10.1038/s41598-018-21848-2.
55. **Irmak, S.**, V. Sharma, A.T. Mohammed and K. Djaman. 2018. Impacts of cover crops on soil physical properties: Field capacity, permanent wilting point, soil-water holding capacity, bulk density, hydraulic conductivity and infiltration. *Transactions of the ASABE* 61(4):1307-1321. doi.org/10.13031/trans.12700.
56. Oliveira, M.C., T. Gaines, E.L. Patterson, A.J. Jhala, **S. Irmak**, K. Amundsen and S.Z. Knezevic. 2018. Interspecific and intraspecific transference of metabolism-based Mesotrione resistance in *Dioecious Weedy Amaranthus*. *The Plant Journal* 96(5):1051-1063. doi:10.1111/tpj.14089.
57. Djaman, P.M. Ndiaye, K. Koudahe, A. Bodian, L. Diop and **S. Irmak**. 2018. Spatial and temporal trend in monthly and annual reference evapotranspiration in Madagascar for the 1980-2010 period. *Int. J. Climatology* 2(2):110-120. doi:10.15406/ijh.2018.02.00058.
58. Yonts, C.D., A. Haghverdi, D.L. Reichert and **S. Irmak**. 2018. Deficit irrigation and surface residue cover effects on dry bean yield, in-season soil water content and irrigation water use efficiency in western Nebraska High Plains. *Agricultural Water Management* 199:138-147. doi.org/10.1016/j.agwat.2017.12.024.
59. Anderson, R., D. Keshwani, A. Guru H. Yang, **S. Irmak**, and J. Subbiah. 2018. An integrated modeling framework for crop and biofuel systems using DSSAT and GREET models. *J. Environmental Modelling and Software* 108:40-50. doi.org/10.1016/j.envsoft.2018.07.004.
60. Vuran, M.C., A. Salam, R. Wong and **S. Irmak**. 2018. Internet of underground things: Sensing and communications on the field for precision agriculture. *IEEE Internet of Things (WF-IoT 2018)*. 307:586-591. doi:10.1109/WF-IoT.2018.8355096.
61. Safa, B., T.J. Arkebauer, Q. Zhu, A. Suyker and **S. Irmak**. 2018. Latent heat and sensible heat flux simulation in maize using artificial neural networks. *Computers and Electronics in Agriculture* 154:155-164. doi.org/10.1016/j.compag.2018.08.038.
62. Sharma, V., **S. Irmak** and J. Padhi. 2018a. Effect of cover crops on soil quality: Part I: Soil chemical properties – organic C, total N, pH, EC, organic matter content, NO₃-N, and P. *J. Soil and Water Conservation* 73(6):637-651. doi:10.2489/jswc.73.6.637.
63. Sharma, V., **S. Irmak** and J. Padhi. 2018b. Effect of cover crops on soil quality: Part II. Soil exchangeable bases (K, Mg, Na, Ca) and soil micronutrients (Zn, Mn, Fe, Cu, and B). *J. Soil and Water Conservation* 73(6):652-668. doi:10.2489/jswc.73.6.652.
64. Chahal, P., **S. Irmak**, M. Jugulam and A. Jhala. 2018. Evaluating effect of degree of water stress on growth and fecundity of Palmer amaranth (*Amaranthus palmeri*) using soil moisture sensors. *Weed Science* 66(6):738-745. doi.org/10.1017/wsc.2018.47.
65. Djaman, K., V.C. Mel, L. Diop, A. Sow, R. El Namaky, B. Manneh, K. Saito, K. Futakuchi and **S. Irmak**. 2018. Effects of alternate wetting and drying irrigation regime and nitrogen fertilizer on yield and nitrogen use efficiency of irrigated rice in the Sahel. *Water* 10(711):1-20. doi:10.3390/w10060711.
66. Djaman, K., M. Sall, A. Sow, B. Manneh and **S. Irmak**. 2018. Analysis of air temperature and relative humidity measured over rice and grass canopies and their impacts on Penman-Monteith reference evapotranspiration. *J. Irrigation and Drainage Engineering* 145(1):06018008. doi:10.1061/(ASCE)IR.1943-4774.0001362.
67. Chahal, P.S., **S. Irmak**, T. Gaines, K. Amundsen, M. Jugulam, P. Jha, I.S. Travlos and A.J. Jhala. 2018. Control of photosystem (PS) II- and 4-Hydroxyphenylpyruvate Dioxygenase (HPPD)-inhibitor-resistant Palmer amaranth (*Amaranthus palmeri* S. Wats.) in conventional corn. *Weed Technology* 32:326-335. doi: 10.1017/wet.2017.111.
68. Djaman, K., M. O'Neill, C. Owen, D. Smeal, K. Koudahe, M. West, S. Allen, K. Lombard and **S. Irmak**. 2018. Crop evapotranspiration, irrigation water requirement, and water productivity of maize from meteorological data under semiarid climate. *Water* 10(405):2-17. doi:10.3390/w10040405.
69. Djaman, K., and **S. Irmak**. 2018. Evaluation of critical N and P models for maize under full and limited irrigation conditions. *Ital. Journal of Agronomy* 13(1):80-92. doi.org/10.4081/ija.2017.958.
70. Djaman, K., K. Lombard, C. Owen, D. Smeal, K. Koudahe, M. West, S. Allen, D. Begay, M. O'Neill and **S. Irmak**. 2018. Long-term winter wheat seasonal irrigation amount, evapotranspiration, yield, and water productivity under semiarid climate. *Agronomy* 8(96):1-16. doi:10.3390/agronomy8060096.

71. Barker, J., D. Heeren, K. Koehler-Cole, C. Shapiro, H. Blanco-Canqui, R. Elmore, C. Proctor, **S. Irmak**, C. Francis, T. Shaver and A. Mohammed. 2018. Soil water storage of cover crops in maize and soybean in Nebraska. *Agronomy Journal* 110(5):1718-1730. doi:10.2134/agronj2017.12.0739.
72. Ringenberg, D., W. Kranz, **S. Irmak** and B. Dvorak. 2018. Extending Extension's Outreach: Efficacy of using student interns to obtain implementation of irrigation improvements. *Journal of Extension* 56(4):1-6.
73. Kukal, M., and **S. Irmak**. 2017. Spatial and temporal changes in maize and soybean grain yields, precipitation use efficiency and crop water use efficiency in the USA Great Plains. *Transactions of the ASABE* 60(4):1189-1208. doi 10.13031/trans.12072.
74. Djaman, K., **S. Irmak**, M. Sall, A. Sow and K. Koudahe and I. Kabenge. 2017. Comparison of sum-of-hourly and daily time step standardized ASCE Penman-Monteith (ASCE-PM) grass-reference evapotranspiration in Western Africa. *Theoretical and Applied Climatology*. doi.org/10.1007/s00704-017-2291-6.
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2.1.2. REFEREED JOURNAL ARTICLES ACCEPTED (OR IN PRESS) FOR PUBLICATION

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2. Mausbach, J., **S. Irmak**, D. Sarangi, J. Lindquist and A. Jhala. 2021. Control of acetolactate synthase inhibitor/glyphosate-resistant Palmer amaranth (*Amaranthus palmeri*) in isoxaflutole/glyphosate-resistant soybean. *Weed Technology* (in press).
3. Yan, Q., H. Yangy, M. Vuran and **S. Irmak**. 2021. Privacy-preserving geo-distance evaluation for precision agriculture applications. *IEEE Transactions on Information Forensics & Security* (in press).

2.1.3. REFEREED JOURNAL ARTICLES IN REVIEW

Fifteen refereed journal articles are currently under review.

2.1.4. BOOK CHAPTERS

1. **Irmak, S.**, and M.S. Kukal. 2021. Evapotranspiration Processes in the Soil-Residue-Canopy System. *In: Modeling Soil-Plant-Climat-Management Processes*. D. Lynch (Managing Editor) and S. Wendroth and L. Ahuja, Co-Editors). ASA, SSSA, CSSA. Madison, WI (in press, invited).
2. Mutiibwa, D., A. Kilic and **S. Irmak**. 2018. Identifying changes in trends of summer air temperatures of the USA High Plains. Book Chapter. *In: Water Challenges of Urbanizing World*. M. Glavan (Ed.). Chapter 9. pp. 145-161. *InTech Publications*. dx.doi.org/10.5772/intechopen.71788. London, UK (invited).
3. Payero, J., and **S. Irmak**. 2011. Actual evapotranspiration, crop coefficient, and energy-balance components of surface-irrigated corn. *In: Evapotranspiration: From Measurements to Agricultural and Environmental Applications*. Chapter 4, INTECH Publisher, G.A. Gerosa (Ed.). ISBN 978-953-307-512-9, November 11, 2011. pp. 59-78 (invited).
4. **Irmak, S.** Evapotranspiration. 2008. *In: Encyclopedia of Ecology*. Manuscript No. 270. Sven Erik Jorgensen & Brian D. Fath, (eds). *Encyclopedia of Ecology*, 1st Edition, Elsevier B.V., Oxford. Elsevier. pp. 1432-1439. Journal Series No. 1037 (invited).

