**APPENDIX D**

**SAES-422**

**Format for Multistate Research Activity**

**Accomplishments Report**

***Note:*** *This report is submitted each year of an activity’s duration and is due 60 calendar days following the annual meeting. The SAES-422 is submitted electronically by AAs into NIMSS. Annual Reports for MRF projects are available to NIFA through NIMSS.*

**Project/Activity Number: S1089**

**Project/Activity Title: Quantification of best management practice effectiveness for water quality protection at the watershed scale**

**Period Covered:** **2023-2024**

**Date of This Report: 10/11/2024**

**Annual Meeting Date(s):**  **August 27-28, 2024**

**NIMSS Project page:** [**https://www.nimss.org/projects/18705**](https://www.nimss.org/projects/18705)

**1. Annual Meeting**

* Participants:

In person attendees (13):

* Latif (Auburn)
* Kevin (Oklahoma)
* Emine (Tennessee)
* Jerrad (Oregon)
* Sushant (South Dakota)
* Trisha (Kansas)
* Fouad (Texas)
* Santosh (Texas)
* Sara (Iowa)
* Aleksey (Kansas)
* Jeeban (Kansas - Postdoc)
* Laura (Kansas - PhD)
* Tyler (Kansas - PhD)

Virtual Attendees (6):

* Francois (NC - virtual)
* Mary (AA - virtual)
* Soni (Rhode Island - virtual)
* Zach (Virginia - virtual)
* Natalie (NC - virtual)
* David (Virginia - virtual)

Summary of minutes of annual meeting:

The meeting took place at the Ice Conference Room at Kansas State University in Manhattan, Kansas. The first day of the meeting was August 27, 2024 and the annual meeting ended on August 28, 2024.

* The meeting started with a welcome by chair/host (Aleksey), as well as welcomes from the Kansas Water Institute (Susan Metzger), College of Engineering (Stacy Hutchinson), BAE (Mark Wilkins).
* Next, we met with USDA Administrative Advisor (Mary Savin). Mary mentioned that we were awarded the Regional Multistate Research Award, but not the National Award. She mentioned that we are strongly encouraged to resubmit next year. Additionally, Mary stressed that the project will end next September and the approval process is a year-long process, so we need to start now with proposal writing and administrative review.
* Host and Chair, Aleksey, prepared a presentation on the “History and activities of S1089”
* Previous S1089 Officer, Fouad, shared updates on the Special Collection we set up in the Journal of Environmental Management. He shared that we need more reviewers and help from members of S1089 because the Special Collection is inundated with submissions.
* Each state shared updates to the group, which is summarized in the section below.
* The first day concluded with a discussion the direction for the new S1089 proposal, as well as an impact statement discussion with Sara Delheimer.
* The second day’s meeting kicked off with a continuation of the previous day’s discussion surrounding the direction for the new S1089 proposal. During discussions, two committees were formed: a committee to spearhead the new S1089 proposal (consisting of Sara McMillan, Francois Birgand, Kevin Wagner, Sushant Mehan, Santosh Palmate, and Gerrad Jones) and a committee to write the agExcellence award nomination (consisting of Soni Pradhanang, Aleksey Sheshukov, Emine Fidan, Latif Kalin, and Rafa Munoz-Carpena).
* Finally, the annual meeting ended with nominations of a new Secretary (a honor bestowed to Sushant Mehan) and the selection of next meeting location (hosted by Texas AgriLife in El Paso, Texas)

Elected officers (2024-2025):

* Secretary: Sushant Mehan (South Dakota State U)
* Vice Chair: Emine Fidan (U Tennessee)
* Chair: Latif Kalin (Auburn U)

Past Chairs:

* Soni Pradhanang (2020-2021)
* Rafa Munoz-Carpena (2021-2022)
* Fouad Jaber (2022-2023)
* Aleksey Sheshukov (2023-2024)

**2. Accomplishments:**

The main focus of this project is to improve the abilities to better understand and predict fate and transport of pollutants and evaluate the effectiveness of best management practices (BMPs) on critical landscapes at the watershed scale. This includes hillslope soil health, water quality of streams and waterbodies, environmental benefits of mitigation practices and cost effectiveness of BMPs. The objectives will be met through the following activities: monitoring at sub-watershed scales, model development and applications at various spatial and temporal scales, and analyzing uncertainty in both monitoring and modeling efforts.