2.1.5. PROFESSIONAL SOCIETY CONFERENCE TECHNICAL and SCIENTIFIC PAPERS and ABSTRACTS

1. Kashyap, S. P., D. Heeren, W. Woldt, C. Neale, **S. Irmak**, Y. Shi, M. Maguire, S. Bhatti and J. Singh. 2021. High-frequency unmanned aircraft flights for crop canopy imaging during moisture-stress and subsequent irrigation. ASABE AIM (Abstract). July 11-14 (virtual).
2. Mausbach, J., **S. Irmak**, M. Kukal, D. Sarangi, J. Lindquist and A. Jhala. 2020. Evapotranspiration of Palmer amaranth (*Amaranthus palmeri*) in corn, soybean, and fallow under subsurface drip and center-pivot irrigation systems. WSSA Annual Conference (Abstract). March 2-5, 2020. Hawaii.
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4. Barnes, E., N. Lawrence, S. Knezevic, O. Rodriguez, **S. Irmak** and A. Jhala. 2019. Response of white and yellow popcorn hybrids to pre- and post-emergence herbicides. 2019 WSSA Annual Meeting. February 11-14, 2019. New Orleans, LA.
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12. Sun, G., S. Sun, J. Xiao, P. Caldwell, D. Amatya, **S. Irmak**, P. Gowda, S. Panda, S. McNulty and Y. Zhang. 2016. Estimating watershed evapotranspiration across the United States using multiple methods. In Stringer, Christina E.; Krauss, Ken W.; Latimer, J.S., eds. *Headwaters to estuaries: Advances in watershed science and management. Proc. 5th Interagency Conference on Research in the Watersheds*. March 2-5, 2015, North Charleston, South Carolina. e-Gen. Tech. Rep. SRS-211. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. p. 302.
13. Sarangi, D., S.Z. Knezevic, J.L. Lindquist, **S. Irmak** and A.J. Jhala. 2015. Pollen-mediated gene flow from Glyphosate-resistant to susceptible Common Waterhemp under field conditions. (Abstract). *North Central Weed Science Society (NCWSS) Annual Meeting*. December 7-10, 2015. Indianapolis, IN.
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29. Irmak, A., I. Ratcliffe, P. Ranade, **S. Irmak**, J. Kjaersgaard, B. Kamble, R. Choragudi, K. G. Hubbard, R. Singh, D. Mutiibwa and N. Healey. 2010. Seasonal Evapotranspiration Mapping Using Landsat Visible and Thermal Data with an Energy Balance Approach in Central Nebraska. *Proc. Remote Sensing and Hydrology.* Jackson Hole, Wyoming, USA, September 2010.
30. Irmak, A., I. Ratcliffe, **S. Irmak**, P. Ranade, J. Kjaersgaard, B. Kamble, K. Hubbard and D. Mutiibwa. 2010. Growing season evapotranspiration with satellite remote sensing procedure. Am. Geophysical Union (AGU) Annual Int. Meeting. December 14-18. San Francisco, California, USA. (Abstract).
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2.1.7. SMART PHONE APPS DEVELOPMENT

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2. **CornSoyWater App.** 2015 (co-author). This web-based and mobile app helps irrigators determine in real-time the available soil-water in a field and determines when to irrigate. Using real-time weather data and field-specific crop information provided by the user, the app uses simulation to track (from planting to current date) crop water use, water inputs from rainfall and irrigation, soil-water to the maximum rooting depth and crop water stress. <http://hprcc-agrono.unl.edu/cornsoywater/>.

2.1.8. REFEREED EXTENSION/EDUCATION AND OUTREACH ARTICLES/NEWSLETTERS/POPULAR MAGAZINE ARTICLES

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2. **Irmak, S.** 2019. Listen to the land. *Progressive Farmer*. February 2019. p. 20-23.
3. **Irmak, S.**, and M.S. Kukal. 2019. UNL researchers: Gap growing between irrigated, rain-fed crop yields. Kearney Hub. August 17, 2019. https://www.kearneyhub.com/news/state/unl-researchers-gap-growing-between-irrigated-rain-fed-crop-yields/article_e0738aco-c09b-11e9-a709-72f1e3d18f3.html.
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8. **Irmak, S.**, and M.S. Kukal. June 29, 2018. 115 years of data reveal longer U.S. growing season, temp trends. <https://news.unl.edu/newsrooms/today/article/115-years-of-data-reveal-longer-us-growing-season-temp-trends/>.
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10. Krienke, B., R. Ferguson, **S. Irmak**, D. Rudnick, T. Shaver, C. Shapiro, K. Glewen and M. Naser. 2018. Feasibility of sensor-based nitrogen fertigation management in corn. *CropWatch*. January 8, 2018.
11. Rudnick, D., J. Chávez, J. Aguilar, **S. Irmak**, J. Bordovsky, and C. Burr. 2017. Advances in irrigation technology. *Colorado Water*. November-December 2017. p. 29-32.
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13. **Irmak, S.** 2016. Retaking the Field. The Case for a Surge in Agricultural Research: Knowledge Transfer: Helping Farmers Save Enough Water to Double Nebraska's Largest Lake. *Supporters of Agricultural Research (SoAR) Foundation*. p. 24.
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37. **Irmak, S.** 2006. Center pivot set up to study crop water stress. *Nebraska Farmer*. April 2006:22.
38. Leininger, D., and **S. Irmak**. 2006. WATER-TIP update. *UBBNRD, Blueprint Newsletter*. July 2006:8.
39. Leininger, D., and **S. Irmak**. Nebraska Agricultural Water Management Demonstration Network. *Upper Big Blue Natural Resources District, Blueprint Newsletter*. April 2006:8.
40. Leininger, D., and **S. Irmak**. WATER-TIP Project. *UBBNRD, Blueprint Newsletter*. January 2006:6.
41. **Irmak, S.** Water management with subsurface drip irrigation. *Midwest Messenger/Bullseye*. August 2005.
42. Haman, D.Z., **S. Irmak** and T.H. Yeager. 2002. A new production system for container plants may decrease the time it takes to grow a plant and use less water. *Am. Nurseryman*. 10(1):54-56.
43. **Irmak, S.** 2001. New system to save water for container-grown nursery plants. *Gator Engineering*. University of Florida, Spring 2001:9-10.

2.1.9. PUBLICATION CITATIONS/DOWNLOADS AND *H* INDEX and *i₁₀* INDEX

Irmak, Suat, *h* index = 49; *i₁₀* Index = 147. A total of 51,461 downloads with 4,844 metadata page hits by 2,900 national and international institutions in 177 countries (Figures 1 and 2) with 1,519 referrers (<http://readership.works.bepress.com/>) for only 72 of my refereed journal articles (out of 220) listed in the Digital Commons with 8,339 citations. These data cover the period only from 2008 to July 2021.

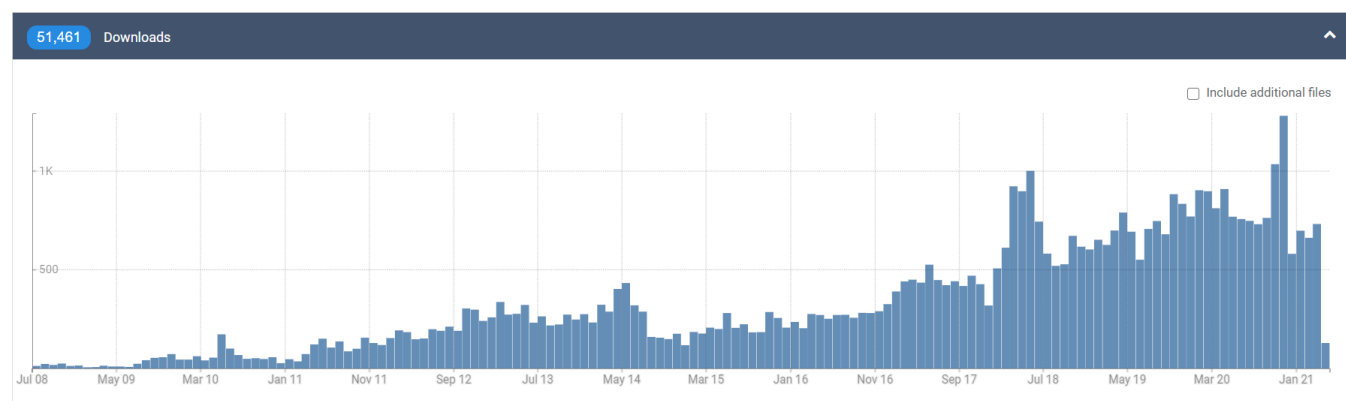


Figure 1. Month downloads (only from July 2008 to April 1, 2021) by national and international scientific, research, and education institutions.

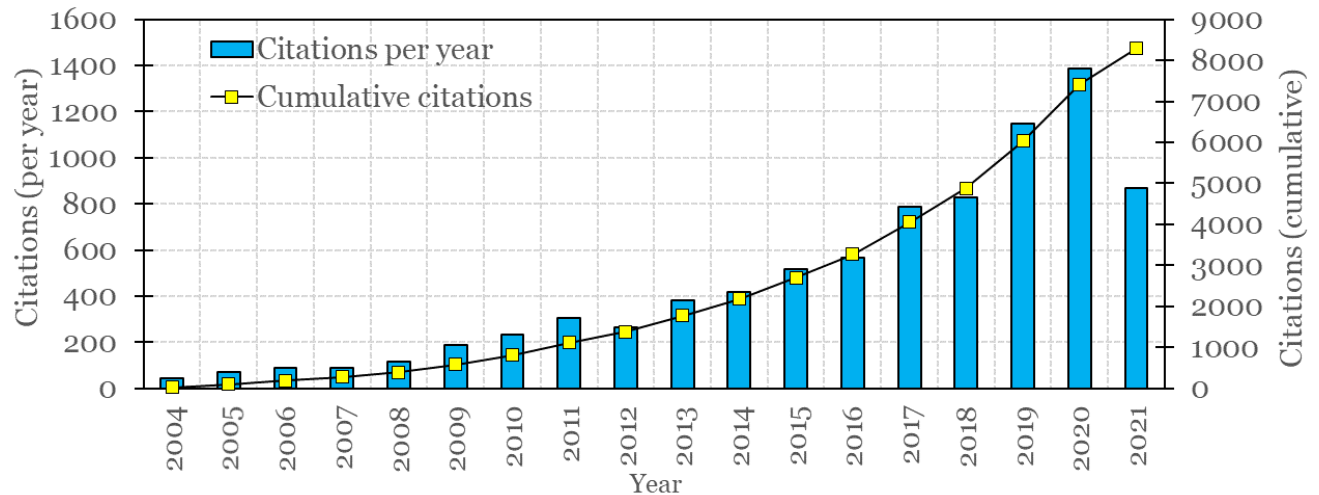


Figure 2. Annual total and cumulative citations (2004-2020) of my papers by national and international scientific, research, and education institutions (Source: Google Scholar).

2.2. AWARDS/HONORS/RECOGNITION

2.2.1. NATIONAL/INTERNATIONAL AWARDS/RECOGNITION *(Major awards are capitalized)*

1. **“ASABE ADS/HANCOR SOIL AND WATER ENGINEERING AWARD.”** Honors and recognizes a member of ASABE who has made significant contributions to the advancement of soil and water engineering in teaching, research, planning, design, construction, management or development of materials. These contributions include in the form of published literature, notable performance, or special actions which have served to advance the science of soil and water engineering. July 17, 2021 (virtual).
2. **“ASABE NETAFIM AWARD FOR ADVANCEMENTS IN MICROIRRIGATION.”** Honors and recognizes an ASABE member who is providing excellence in research, development, extension, education or industry who has made significant contributions in the ability to utilize and adapt microirrigation technology at an appropriate scale for any given level of production technology. The award recognizes engineering excellence in the design, development, evaluation, operation, or management of microirrigation systems and/or efforts that increase the adoption of this efficient irrigation method. July 17, 2021(virtual).
3. **“2021 ASABE EDUCATIONAL BLUE RIBBON AWARD”** for the article *“Long-term (1893-2012) Changes in Monthly, Growing Season, and Annual Precipitation Trends and Magnitudes.”* July 17, 2021 (virtual).
4. **“2021 ASABE STANDARDS DEVELOPMENT AWARD”** (Revision). ANSI/ASAE S436.2 JUN2020, Field Test Procedure for Determining Irrigation Water Distribution Uniformity of Center Pivot and Lateral Move Systems. July 17, 2021 (virtual).
5. **“2021 ASABE STANDARDS DEVELOPMENT AWARD”** (New Standard). ANSI/ASABE S627 NOV2020, Weather-Based Landscape Irrigation Control Systems. July 17, 2021 (virtual).
6. **“FELLOW OF THE AMERICAN SOCIETY OF AGRICULTURAL AND BIOLOGICAL ENGINEERS (ASABE).”** ASABE’s highest honor and is awarded to a member of unusual professional distinction, with outstanding and extraordinary qualifications and experience in the discipline. Irmak is honored for his global impact in advancing the agricultural science, engineering and education in irrigation engineering, evapotranspiration, and surface energy balance measurements and modeling, climate change impact on agricultural productivity and water resources, understanding crop physiology, biophysics vs environment interactions. July 14, 2020.

7. **“2019 AMERICAN SOCIETY OF AGRONOMY EXCELLENCE FOR EXTENSION EDUCATION MATERIALS IN EXTENSION EDUCATION COMMUNITY AWARD”** in the category of Digital Communications. November 13, 2019. San Antonio, TX.
8. **“2019 ASABE STANDARD DEVELOPMENT AWARD”** for the Committee STC-01-ANSI/ASABE S632-1-Precision Agriculture Irrigation Language: Core Concepts, Processes, and Objects, and ANSI/ASABE S632-3-Precision Agriculture Irrigation Language: Irrigation System Operations. July 8, 2019. Boston, MA.
9. **“2019 UNIVERSITIES COUNCIL ON WATER RESOURCES EDUCATION AND PUBLIC SERVICE AWARD”** for the North Central Region Water Network. June 4, 2019.
10. **“Among 10 Most Downloaded Articles in Ad Hoc Networks Journal”** for the article *“Internet of Underground Things in Precision Agriculture: Architecture and Technology Aspect.”* February 1, 2019.
11. **“2018 ASABE EDUCATIONAL BLUE RIBBON AWARD”** for the article *“Evapotranspiration (ET) basics and estimating crop ET from reference ET and crop specific coefficients.”* July 30, 2018. Detroit, MI.
12. **“2018 ASABE EDUCATIONAL BLUE RIBBON AWARD”** for the refereed article *“Simplified forms of deep percolation estimation method below the crop root zone for silt-loam soils.”* July 30, 2018. Detroit, MI.
13. **“2018 ASABE EDUCATIONAL BLUE RIBBON AWARD”** for the refereed article *“Simplified forms of surface runoff estimation method for silt-loam soils.”* July 30, 2018. Detroit, MI.
14. **“2018 ASABE EDUCATIONAL BLUE RIBBON AWARD”** for Nebraska Agricultural Water Management Network (NAWMN) Educational Website. July 30, 2018. Detroit, MI.
15. **“GLOBAL WATER SECURITY OF AGRICULTURE AND NATURAL RESOURCES CONFERENCE CERTIFICATE OF APPRECIATION”** Presented by the ASABE and Indian Society of Agricultural Engineers for contributions as a Committee Co-Chair. October 3-6, Hyderabad, India.
16. **“One of the Most Popular Authors in the Civil and Environmental Engineering Commons.”** Of the 30,316 authors in the US, my scientific papers received some of the highest downloads. January 5, 2018.
17. **“2017 USDA-NIFA NATIONAL WATER & ENERGY CONSERVATION AWARD”** for the USDA-NIFA Multistate Project W-3128 (Scaling Microirrigation Technologies to Address the Global Water Challenge). The award honors a significant achievement in the conservation of water and energy relating to irrigation procedures, equipment, methods and techniques. November 9, 2017. Orlando, FL.
18. **“2017 ASABE EDUCATIONAL AIDS BLUE RIBBON AWARD”** presented by the American Society of Agricultural and Biological Engineers (ASABE) for the refereed publication *“Observed space and time changes in air temperatures and daily temperature range for the counties in the US Great Plains from 1968 to 2013.”* July 17, 2017. Spokane, WA.
19. **“2017 ASABE STANDARDS DEVELOPMENT AWARD”** for the standard *“ANSI/ASABE S626 SEP2016, Landscape Irrigation System Uniformity and Application Rate Testing”* by the ASABE NRES-246 Turf and Landscape Committee. July 17, 2017. Spokane, WA.
20. **“2017 BEST PAPER AWARD”** in the Journal of Irrigation and Drainage Engineering for the refereed journal article *“Inter-annual variation in long-term center pivot-irrigated maize evapotranspiration (ET) and various water productivity response indices: Part I. Grain yield, actual and basal ET, irrigation-yield production functions, ET-yield production functions, and yield response factors.”* Presented by the Irrigation and Drainage Council of the American Society of Civil Engineers (ASCE) and Environmental and Water Resources Institute (EWRI), Sacramento, CA. May 23, 2017.
21. **“2017 BEST PAPER AWARD”** in the J. Irrigation and Drainage Engineering for the refereed journal article *“Inter-annual variation in long-term center pivot-irrigated maize evapotranspiration (ET) and various water productivity response indices: Part II. Irrigation water use efficiency (IWUE), crop WUE,*

evapotranspiration WUE, irrigation-evapotranspiration use efficiency, and precipitation use efficiency.” Presented by the Irrigation and Drainage Council of the ASCE-EWRI, Sacramento, CA. May 23, 2017.

22. “**2016 ASABE EDUCATIONAL AIDS BLUE RIBBON AWARD**” presented by the Am. Soc. Agric. and Biological Engineers (ASABE) for the refereed publication “*Basic soil and water resources and irrigation engineering/agricultural water management and related terminology.*” July 18, 2016. Orlando, FL.
23. Nominated for the “**NATIONAL ACADEMY OF SCIENCES PRIZE IN FOOD AND AGRICULTURAL SCIENCES**” by UNL Chancellor Ronnie Green. September 30, 2016.
24. “**2016 ASABE EDUCATIONAL AIDS BLUE RIBBON AWARD**” presented by the American Society of Agricultural and Biological Engineers (ASABE) for the refereed publication “*Spatial and temporal corn evapotranspiration across Nebraska.*” July 18, 2016. Orlando, FL.
25. “**2016 BEST PAPER AWARD**” in the Journal of Irrigation and Drainage Engineering for the refereed journal article “*Impact of nitrogen fertilizer on maize evapotranspiration crop coefficients under fully irrigated, limited irrigated and rainfed settings.*” Presented by the Irrigation and Drainage Council of the ASCE-EWRI, West Palm Beach, FL. May 25, 2016.
26. “**IRRIGATION ASSOCIATION PARTNER OF THE YEAR AWARD**” that honors a person or group making exceptional contributions or distinctive accomplishments to irrigation. The award was presented for the Center Pivot Irrigation Program that was established and executed in partnership between UNL Extension, NE DNR and NET. November 12, 2015. Long Beach, CA.
27. “**USDA-NIFA NATIONAL INNOVATIVE PROGRAMS AND PARTNERSHIP AWARD**” (*UNL’s first USDA-NIFA Partnership award*) for the Nebraska Agricultural Water Management Network (NAWMN) for its groundbreaking water management work and contributions in advancing agricultural science. The network has transferred high-quality research and data on soil water status and crop-water use measurements to farmers and their advisers; fostered adoption of new or newer irrigation water-management technologies to help farmers increase water-use efficiency, reduced energy consumption and protected agro-ecosystem services; developed new water, soil and crop management tools; and enhanced communication between growers, crop consultants, academics and state and federal agencies. The award was presented by the USDA Undersecretary Dr. Catherine Woteki and the USDA-NIFA Director Dr. Sonny Ramaswamy. October 23, 2014. Washington, D.C. The project impacts have also been presented to President Obama in a briefing by Dr. Ramaswamy.
28. “**NASA CERTIFICATE OF SERVICE APPRECIATION**” in recognition of valuable contribution and outstanding support to the Advanced Information Systems Technology (AIST) Program and the NASA Earth Science Technology Office. Presented by Dr. George J. Komar, NASA Earth Science and Technology Office Associate Director and Program Manager. October 2014.
29. “**2014 ASABE JOHN DEERE GOLD MEDAL AWARD**” presented by the American Society of Agricultural and Biological Engineers (ASABE) for achievements through engineering for improved manipulation, use and conservation of soil-water resources, and that has resulted in applications of a new concept, product, art or science that advanced the development of agriculture. Montreal, Canada. July 16, 2014 (*youngest researcher/scientist to receive this award in ASABE history*).
30. “**2014 ASABE HEERMANN SPRINKLER IRRIGATION AWARD**” presented by the American Society of Agricultural and Biological Engineers (ASABE) in recognition of exceptional contributions in research, development, extension, and education that have made significant contributions to the enhancement of productivity and efficiency of sprinkler irrigated agriculture worldwide. Montreal, Canada. July 16, 2014 (*youngest researcher/scientist to receive this award in ASABE history*).
31. “**2014 ASABE SUPERIOR PAPER AWARD**” presented by the American Society of Agricultural and Biological Engineers (ASABE) for the refereed journal article titled “*Development and evaluation of ordinary least squares regression models for predicting irrigated and rainfed maize and soybean yields*” published in *Transactions of the ASABE*. Montreal, Canada. July 16, 2014.