Based on overall goals of S1089 Committee, here are the accomplishments and impacts reported by each state:

**Texas**

* **Accomplishments:**
The Texas team focused on calibrating the Soil and Water Assessment Tool (SWAT) model at the HUC12 scale using data from over 4,000 monitoring stations across the United States. They implemented an R-programming-based automated calibration tool that enhances modeling efficiency. This tool was successfully piloted in the Arkansas-Red-White region, where more than 3,500 sub-basins were calibrated.
* **Impact:**
Developing and implementing a large-scale, automated SWAT calibration tool significantly improved the efficiency and accuracy of hydrological model predictions across multiple basins. The tool’s effectiveness in large-scale applications will facilitate better BMP targeting in watersheds by identifying critical areas contributing to nonpoint source pollution, ultimately improving water quality at the regional scale.

**Kentucky**

* **Accomplishments:**
Researchers at the University of Kentucky focused on understanding the transport and fate of contaminants in karst and tile-drained landscapes through monitoring and modeling. They used both AI and physically-based models to enhance predictions and have ongoing collaborations with USDA-ARS to evaluate contaminant transport in these complex landscapes.
* **Impact:**
These efforts provided critical insights into the unique challenges of managing water quality in karst and tile-drained areas, where conventional BMPs are often less effective. The improved understanding of nutrient and contaminant movement will enable more precise targeting of BMPs and better management of water resources in regions with similar landscape features.

**North Carolina State University**

* **Accomplishments:**
NC State developed novel stormwater monitoring techniques using low-cost sensors and machine vision models (e.g., fast R-CNN, YoloV8) to monitor flow and water quality in complex urban and agricultural settings. Additionally, nutrient source apportionment methods were developed using SWAT to better inform BMP placement.
* **Impact:**
The use of innovative, low-cost monitoring tools and AI-based image analysis provided a scalable solution for continuous monitoring of stormwater and nutrient pathways, reducing monitoring costs. This allowed for more frequent and accurate assessment of BMP effectiveness, improving decision-making processes for stormwater management in urban and peri-urban environments.

**Oklahoma**

* **Accomplishments:**
The Oklahoma team focused on evaluating regenerative agricultural BMPs, such as no-till and cover cropping, through small watershed-scale monitoring. They found that implementing a winter cover crop on high cotton seeding rate plots significantly reduced runoff volume.
* **Impact:**
The findings contributed to the understanding of how regenerative practices can reduce water quality impacts in cotton production systems. This data supports the adoption of these practices, demonstrating their potential to reduce runoff and improve water quality in similar agricultural settings.

**Virginia Tech**

* **Accomplishments:**
Virginia Tech focused on urban stormwater management and BMP effectiveness in reducing nitrogen loads in mixed-use watersheds. They also developed integrated urban hydrologic models using SWMM and HEC-RAS to assess BMP impacts on stream stability.
* **Impact:**
Their modeling and monitoring efforts informed the design of stormwater infrastructure, improving urban water management strategies. This work supports urban planners in identifying cost-effective BMPs that enhance water quality and stabilize stream environments in rapidly developing areas.

**Iowa State University**

* **Accomplishments:**
ISU conducted paired watershed studies to evaluate nutrient reduction potentials of various BMPs using high-frequency sensors. They also integrated these data into predictive models to improve understanding of nutrient transport dynamics at small watershed scales.
* **Impact:**
ISU’s work highlighted the importance of high-resolution monitoring in capturing nutrient dynamics, leading to more effective targeting and evaluation of BMPs. Their findings support refined nutrient management strategies, particularly in tile-drained agricultural landscapes.

**Kansas State University**

* **Accomplishments:**
Kansas State focused on developing models for ephemeral gully erosion detection and management, as well as assessing the efficacy of streambank stabilization practices. They successfully applied machine learning and topographic analysis to identify gully locations and developed a 2-D hydraulic model to simulate streambank erosion.
* **Impact:**
Their modeling tools provided crucial insights into soil erosion and sediment management, supporting the targeting of BMPs for erosion control. These tools will help reduce sediment loadings in vulnerable watersheds, enhancing water quality and soil health.

**Auburn University**

* **Accomplishments:**
Auburn advanced climate and water quality modeling to predict BMP effectiveness under changing climate conditions. They developed tools for soil moisture forecasting and improved understanding of land-climate interactions in agricultural watersheds.
* **Impact:**
These models are helping to build more resilient agricultural systems by providing data-driven insights into the interactions between land use, BMPs, and climate. Auburn’s efforts will inform adaptive BMP strategies that are better suited to future climate scenarios.