32. **“EXCELLENCE IN MULTISTATE RESEARCH AWARD”** Presented by the Western Association of Agricultural Experiment Station Directors and U.S. Department of Agriculture’s National Institute of Food and Agriculture (NIFA) and the Experiment Station Committee on Organization and Policy for the outstanding progress and impacts of the Regional Committee W2128 Microirrigation for Sustainable Water Use. The award was given to one committee out of 200 national committees. July 13, 2014, Lake Tahoe, NV.
33. **“2013 ASCE HONORABLE PAPER AWARD”** presented by the Irrigation and Drainage Council of the American Society of Civil Engineers-Environmental and Water Resources Institute (ASCE-EWRI) for the refereed journal article titled *“Dynamics of nocturnal, daytime, and sum-of-hourly evapotranspiration and other surface energy fluxes over non-stressed maize canopy”* published in *J. Irrigation and Drainage Engineering*. Cincinnati, OH. May 19, 2013.
34. **“2013 ASABE EDUCATIONAL AIDS BLUE RIBBON AWARD”** presented by the American Society of Agricultural and Biological Engineers (ASABE) for the publication titled *“Evaluation of water productivity and irrigation efficiency in Nebraska corn production.”* July 21, 2013. Kansas City, MO.
35. **“NATIONAL FINALIST IN THE “SEARCH FOR EXCELLENCE IN THE CROP PRODUCTION CATEGORY OF NACAA AWARDS PROGRAM”** for the Nebraska Agricultural Water Management Network (NAWMN) impact and accomplishments. NACAA 97th Annual Conference, July 15-19, 2012, SC.
36. **“OUTSTANDING SERVICE AS PAST CHAIR OF THE EVAPOTRANSPIRATION IN IRRIGATION AND HYDROLOGY COMMITTEE”** presented by the American Society of Civil Engineers-Environmental and Water Resources Institute (ASCE-EWRI). May 23, 2012. Albuquerque, NM.
37. **“2011 ASABE EDUCATIONAL AIDS BLUE RIBBON AWARD”** presented by the ASABE. This competition encourages agricultural engineers in industry and public service to strive for excellence in extension activities through the interchange of ideas on successful methods and techniques. It also promotes excellence in educational aids, which represent agricultural engineering and through the exchange of ideas and individual recognition, contributes to overall improvement in the use of educational aids. August 8, 2011. Louisville, KY.
38. **“2011 ASABE SUPERIOR PAPER AWARD”** presented by the ASABE for the refereed journal article *“Nebraska Agricultural Water Management Network: Integrating Research and Extension/Outreach”* published in the *Applied Engineering in Agriculture*. August 8, 2011. Louisville, KY.
39. **“2011 HONORABLE PAPER AWARD”** presented by the Irrigation and Drainage Council of the ASCE-EWRI for the refereed journal article *“Actual and reference evaporative losses and surface coefficients of a maize field during non-growing (dormant) periods”* published in *J. Irrigation and Drainage Engineering*. Palm Springs, CA, May 18, 2011.
40. **“2010 ASABE YOUNG EXTENSION PROFESSIONAL AWARD”** recognizes outstanding success in motivating people to acquire knowledge, skills and understanding to improve agricultural operations. Irmak received the award for his exemplary leadership and outstanding contributions and impact to soil and water resources engineering through research, extension education, and outreach programs. Pittsburgh, PA. ***The first and only ASABE member to receive both New Holland Young Researcher and ASABE Young Extension Professional Award in ASABE history since its establishment in 1907.***
41. **“2010 HONORABLE PAPER AWARD”** presented by the Irrigation and Drainage Council of the ASCE-EWRI for the refereed journal article *“Variability analyses of alfalfa-reference to grass-reference evapotranspiration ration in growing and dormant seasons”* published in *J. Irrigation and Drainage Engineering, ASCE*. Providence, Rhode Island, May 18, 2010.
42. **“2010 HONORABLE PAPER AWARD”** presented by the Irrigation and Drainage Council of the ASCE-EWRI for the refereed journal article *“Reference and crop evapotranspiration in south central Nebraska: I. Comparison and analyses of grass and alfalfa-reference evapotranspiration”* published in *J. Irrigation and Drainage Engineering, ASCE*. Providence, Rhode Island, May 18, 2010.

43. **“2010 HONORABLE PAPER AWARD”** presented by the Irrigation and Drainage Council of the ASCE-EWRI for the refereed journal article *“Reference and crop evapotranspiration in south central Nebraska: II. Measurement and estimation of actual evapotranspiration”* published in *J. Irrigation and Drainage Engineering, ASCE*. Providence, Rhode Island, May 18, 2010.
44. **“EXCELLENCE IN AGRICULTURE AWARD”** for Nebraska Agricultural Water Management Demonstration Network (NAWMDN). Presented at the 95th National Association of County Agricultural Agents (NACAA) Annual Meeting and Professional Development Conference, July 11-15, 2010. Tulsa, OK.
45. **“ENGINEER OF THE YEAR AWARD”** presented by the Nebraska Section of the American Society of Agricultural and Biological Engineers (ASABE). The award is given to an ASABE member of the Nebraska Section to recognize outstanding achievement of an individual in the Agricultural and Biological Engineering field. October 2009. Hastings, NE.
46. **“ASABE NATIONAL AWARD IN THE INNOVATIVE EXTENSION METHODS AND IMPACT ASSESSMENT”** presented by American Society of Agricultural and Biological Engineers (ASABE) for the *Nebraska Agricultural Water Management Demonstration Network (NAWMDN)*. June 2009, Reno, NV.
47. **“NATIONAL FINALIST AT THE EXTENSION PROGRAM POSTER COMPETITION”** for the poster presentation “Nebraska Agricultural Water Management Demonstration Network.” The National Association of County Agricultural Agents (NACAA) Annual Meeting, September 23, 2009. Portland, OR.
48. **“MOST POPULAR ENVIRONMENTAL AND WATER RESOURCES PAPER”** for the refereed journal article *“Actual and reference evaporative losses and surface coefficients of a maize field during non-growing (dormant) periods”* published in the *J. Irrigation and Drainage Eng.* was selected by the American Society of Civil Engineers (ASCE)/Environmental and Water Resources Institute (EWRI), June 2009.
49. **“NEW HOLLAND YOUNG RESEARCHER AWARD”** presented by the American Society of Agricultural and Biological Engineers (ASABE) for recognition of dedicated use of scientific methodology to seek out facts or principles significant to the agricultural and biological engineering profession. Rhode Island, Providence, July 2, 2008. ***The first and only ASABE member who received both New Holland Young Researcher and ASABE Young Extension Professional Award in ASABE history since its establishment in 1907.***
50. **“2008 ASABE EDUCATIONAL AIDS COMPETITION BLUE RIBBON AWARD”** in the Educational Publications Category for the publication *“Drip Irrigation Design and Management Considerations for Windbreaks.”* UNL NebGuide G07-525. Rhode Island, Providence, July 2, 2008.
51. **“MOST POPULAR ENVIRONMENTAL AND WATER RESOURCES PAPER”** for the refereed journal article *“Application of SEBAL Model for Mapping Evapotranspiration and Estimating Surface Energy Fluxes in South Central Nebraska”* in the *J. Irrigation and Drainage Engineering, 134(3):273-285* was selected as a by the ASCE-/Environmental and Water Resources Institute (EWRI), June 2008.
52. **“2006 ASABE EDUCATIONAL AIDS COMPETITION BLUE RIBBON AWARD”** in the Educational Publications Category for the publication *“Using Modified Atmometers (ET_{gag}) for Irrigation Management.”* Extension NebGuide, G05-1579. Portland, OR, 2006.
53. **“EXCELLENT SERVICE AWARD”** presented by the Environmental and Water Resources Institute (EWRI) of the American Society of Civil Engineers (ASCE). The award was presented for recognition of excellent service to the 2006 ASCE-EWRI World Environmental and Water Resources Congress through hard work, support and organization of the “Irrigation and Drainage Engineering” track Omaha, NE, 2006.
54. **“BEST PAPER AWARD”** in the *J. Irrigation and Drainage Engineering* for the refereed journal article titled *“Solar and Net Radiation-Based Equations to Estimate Reference Evapotranspiration.”* Presented by the Irrigation and Drainage Council of the ASCE-. Anchorage, Alaska, 2005.

55. Recognized by the Am. Soc. of Agricultural Engineers for *being in the top 5% of the technical reviewers for showing exceptional quality in technical refereed manuscript review* for the society journals, 2004.

2.2.2. REGIONAL/LOCAL AWARDS/RECOGNITION (*Major awards are capitalized*)

1. **“2020 NEBRASKA SECTION ASABE OUTSTANDING CONTRIBUTION TO AGRICULTURE AWARD.”** September 18, 2020. Lincoln, NE.
2. **“2020 UNL COLLEGE OF ENGINEERING HOLLING FAMILY DISTINGUISHED TEACHING, ADVISING AND MENTORING AWARD”** in recognition of effectiveness as an adviser and mentor as well as effectiveness as a teacher. April 30, 2020. Lincoln, NE.
3. **“2020 GAMMA SIGMA DELTA-THE HONOR SOCIETY OF AGRICULTURE–THE EXTENSION AWARD OF MERIT AWARD.”** UNL-IANR. January 26, 2020. Lincoln, NE.
4. **“2019 HOLLING FAMILY SENIOR FACULTY EXCELLENCE IN TEACHING AWARD”** in recognition of providing an exemplary educational environment. UNL-IANR. March 12, 2019. Lincoln, NE.
5. **“UNL SERVICE AWARD”** September 25, 2018. Lincoln, NE.
6. **“2018 UNL COLLEGE of ENGINEERING COLLEGE FACULTY SERVICE AWARD”** recognizes outstanding individuals for service to their academic unit, college and university, as well as profession and community. April 5, 2018. Lincoln, NE.
7. **“2018 UNL DIVISION OF STUDENT AFFAIRS, THE PARENTS ASSOCIATION AND TEACHING COUNCIL’S CONTRIBUTIONS TO STUDENTS AWARD.”** Recognized for making significant difference in student’s life. February 2, 2018. Lincoln, NE.
8. **“2017 UNL COLLEGE OF ENGINEERING IMPACTFUL RESEARCH AWARD.”** November 9, 2017. Lincoln, NE.
9. **“UNL COLLEGE OF ENGINEERING LAGERSTROM AWARD”** presented to the Biological Systems Engineering Department based on department’s outstanding accomplishments in providing service to its students, the College, the University, and the broader community. April, 2016. Lincoln, NE.
10. **“INNOVATIVE EXTENSION FACULTY AWARD”** The award provides recognition of outstanding contributions by an Extension Specialist in the program area(s) relative to his/her assignment. The award recognizes leadership in developing and carrying out programs in cooperation with Extension Educators and other Extension Specialists. Presented by UNL Extension, November 13, 2014. Kearney, NE.
11. **“2014 UNL COLLEGE OF ENGINEERING RESEARCH AND CREATIVE ACTIVITY AWARD”** for recognition of activities associated with investigation or experimentation aimed at the discovery and/or interpretation of facts and development of creative works or new products. April 15, 2014. Lincoln, NE.
12. **“2013 OMTVEDT INNOVATION AWARD”** in recognition of exceptional service for leadership and significant contributions to the initial development of partnerships and programs in the Institute of Agriculture and Natural Resources. September 6, 2013. Lincoln, NE.
13. Honored with the **“HAROLD W. EBERHARD DISTINGUISHED PROFESSORSHIP.”** University of Nebraska-Lincoln Institute of Agriculture and the Natural Resources. January 1, 2013. Lincoln, NE.
14. **“CERTIFICATE OF APPRECIATION IN RECOGNITION OF SERVICE TO NEBRASKA NATIONAL GUARD AGRIBUSINESS DEVELOPMENT TEAMS (ADT1-4) SERVING IN AFGHANISTAN.”** Presented by Lynn M. Heng (NE ADT2 Commander); William J. Pruisa (NE ADT3 Commander); and Donald E. Kneifl (NE ADT4 Commander). October 2012. Lincoln, NE.

15. **“2011 UNL EXTENSION EXCELLENCE IN TEAM PROGRAMMING AWARD”** (Team Leader) presented by the UNL Extension to recognize the importance of interdisciplinary team efforts in achieving the goals of UNL Extension in terms of problem identification, team strategy, grant success, productivity, and impact and the output of the team in relation to inputs. November 9, 2011. Kearney, NE.
16. **“OUTSTANDING YOUNG SCIENTIST AWARD.”** UNL Chapter of Sigma Xi (Scientific Research Society) for "novel contributions to understanding and optimizing water use in irrigated agriculture." April 2008. Lincoln, NE.
17. **“2007 HOLLING FAMILY TEACHING EXCELLENCE AWARD.”** Presented by the UNL-IANR and the Nebraska College of Technical Agriculture (NCTA). The award is given to outstanding faculty within NU's IANR and NCTA for their innovation, impact, and program quality in teaching. Lincoln, NE, 2007.
18. **“2007 DISTINGUISHED EXTENSION NEW EMPLOYEE AWARD”** for recognition of outstanding extension programming. Grand Island, NE, 2007.
19. Gamma Sigma Delta (The Honor Society of Agriculture) *“in recognition of high scholarship, outstanding achievement or service.”* Lincoln, NE, 2007.
20. **“YOUNG RESEARCHER AWARD”** presented by the Florida section of the American Society of Agricultural Engineers, Key West, FL, 2002.
21. **“UNIVERSITY OF FLORIDA PRESIDENTIAL RECOGNITION AWARD”** in recognition of outstanding achievement and contributions to the University of Florida. Presented by President Charles E. Young, President of the University of Florida. Gainesville, FL, 2000.
22. Gamma Sigma Delta (The Honor Society of Agriculture) *“in recognition of high scholarship, outstanding achievement and service.”* Gainesville, FL, 2000.
23. Competitive graduate student travel scholarship. College of Engineering, Univ. of FL, Gainesville, FL, 2000.
24. Competitive graduate student travel scholarship. College of Engineering, Univ. of FL, Gainesville, FL, 1999.
25. Florida Gamma Beta Chapter of Alpha Epsilon; The Honor Society of Agricultural, Food, and Biological Engineering, Gainesville, FL, 1999.
26. **“SECOND PRIZE WINNER”** for a Poster Presentation in Engineering and Math.” The 1999 Graduate Student Forum of the University of Florida. Gainesville, FL, 1999.
27. **“OUTSTANDING GRADUATE STUDENT AWARD (1998-1999)”** presented by Agric. and Biological Eng. Dept., Institute of Food and Agricultural Sciences (IFAS), Univ. of Florida. Gainesville, FL, 1999.
28. **“OUTSTANDING ACADEMIC ACHIEVEMENT AWARD”** presented by the College of Engineering, University of Florida. Gainesville, FL, 1999.
29. **“SECOND PRIZE WINNER”** for a Poster Presentation in Ecology and Environmental Sciences.” The 1998 Graduate Student Forum of the University of Florida. Gainesville, FL, 1998.
30. Graduate Research Assistantship and fellowship, University of Florida, Agricultural and Biological Engineering Department. Gainesville, FL, 1999-2002.

3. TEACHING AND HIGHER EDUCATION ACCOMPLISHMENTS

3.1. GRADUATE STUDENTS

3.1.1. PH.D. STUDENTS IN PROGRESS (MA)

1. Jared Daily (**co-advisor**). Research topic TBD. Dept. of Biol. Sys. Eng.

3.1.2. PH.D. STUDENTS IN PROGRESS (GCM)

1. Carolyn Sheline. *Designing solar-powered drip irrigation systems considering optimal irrigation operation, methods to maximize crop productivity and reduce system cost in small to medium scale farm context*. Massachusetts Institute of Technology (MIT).
2. Jasreman Singh. *Plant water stress determination using UAVs*. Dept. of Biol. Sys. Eng.
3. Mandeep Singh. *Evapotranspiration of various weed species in maize and soybean cropping systems under subsurface drip and center pivot irrigation methods*. Dept. of Agronomy and Horticulture.

3.1.3. PH.D. STUDENTS COMPLETED

1. Ali T. Mohammed. Maize growth, yield, water productivity and evapotranspiration response to different irrigation methods and amounts and different timing and methods of nitrogen applications. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in May 2020.
2. Rupinder Sandhu. Performance analysis of AquaCrop and Hybrid-Maize models in estimating crop yield, water use and plant phenological and physiological variables. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in December 2019.
3. Meetpal Kukal. Coupled water and light use and efficiency in four row crops under optimal growth conditions. Funded 100% from my grant. Dept. of Biol. Sys. Eng. Graduated in May 2019.
4. Ethann Barnes. Controlling weeds in popcorn production and pollen flow from popcorn to field corn. Dept. of Agron. & Horticulture. Graduated in May 2019.
5. Vasudha Sharma. Fundamentals of variable rate irrigation and fertigation in comparison to fixed rate irrigation and conventional fertilizer management. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in May 2018.
6. Parminder Chahal. Water stress and water uptake of various weed species. Dept. of Agron. & Hort. Graduated in May 2018.
7. Abdul Salam. Pulses in the sand: long range and high data rate communication techniques for next generation wireless underground networks. Dept. of Comp. Sci. and Eng. Graduated in December 2017.
8. Angela Bastidas. Interseeding cover crops in corn. Dept. Agron. & Hort. Graduated in December 2017.
9. Maxwell Oliveira. Efficacy of weed control methods. Dept. Agron. & Hort. Graduated in December 2017.
10. Bruno Patias Lena. Evapotranspiration and crop coefficient of *Jatropha*. Funded by FAPESP. Luiz de Queiroz College of Agric. of University of Sao Paulo, Brazil. Graduated in May 2017.
11. Debalin Sarangi. Water use of glyphosate-resistant weed species. Dept. Agron. & Hort. Graduated in August 2016.
12. Brian T. Krienke. Assessing factors influencing maize yield response to nitrogen using remote sensing technologies. Dept. of Agron. & Horticulture. Graduated in May 2016.
13. Daran R. Rudnick. Maize evapotranspiration, stomatal resistances, crop water productivity, and economic analysis for various nitrogen fertilizer rates. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in August 2015.
14. Nick Ward. Variable nitrogen management. Dept. of Agron. & Horticulture. Graduated in August 2015.
15. Babak Safa. Net ecosystem exchange (NEE) simulation in maize using artificial neural networks. Dept. of Agron. & Horticulture. Graduated in August 2015.
16. Vivek Sharma. Remote sensing approach for the assessment and quantification of evapotranspiration. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in December 2014.
17. Xin Dong. Underground-wireless sensors network. Dept. of Computer Science and Engineering. Dept. of Computer Sci. and Eng. Graduated in December 2013.
18. Ryan Rapp. Strategies for controlling invasive weed species. Dept. of Agron. & Horticulture. Graduated in December 2011.
19. Denis Mutibwa. Identifying the changes in climatic trends and fingerprints in land use/landcover change in the High Plains of the USA. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in August 2011.
20. Isa Kabenge. Surface energy fluxes and stomatal and canopy resistance of *Phragmites*-dominated cottonwood and willow plant communities in the Platte River Basin in central NE. Funded 50% from my grant and 50% departmental funding. Dept. of Biol. Sys. Eng. Graduated in May 2011.