**University of Tennessee**

* **Accomplishments:**
Tennessee focused on developing the RUSLE2/Ephgee whole-field erosion model to combine hillslope and ephemeral gully erosion. They also created predictive flood maps and a Bayesian water quality model to understand the impacts of flooding on water contamination.
* **Impact:**
Their models provide a comprehensive view of erosion and flood impacts, enabling the prioritization of BMPs in erosion-prone and flood-vulnerable areas. This supports the design of more effective BMPs for controlling soil loss and managing water quality during extreme events.

**South Dakota State University**

* **Accomplishments:**
South Dakota State University refined the SWAT model to simulate drainage water management and assessed its parameter transferability in different hydrological settings. Additionally, remote sensing and AI models were developed to predict surface soil moisture and actual evapotranspiration, particularly in semi-arid regions. They also published a series of practical guides on water management and ag cybersecurity.
* **Impact:**
SDSU’s advancements in modeling and AI applications provide crucial tools for managing water resources in the Northern Great Plains. The practical outreach publications expanded awareness and adoption of best practices for water quality and cybersecurity management among stakeholders, enhancing overall landscape resilience.

**Overall Impact**

The combined efforts of participating states under Objective 1 have significantly advanced the development and application of monitoring and modeling tools to target and implement BMPs more effectively across diverse landscapes. These contributions support enhanced water quality management at local, regional, and national scales, making significant strides in mitigating nonpoint source pollution and improving watershed health.

Products

1. Publications – 58
2. Award money secured - $ 8.6 m
3. Number of Student – 59
4. Thesis/Dissertation – 7
5. Presentations – 43
6. Popular Articles - 7

**Publications (58 Publications)**

South Dakota State University

1. Mankin, K. R., Mehan, S., Green, T. R., and Barnard, D. M.: Review of Gridded Climate Products and Their Use in Hydrological Analyses Reveals Overlaps, Gaps, and Need for More Objective Approach to Model Forcings, Hydrol. Earth Syst. Sci. Discuss. [preprint], https://doi.org/10.5194/hess-2024-58, accepted, 2024.
2. Lamichhane, Manoj, Abin Raj Chapagain, Sushant Mehan, Daniel P. Ames, and Sagar Kafle. "Integrating Solar-Induced Chlorophyll Fluorescence with Traditional Remote Sensing and Environmental Variables for Enhanced Rice Yield Prediction in Nepal Using Machine Learning." Remote Sensing Applications: Society and Environment, vol. 32, 2024, DOI: 10.1016/j.rsase.2024.101371.
3. Amatya, D. M., Williams, T. M., Skaggs, R., Wayne; N., Jami E., and Mehan, S. (2024). Silvicultural Practices and Water Table Dynamics of Coastal Forested Wetlands in a Changing Climate. Accepted for publication in Journal of Natural Resources and Agricultural Ecosystems (ASABE Journals).
4. Sharma, A., Mehan, S., McDaniel, R., Arnold, J. Trooien, T., Sammons, N., and Amegbletor, L. (2024). Assessing SWAT+ Performance in Simulating Drainage Water Management and Parameter Transferability for Watershed-Scale Applications. Journal of Hydrology. (Accepted for Publication)
5. Lamichhane, M.\*, Phuyal, S., Mahato, R., Shrestha, A., Pudasaini, U., Lama, S.D., Chapagain, A.R., Mehan, S. and Neupane, D. (2024). Assessing Climate Change Impacts on Streamflow and Baseflow in the Karnali River Basin, Nepal: A CMIP6 Multi-Model Ensemble Approach Using SWAT and Web-Based Hydrograph Analysis Tool. Sustainability, 16(8), p.3262. https://doi.org/10.3390/su16083262