21. Koffi Djaman. Evapotranspiration, crop coefficients, and yield relationships for maize under full and deficit irrigation settings. Fulbright Scholarship (2008-2009) and funded 100% from my research grant (2010-2011). Dept. of Biol. Sys. Eng. Graduated in December 2011.
22. Ramesh Singh. Application of satellite remote sensing technique to estimate surface energy fluxes. Dept. of Biol. Sys. Eng. Graduated in May 2009.
23. Nathan Utt. Halted his Ph.D. program after second year due to family challenges.
24. Octavio Lagos. Watershed scale modeling of water and energy balance. 100% grant funded. Dept. of Biol. Sys. Eng. Graduated in December 2008.
25. Akwasi Abunyewa. Skip row for efficient utilization of nitrogen and water for grain sorghum production. Dept. of Agron. & Hort. Graduated in December 2008.

3.1.4. MS STUDENTS IN PROGRESS (MA)

1. Matt Drudik. *Soybean evapotranspiration and productivity response to different planting date, population density and variety*. Dept. of Agronomy and Horticulture.
2. Jasmine Mausbach. Soil-water competition between weeds, maize and soybean. Funded 50% from my research grant. Dept. Agron. and Hort.

3.1.5. MS STUDENTS IN PROGRESS (GCM)

1. Suresh Pradhyun Kashyap. Thesis topic TBD. Dept. of Biol. Sys. Eng.
2. Sevgi Saylak. *Sunflower productivity, evapotranspiration and plant growth parameters response to salinity and water stress*. Dept. of Agronomy and Horticulture.
3. Venkat Sai Suman Lamba Karanam. *Underground wireless sensor network*. Dept. Comp. Sci. and Eng.

3.1.6. MS STUDENTS COMPLETED (MA)

1. Trevor Hinn. *Soybean productivity, soil-water, evapotranspiration and water use efficiency response to variable and fixed (uniform) rate irrigation management*. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in May 2020.
2. Kiran Sharma. *In-field soil moisture sensor performance of various FDR and TDR-type sensors in coarse- and fine-textured soils*. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in May 2019.
3. Sahil Sharma. *Use of long-term weather data and spatially delineated field attributes to predict water and energy conservation from variable rate irrigation*. Dept. of Biol. Sys. Eng. Graduated in August 2018.
4. Rupinder Sandhu. *Soybean productivity response to water under different population densities and irrigation levels*. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in May 2016.
5. Zhu Yan. *Soil moisture sensor performance*. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in May 2016.
6. Kevin Achieng. Evapotranspiration estimation in the Middle Republican NRD (left to Montana State Univ. before finishing his MS.). 2017.
7. Meetpal Kukal. *Long-term spatio-temporal analyses of maize and soybean evapotranspiration and water productivity in the Great Plains*. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in December 2015.
8. Vasudha Sharma. *Soil-water dynamics, evapotranspiration, and single and basal crop coefficients of cover crop mixtures in seed maize-cover crop rotation fields*. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in August 2014.
9. Maria G. Arellano. *Evaluation of combination-based energy balance, temperature and radiation-based reference (potential) evapotranspiration equations in different climates*. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in December 2013.
10. Ali T. Mohammed. *Yield and water use efficiency response of drought-tolerant and conventional maize hybrids under different irrigation levels and populations in different climatic gradients*. Dept. of Biol. Sys. Eng. Graduated in December 2013.
11. Daran Rudnick. *Impact of water and nitrogen management on maize productivity and development of new nitrogen water use efficiency index*. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in May 2013.

12. Vivek Sharma. *Quantification of net irrigation requirements and application of GIS and geographically-weighted regression to evaluate spatial non-stationarity relationships between precipitation vs. irrigated and rainfed maize and soybean yields*. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in May 2011.
13. Michael Burgert. *Large scale implementation of irrigation management tools/strategies for maize*. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in May 2009.
14. Denis Mutibwa. *Scaling-up leaf stomatal resistance to canopy resistance using photosynthetic photon flux density*. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in December 2007.

3.1.7. MS STUDENTS COMPLETED (GCM)

1. Isabella Presotto Possignolo. *Irrigation scheduling using canopy temperature*. Dept. of Biol. Sys. Eng. Graduated in May 2020.
2. Emily O'Donnel. *Irrigation management, environment and profits*. Dept. of Agricultural Economics. Graduated in August 2018.
3. Putri Sukmahartati. *Hydrologic analyses using soil classifications in Indonesia*. Department of Civil and Environmental Engineering. Graduated in December 2017.
4. Rigoberto Wong. *Irrigation control system using soil information transmitted wirelessly from underground nodes to a moving gateway*. Dept. Comp. Sci. and Eng. Graduated in August 2017.
5. Matt J. Nelson. *Impact of using spatially distributed soils information on flood hydrograph simulation with HEC-HMS*. Civil Engineering Department. Graduated in May 2017.
6. Nuwan Wijewardane. *Development of multi-sensor for soil organic carbon measurements*. Dept. of Biol. Sys. Eng. Graduated in August 2016.
7. Clint Aegerter. *Modeling and satellite remote sensing of the meteorological impacts of irrigation*. Earth and Atmospheric Sciences. Graduated in August 2016.
8. Justin Gibson. *Quantification of recharge rates of agricultural fields*. Funded 100% from my research grant. Dept. of Earth and Atmospheric Sciences. Graduated in December 2015.
9. Dilshad Brar. *Conservation of energy using variable frequency drive for center pivot irrigation systems in Nebraska*. Dept. of Biol. Sys. Eng. Graduated in August 2015.
10. Gustavo Bosch Rubia. *Land use and water and soil management impacts on groundwater recharge in loess regions of south central Nebraska*. Dept. of Biol. Sys. Eng. Graduated in August 2015.
11. Andrew Volkmer. *Quantification of surface run-off from tilled and untilled fields*. Funded 100% from my research grant as a PI. Dept. of Biol. Sys. Eng. Graduated in August 2014.
12. Alister Bryson. *Irrigation practices influence on West Nile Virus of Great Plains Ecosystems*. Medical and Veterinary Entomology. Dept. of Entomology. Graduated in May 2014.
13. Michael McKinney. *Tillage management impact on surface soil hydrologic properties*. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in August 2012.
14. Isaac Mortensen. *Optimization of deficit irrigation*. Graduated in May 2011. Dept. of Biol. Sys. Eng.
15. Jessica Deck. *Measurement of surface run-off and infiltration for tilled and untilled fields*. Funded 100% from my research grant. Dept. of Biol. Sys. Eng. Graduated in December 2010.
16. Venkata Mannam (*graduate committee member*). *Weed water uptake dynamics*. Dept. of Agron. & Horticulture. Graduated in December 2010.
17. Pari Ranade. *Developing irrigation management decisions using a functional crop growth model*. School of Natural Resources. Graduated in May 2009.
18. Travis Yonts. *Modeling and monitoring the hydrology of conservation terrace systems*. Dept. of Biol. Sys. Eng. Graduated in August 2006.

3.2. INTERNATIONAL AND NATIONAL UNDERGRADUATE INTERN STUDENTS

1. Raissa Urujeni (May 5 - July 30, 2018). Rwanda Undergraduate Internship Program, Rwanda.
2. Jean Claude Irakudunda (May 2017-August 2017). Rwanda Undergraduate Internship Program, Rwanda.
3. Christian Uwineza (May 2017-August 2017). Rwanda Undergraduate Internship Program, Rwanda.
4. Sean Krebs (May 2017-current). UNL Biological Systems Engineering, Nebraska.
5. Trevor Hinn (May 2016-current). UNL Biological Systems Engineering, Nebraska.
6. Maria (Zhao) Bin (July-August, 2015) Northwest Agricultural and Forestry University, China
7. Kevin (Zhou) Zou (July-August, 2015) Northwest Agricultural and Forestry University, China
8. Caroline Salles (Brazil-May -September, 2015)

9. Arthur Santos (Brazil-May-August 2015)
10. Liza Freitas (Brazil-May – September, 2014)
11. Danielle Pessoa Cordeiro (Brazil-May – September, 2014)
12. Chunshan Hu (China-Northwest Agriculture and Forestry Univ., 2 months, 2013)
13. Gao Yujing (China-Northwest Agriculture and Forestry Univ., 2 months, 2013)
14. Henrique Castro (Brazil- College of Agric., Luiz de Queiroz, Univ. of Sao Paulo - Brazil, 3 months, 2013)
15. Lucas R.L. Vaz (Brazil- Universidade Dederal De Minas Gerais, Instituto De Ciências Agrárias, 2013)
16. Shen Changyue (China-Northwest Agriculture and Forestry Univ., 3 months, 2012)
17. Wang Xiaowen (China-Northwest Agriculture and Forestry Univ., 3 months, 2012)
18. Liao Zhihao (China-Northwest Agriculture and Forestry Univ., 3 months, 2012)
19. Zhu Yan (China-Northwest Agriculture and Forestry Univ., 3 months, 2012)
20. Chen Xi (China-Northwest Agriculture and Forestry Univ., 3 months, 2012)

3.3. UCARE STUDENTS AND SENIOR DESIGN PROJECT STUDENTS

4. C. Wei-Jian (**major advisor**). *UV inactivation of salmonella in liquid egg white*. Dept. of Biol. Sys. Eng. 2007-2008.
2. Michael Schaal (**major advisor**). *High pressure processing*. Dept. of Biol. Sys. Eng. 2009-2010.
3. Robert Wilson (**co-advisor**). Evaluation of soil moisture sensors utilized in the NRCS-SCAN program. Dept. of Biol. Sys. Eng. 2009-2010.

3.4. FORMER STUDENTS AND POST-DOCS SUPERVISION/ADVISING AND THEIR CURRENT EMPLOYMENTS

1. Ali T. Mohammed, former MS and Ph.D. student and post-doc. Supervised from 5/2020-current. Supported 100% from my grants.
2. Meetpal S. Kukal, former MS and Ph.D. student and post-doc. Supervised from 5/2019 to August 15, 2021. Supported 100% from my grants. Currently Assistant Research Professor at Penn State University, Agricultural and Biological Engineering Department.
3. Rupinder Sandhu, former MS and Ph.D. student and post-doc. Supervised from 12/2019 to 07/2020. Supported 100% from my grants (with Locus Agricultural Solutions).
4. Vasudha Sharma, former MS and Ph.D. student. Supervised from 04/2012 to 05/2018. Funded 100% from my grants from 2012 to 2018 (faculty member at the University of Minnesota).
5. Lameck Odhiambo, former post-doc and research assistant and associate professor. Supervised from 07/2008 to 09/2016. Funded 100% from my grants from 07/2008 to 09/2016 (Retired).
6. Vivek Sharma, former MS and Ph.D. student and post-doc. Supported 100% from my grants. Supervised from 12/2014 to 4/1/2016 (faculty member at the University of Florida).
7. Dilshad Brar, Research Technologist. Supported 100% from my grants. Supervised from 2015 to 2016.
8. Jyoti Padhi, post-doc. Supported 100% from my grants. Supervised from 7/2014 to 08/2015 (faculty member at KIT University, India).
9. Daran R. Rudnik, former MS and P.D. student. Supported 100% from my grants (faculty member at University of Nebraska-Lincoln).
10. Matt Drudik, Research Technician. Supported 100% from my grants. Supervising from 04/2014 to current.
11. Adriano Diotto, former Ph.D. student and post-doc. Supported 100% from my grants. Supervised from 05/2013 to 12/2015 (faculty member at University of Lavras-UFLA, Brazil).
12. Ed Barnes, Research Technician. Supported 100% from my grants. Supervised from 05/2013 to 05/2015.
13. Isa Kabenge, former Ph.D. student (faculty member at the Makerera Univ., Uganda).
14. Denis Mutibwa, former MS and Ph.D. student and post-doc. Supported 100% from my grants. Supervised from 08/2011 to 01/2013 (scientist at the USDA-Beltsville, Maryland).
15. Koffi Djaman, former Ph.D. student and post-doc. Supported 100% from my grants. Supervised from 12/2011 to 12/2013 (faculty member at New Mexico State University).
16. William Rathje, Research Technician: Supported 50% from my grants. Supervised from 04/2004 to 01/2013.
17. Jessica Torrior, Former Research Assistant Professor. Supported 100% from my grants. Supervised from 4/2013 to 01/2014 (faculty member at Montana State University).
18. Gaby Arellano, former MS student. Research Technologist. Supported 100% from my grants. Supervised from 06/2007 to 05/2009 (Western Landroller-Flowservice Pump Division, Hastings, NE).
19. Octavio Lagos, former Ph.D. student (faculty member at the Universidad de Concepcion, Chile).

20. Mike Burgert, former MS student. Research Technologist. Supported 100% from my grants. Supervised from 06/2007 to 05/2009 (USDA-NRCS).
21. Kari Skaggs, Research Technologist. Supported 100% from my grants. Supervised from 06/2009 to 01/2014 (Nebraska State Government).
22. Sumantra Chatterjee, post-doc. Supported 100% from my grants. Supervised from 09/2009 to 04/2013.
23. Christopher H. Hay, post-doc. Supported 100% from my grants. Supervised from 07/2007 to 07/2009 (faculty member at South Dakota State Univ.).

4. PROFESSIONAL SERVICE ACCOMPLISHMENTS

4.1. PROFESSIONAL SERVICE FOR FEDERAL AND STATE AGENCIES

4.1.1. SERVICE AS PROFESSIONAL AND SCIENTIFIC EXPERT

1. Worked as a scientific expert in a United States Supreme Court multi-state litigation case for two years related to water resources, agricultural crop production, irrigation engineering, and related topics.
2. Worked on a panel with one of the NE Natural Resources Districts on irrigation water allocation program.
3. Served as a Scientific Expert with the USDA Office of Scientific Quality Reviews for reviewing and evaluating USDA ARS 5-year research programs.

4.1.2. PEER-REVIEW OF REFEREED JOURNAL PUBLICATIONS

1. Nature Scientific Reports, 2017- present
2. Journal of Applied Meteorology and Climatology, 2005- present
3. Water Resources Research, 2005-present
4. Agricultural and Forest Meteorology, 2006-present
5. Transactions of the ASABE, 2001- present
6. Journal of Irrigation and Drainage Engineering, 2002- present
7. Applied Engineering in Agriculture, 2001- present
8. Agricultural Water Management, 2002- present
9. Irrigation Science, 2003- present
10. Great Plains Research, 2006- present
11. Agronomy Journal, 2003- present
12. Acta Horticulturae, 2005-present
13. Soil Science Society of American Journal, 2003-present
14. Biosystems Engineering, 2006-present
15. Journal of Hydrology, 2005-present
16. Hydrology Research, 2009-present
17. Applied Geography, 2009-present
18. Atmospheric Environment, 2010-current

4.1.3. PEER-REVIEWER/PANELIST OF SCIENCE AND RESEARCH PROPOSALS

1. American Association for the Advancement of Science (AAAS) and AAAS-GIST Tech-I, 2009-present
2. National Science Foundation (NSF), Hydrologic Sciences Program, 2008-present
3. NASA, 2008-present
4. USDA-AFRI, 2011-present
5. Global Center for Food Systems Innovation (GCFSI), 2015-present
6. US Department of State and Israel Binational Agricultural Research and Development Fund Program
7. European Science Foundation
8. Kansas EPSCOR
9. Israel Ministry of Science and Technology (2015-present)
10. USDA-CSREES National Research Institute, 2005-present
11. United States Geological Survey (USGS), 2006-present
12. United States Environmental Protection Agency (EPA), 2008-present
13. NE Department of Natural Resources Integrated Management Plan proposals, 2005-present
14. USDA Agricultural Research Service proposals, 2005-present.

15. Netherlands Scientific Research Council, 2009-present
16. Czech Science Foundation, Advancement of Science and Research Program, 2009-present.

4.1.4. PROMOTION AND TENURE COMMITTEE EXTERNAL REVIEWER

Promotion and tenure external reviewer for Colorado State University, Texas A&M University, University of Florida, Purdue University, Utah State University, University of Georgia, University of Oklahoma, Indian Institute of Technology-Madras.

4.1.5. TESTIMONY BEFORE FEDERAL AND STATE GOVERNMENTS and UNITED STATES SUPREME COURT

1. **Irmak, S.** December 6, 2016. Testified before NE Natural Resources Districts on irrigation water allocation program (invited). *Davenport, NE*. 40 people.
2. **Irmak, S.** February 8, 2016. Testified at the US Congress (US Senate) (invited). Role of technology in enhancing agricultural practices and productivity. US Capitol Hill. *Washington, DC*. 13 people.
3. **Irmak, S.** February 8, 2016. Testified at the US Congress (US House of Representatives) (invited). Irrigation and water resources and agricultural productivity and future potential emerging issues in US agriculture. US Capitol Hill. *Washington, DC*. 83 people.
4. **Irmak, S.** November 10, 2016. Testified before the NE State Legislators (LR 455) (invited). Change in climate variables impact on agriculture and water resources. NE State Capitol. *Lincoln, NE*. 20 people.
5. **Irmak, S.** December 14, 2016. Retained as a Scientific Expert in a United States Supreme Court multi-state litigation case on water resources, irrigation, and agricultural crop production.
6. Vuran, M. C., X. Dong, and **S. Irmak**. October 7, 2013. Testified before the NE State Legislators (invited). From the soil to the cloud: Wireless underground sensor network for autonomous irrigation. NE State Capitol. *Lincoln, NE*. 55 people.
7. **Irmak, S.** November 28, 2012. Testified before the Unicameral Natural Resources Committee Senators and Staff Members (invited). Technology implementation in agriculture and NAWMN for enhancing crop water productivity. NE State Senate. *Lincoln, NE*. 50 people.
8. **Irmak, S.** February 20, 2007. Testified before the NE State Natural Resources Committee on upcoming legislative hearings on water resources bills (LB701 and LB493) (invited). *Lincoln, NE*. 15 people.