Auburn University

1. Kumar, R., Kundu, D., Kormoker, T., Joshi, S., Rose, P. K., **Kumar**, S., Sahoo, P. K., Sharma, P., & Lamba, J. 2024. Phycoremediation of potentially toxic elements for agricultural and industrial wastewater treatment: Recent advances, challenges, and future prospects. Desalination and Water Treatment, 100505. https://doi.org/10.1016/j.dwt.2024.100505
2. B. Biswas, S. Adhikari, H. Jahromi, M. Ammar, J. Baltrusaitis, A. Torbert, J. Linhoss and J. **Lamba**. 2024. Magnesium doped biochar for simultaneous adsorption of phosphate and nitrogen ions from aqueous solution. Chemosphere. https://doi.org/10.1016/j.chemosphere.2024.142130.
3. Malhotra, K., J. **Lamba**, T. R. Way, C. Williams, K. G. Karthikeyan, S. Budhathoki\*, R. Prasad, P. Srivastava, and J. Zheng, J. 2024. Preferential flow of phosphorus and nitrogen under steady-state saturated conditions. Vadose Zone Journal. https://doi.org/10.1002/vzj2.20331
4. Eva, E., L. Marzen and J. **Lamba**. 2024. Modeling the Effect of LULC change on Water Quantity and Quality in Big Creek Lake Watershed, South Alabama USA. Egyptian Journal of Remote Sensing.
5. Kaur, P., J. **Lamba**, T.R. Way, K. Balkcom, A. Sanz-Saez, and D. Watts. 2024 Characterization of soil pores in strip-tilled and conventionally-tilled soil using X-ray computed tomography. Soil and Tillage Research. 239, 106035.
6. Takhellambam, B.S., P. Srivastava, J. **Lamba**, W. Zhao, H. Kumar, D. Tian, and R. Molinari. 2024. Artificial Neural Network-Empowered Projected Future Rainfall Intensity-Duration-Frequency Curves under Changing Climate. Atmospheric Research. Volume 297, 107122. https://doi.org/10.1016/j.atmosres.2023.107122.
7. Kaur, P., J. **Lamba**, T.R. Way, V. Sandhu, K. Balkcom, A. Sanz-Saez, and D. Watts. 2024. Cover crop effects on X-ray computed tomography derived soil pore characteristics. Journal of Soils and Sediments. https://doi.org/10.1007/s11368-023-03596-7
8. Bickley, S., S. Isik, C. Anderson, L. **Kalin** (2024), “Land Use and Runoff Effects on Tidal Creek Ecosystem Metabolism”, Marine Ecology Progress Series. Accepted.
9. Baltaci, E., L. **Kalin** (2024), “A Low-Impact Development-based Modeling Framework for Flood Mitigation in a Coastal Community”, Water. 16(19), 2772; https://doi.org/10.3390/w16192772.
10. Haas, H., L. **Kalin**, S. **Kumar**, G. Sun (2024). “Understanding the effects of afforestation on water quantity and quality at watershed scale by considering the influences of tree species and local moisture recycling”. Journal of Hydrology. https://doi.org/10.1016/j.jhydrol.2024.131739.
11. Wang, Z., H. Tian, S. Pan, H. Shi, J. Yang, N. Liang, L. **Kalin**, C. Anderson (2024), “Phosphorus Limitation on CO2 Fertilization Effect in Tropical Forests Informed by A Coupled Biogeochemical Model”, Forest Ecosystems. https://doi.org/10.1016/j.fecs.2024.100210.
12. Yin, Z., Y. Liu, C. Li, Z. Si, L. **Kalin**, E. Baltaci, H. Peng, S. Saitoh, Q. Li (2024), “Marine aquaculture spatial planning on market orientation for Pacific oyster in Shandong, China”, Aquaculture. https://doi.org/10.1016/j.aquaculture.2024.741144.
13. Haas, H., L. **Kalin**, H. Yen (2024), “Improved forest canopy evaporation leads to better predictions of ecohydrological processes”, Ecological Modeling. Vol 489. https://doi.org/10.1016/j.ecolmodel.2024.110620.
14. Haas, H., L. **Kalin**, E. Baltaci (2024), “How wide is the problem? Scrutinizing the importance of channel geometry representation in watershed modeling”, Environmental Modeling and Software. Vol 172. https://doi.org/10.1016/j.envsoft.2023.105935.
15. Tassi, R. E.J. Seidel, D.M. da Motta-Marques, A.O.N. Villanueva, L. **Kalin** (2023), “Wildlife roadkill driven by hydrological regime in a subtropical wetland”, Water. 15(24), pg. 4307. https://doi.org/10.3390/w15244307.
16. Karki, R., P. Srivastava, L. **Kalin** (2023), “Evaluating climate change impacts in a heavily irrigated karst watershed using a coupled surface and groundwater model”, Journal of Hydrology: Regional Studies. https://doi.org/10.1016/j.ejrh.2023.101565.
17. Zihao, B., H. Tian, S. Pan, H. Shi, C. Lu, C. Anderson, W-J Cai, C. Hopkinson, D. Justic, L. **Kalin**, S. Lohrenz, S. McNulty, N. Pan, G. Sun, Z. Wang, Y. Yao, Y. You (2023), “Soil legacy nutrients contribute to the decreasing stoichiometric ratio of N and P loading from the Mississippi River Basin”, Global Change Biology. http://doi.org/10.1111/gcb.16976.
18. Singh, A., **Kumar**, S., Chen, L., Maruf, M., Lawrence, P., & Lo, M. H. (2024). Land Use Feedback under Global Warming–A Transition from Radiative to Hydrological Feedback Regime. Journal of Climate. 37 (14), 3847-3866. https://doi.org/10.1175/JCLI-D-23-0426.1
19. Duan, Y., & **Kumar**, S. (2024). A revised interpretation of signal-to-noise ratio paradox and its application to constrain regional climate projections. Environmental Research: Climate. DOI 10.1088/2752-5295/ad3a0c
20. Richter, J. H., Glanville, A. A., King, T., **Kumar**, S., Yeager, S. G., Davis, N. A., Duan, Y.,... & Oleson, K. (2024). Quantifying sources of subseasonal prediction skill in CESM2. npj Climate and Atmospheric Science, 7(1), 59.