4.1.6. LEADERSHIP AND MEMBERSHIP IN NATIONAL/INTERNATIONAL PROFESSIONAL ORGANIZATIONS

1. Chair of the ASABE International Evapotranspiration Symposium (04/2018-current).
2. Organizing Committee for the 1st International Biosystems Engineering Congress (09/2019) (Hatay, Turkey)
3. Organization Committee for the 3rd Food and Agriculture Policy Conference (11/2019) (Adana, Turkey)
4. ASABE Global Water Security Conference Leadership and Planning and Organizing Committee Co-Chair (2017-2018) (Hyderabad, India).
5. American Association for the Advancement of Science (AAAS) (2016-current).
6. Associate Editor, Soil and Water Division, ASABE (2013-2016).
7. Organizer of hybrid evapotranspiration session in the ASABE Annual Conference (2015).
8. Served as a scientific and technical member of the National Water Resources Working Group in 2013 and 2014. This national group developed a report titled “National Initiative on the Improvement of U.S. Water Security” that was approved by the National Association of State Universities and Land-Grant Colleges Research Directors. To develop a strategy for enhancing how Land Grant Institutions can help USDA, the Board on Agriculture Assembly [by way of the Policy Board of Director’s Budget and Advocacy Committee (BAC)] created an ad hoc national Working Group on Water Resources in Fall 2013. The members of the National Working Group were charged with developing recommendations for how Land Grant Institutions can best address U.S. Water Security (e.g., water quantity and quality issues) following their tripartite mission of research, education and Extension. Members were selected based on experience with previous programs, their expertise, and regional representation.
9. Planning committee for the ASABE International Evapotranspiration Symposium (2014).
10. Chair-elect. ASABE SW-244 Irrigation Management Committee. (07/2013-current).
11. Member and Chair of the M-114 New Holland Young Researcher Award Selection Committee- American Society of Agricultural and Biological Engineers (ASABE) (08/2010-09/2012).

12. ASABE-Gunlogson Design Competition Judge (2012-current).
13. ASABE Fountain Wars Judge (2013-current)
14. Young Extension Professional Award Committee (08/2010-2012).
15. Chair-elect (2009) and state of Nebraska representative for the WERA-202, Western Regional Committee on Use of Climate Information in Irrigation Scheduling (05/2004-present).
16. Chair-elect: American Society of Civil Engineers, Environmental and Water Resources Institute (ASCE-EWRI) Evapotranspiration in Irrigation and Hydrology Task Committee (2007-2009).
17. ASCE-EWRI Standardization of Reference Evapotranspiration and Crop Coefficient Task Committees (10/2001-present).
18. Nebraska representative for the Regional Committee W-2128 on Microirrigation for Sustainable Water Use. (06/2009-current).
19. ASABE-SW-244/Standardization Committee for ASAE EP505 Weather Station Instrumentation and Measurement and Reporting Practices for Automated Weather Stations (07/2007-current).
20. ASABE-SW-241 Sprinkler Irrigation Committee (05/2008-current).
21. ASABE-SW-242 Surface Irrigation Committee (05/2008-current).
22. ASABE-SW-245 Microirrigation Committee. May 2007-current).
23. Vice Chair: Am. Soc. of Civil Engineers, Environmental and Water Resources Institute (ASCE-EWRI) Irrigation in Hydrology Task Committee on Standardization of Reference Evapotranspiration. (2005-2007).
24. Secretary-elect: Am. Soc. of Civil Engrs., Environmental and Water Resources Institute (ASCE-EWRI) Irrigation in Hydrology Task Comm. on Standardization of Reference Evapotranspiration (2004-2007).
25. American Society of Agricultural and Biological Engineers (ASABE) (1997-current).
26. Assistant Judge of the ASABE Educational Award Competition (2006- current).
27. American Society of Civil Engineers (Full member) (2002- current).
28. United States Committee on Irrigation and Drainage (USCID) (2002-present).
29. Registered Professional Engineer of Turkish Society of Agricultural Engineers (1992-present).
30. Nebraska section of the ASABE (2004- current).

4.2. UNIVERSITY SERVICE

4.2.1. LEADERSHIP and MEMBERSHIP

1. UNL Consortium for Integrated Translational Biology Leadership Committee Chair.
2. College of Engineering Research Committee.
3. College of Engineering Promotion and Tenure Committee.
4. BSE Department Extension Committee.
5. BSE Department Awards Committee.
6. BSE Dept. Facilities Committee.
7. BSE Graduate Committee.
8. Heuermann Lecture Speaker Selection Advisory Committee.
9. UNL Water Center Advisory Committee.
10. Lead Nebraska Representative for the North Central Region Water Network; Administrative Council and Executive Committee.
11. Chair of the Biological Systems Engineering Dept. Promotion and Tenure Committee.
12. Kermit Wagner Professorship selection committee.
13. UNL-IANR Vice Chancellor Search and Advisory Committee.
14. UNL Police Department-Campus Security Authority.
15. UNL Water Website Committee (responsible for agricultural water management).
16. BSE Steering Committee.
17. Member and Secretary of the Biol. Sys. Eng. Dept. Promotion and Tenure Committee.
18. Irrigation Efficiency Issue Team.
19. UNL-IANR Consortium for Integrated Translational Biology Leadership Team member and vice chair.
20. UNL-IANR Phenotyping Research Facility Committee.
21. UNL Long-Term Agricultural Research (LTAR) Committee.
22. UNL Senate Executive Committee.
23. Founder and leader, Nebraska Agricultural Water Management Network (NAWMN).
24. Founder and leader, Nebraska Water and Energy Flux Measurement, Modeling and Research Network (NEBFLUX).

25. Faculty advisor for the Turkish Student Association.
26. Nebraska On-Farm Research Network Advisory Committee.
27. Elected to the UNL Faculty Senate Executive Committee.
28. Senator-elect for the UNL Faculty Senate.
29. IANR Outstanding Employee Award Committee faculty representative.
30. Member of Search and Advisory Committees to hire tenure-track faculty members, upper-rank administration and full-time staff.
31. Member of the BSE Graduate Faculty.
32. University of Nebraska-Lincoln Extension Association (NCEA).

5. OTHER ACCOMPLISHMENTS

5.1. MEDIA REPORTS

5.1.1. PRESS RELEASES ON RESEARCH AND EXTENSION:

1. SCAL Field Day Discussion. Pure Nebraska-1011 NOW. KOLN/KGIN TV. August 21, 2018.
2. Irrigation management strategies (radio interview), KRVN, August 27, 2008. York, NE.
3. Evapotranspiration. *High Plains Journal-Nebraska and South Dakota Edition*. August 18, 2008.
4. Evapotranspiration measurement for water management. *The North Platte Telegraph*. August 10, 2008.
5. Evapotranspiration measurement is key to irrigation management. *McCook Daily Gazette*. August 7, 2008.
6. Subsurface drip irrigation management. Market Journal. August 6, 2008, Clay Center, NE.
7. Agricultural Water Management Network, IANR-Market Journal radio interview, May 5, 2008. Lincoln, NE.
8. Irrigation, energy conservation. High Plains/Midwest Ag. Journal, September 22, 2007.
9. New irrigation strategy saves fuel and money, KHAS-TV News, September 4, 2007.
10. Apogee Infrared Thermometers (IRTs) have been used by Dr. S. Irmak, of the University of Nebraska-Lincoln, in his Crop Water Stress Index (CWSI) research. Apogee Inst., Inc., Logan, Utah, August, 2007.
11. Nebraska Corn Board and UNL partners in water management research, NTV Nebraska-TV, July 25, 2007.
12. Irrigation research at the South Central Agricultural Laboratory, KHAS-TV News 5, June 12, 2007.
13. Central Plains Irrigation Conference Addresses Current Water Issues, February 2007.
14. Sensors, gauges provide irrigator confidence for water management. UNL-IANR Connect, August 2006.
15. Irrigation and Energy Conservation Field Day Offered at UNL's ARDC near Mead, August, 2006.
16. Subsurface drip irrigation: Installation at the South Central Agricultural Laboratory. November 6, 2004. Published as a video clip in Market Journal, UNL Extension.
17. Results from first year of subsurface drip irrigation and crop water use measurements. June 19, 2004. Published as a video clip in Market Journal, University of Nebraska-Lincoln Extension.

5.1.2. INTERNATIONAL PROGRAMS/ ACTIVITIES

A total of 38 international programs and activities with Netherlands, South Korea, India, China, Turkey, Brazil, Argentina, Sweden, France, Vietnam, Australia, Iraq, Honduras, and Chile. Descriptions and date of each activity are available, if needed.

6. GRANTS

Obtained a total of \$10+ million research and education grants (including from USDA, NSF, EPA) mostly as a PI. I have several large grants that are pending:

- **\$500,000** (46.5% F&A). Pending. USDA-NIFA. Title: *Integrated low-energy sub-surface drip irrigation and electrodialysis reversal desalination for agriculture*. PIs: A. Winter and Susan Amrose (Massachusetts Institute of Technology, MIT) and **S. Irmak** (UNL).
- **\$379,979** (46.5% F&A). Pending. NSF. Title: *INFEWS/T2: Advancing the science of desalination for drip irrigation: utilizing electrodialysis to reduce levelized water cost, facilitate renewable-powered irrigation, and improve crop productivity*. PIs: A. Winter [Massachusetts Institute of Technology (MIT)], S. Amrose (MIT), **S. Irmak**, and V. Nangia (ICARDA).

7. **REFEREED JOURNAL ARTICLES/BOOK CHAPTERS REVIEWED FOR SCIENTIFIC JOURNALS/BOOKS**

Reviewed over 250 refereed journal articles as a service to scientific community.

8. **EXTERNAL TECHNICAL/SCIENTIFIC PROPOSALS REVIEWED**

Reviewed over 100 scientific, research and educational proposals for AAAS, NSF, USDA-NIFA, NRCS, EPA, USGS, NASA, and other national and international institutions.

9. **TECHNICAL/SCIENTIFIC, EDUCATIONAL and OUTREACH ORAL PRESENTATIONS at the LOCAL, REGIONAL, NATIONAL and INTERNATIONAL CONFERENCES, WORKSHOPS and HANDS-ON IN-SERVICE PROGRAMS**

Authored/co-authored over 500 oral and poster presentations (including over 200 invited). Presentation title, location, number of participants, etc. of each presentation are available, if needed.