University of Tennessee

1. Singh, S., S. Jagadamma, D. Yoder, and Xinhua Yin.  2023.  A weighted soil health index approach for refined assessment of soil health in cropping systems. Frontiers of Soil Science 11 August 2023. <https://doi.org/10.3389/fsoil.2023.1118526>. *Role:  assisted in project design & data analysis*
2. Fidan, E., J. Gray, B. Doll, N. G. Nelson (2023). Machine learning approach for modeling daily pluvial flood dynamics in agricultural landscapes. Environmental Modeling and Software, 167. <https://doi.org/10.1016/j.envsoft.2023.105758>

Kansas State University

1. Koudahe, K., Aguilar, J., Djaman, K., Sheshukov, A. (2024) Evapotranspiration, fiber yield and quality, and water productivity of cotton (Gossypium hirsutum L.) under different irrigation technologies in a semiarid climate. Irrigation Science. https://doi.org/10.1007/s00271-024-00922-w
2. Akin, A., Nguyen, G.T., A.Y. Sheshukov. (2024) Infiltration-Caused Variability of Soil Erodibility Parameters Using the Jet Erosion Test. Water, 16(7), 981; https://doi.org/10.3390/w16070981
3. Zhou, W., Zhang, L., Sheshukov, A., Wang, J., Zhu, M., Sargsyan, K., Xu, D., Liu, D., Zhang, T., Mazepa, V., Sokolov, A., Valdayskikh, V., Ivanov, V. (2024). Ground heat flux reconstruction using Bayesian uncertainty quantification machinery and surrogate modeling. Earth and Space Science, 11, e2023EA003435. https://doi.org/10.1029/2023EA003435
4. Conoscenti, C., Sheshukov, A. Y. (2023). Regional variability of terrain index and machine learning model applications for prediction of ephemeral gullies. Geomorphology, 442, 108915. https://doi.org/10.1016/j.geomorph.2023.108915
5. Mather, M., Granco, G., Bergtold, J., Caldas, M., Heier Stamm, J., Sheshukov, A., Sanderson, M., Daniels, M. (2023) Achieving success with RISE: A widely implementable, iterative, structured process for mastering interdisciplinary team science collaborations, BioScience, 73(12), 891–905, https://doi.org/10.1093/biosci/biad097
6. Bigham, K.A., Keane, T.D., Moore, T.L. 2023 Can deciduous tree revetments reduce streambank erosion rates on a sand-bed stream? River Research and Applications 39(9): 1696-1708. https://doi.org/10.1002/rra.4190
7. Bigham, K.A., Keane, T.D., Moore, T.L. (2024). Effect of flow regulation on streambank erosion: a perspective downstream of a flood control dam, Kansas, USA. River Research and Applications 40(1): 14-28. https://doi.org/10.1002/rra.4212
8. Kyle Kohman, Lior Shamir, Aleksey Sheshukov (2023) Automatic Gully Mapping Using Generative Adversarial Network. Governor’s conference of the future of water in Kansas. Manhattan, KS

Iowa State University

1. Frankenberger, J., S.K. McMillan, M.R. Williams, K. Mazer, J. Ross, B. Sohngen. 2023. Drainage water management: A review of nutrient load reductions and cost effectiveness. *Journal of the ASABE.* doi: 10.13031/ja.15549.
2. Rudko, N., S.K. McMillan, J. Frankenberger, D. Winter Lay, A. Limiac. 2024. Water quality sampling provides insight into nutrient sources and pathways in an agricultural watershed in the Midwestern USA. *Journal of Natural Resources and Agricultural Ecosystems*. Accepted 6/20/2024.

Virginia Tech

1. Towsif Khan, S. Wynn‐Thompson, T.M., Sample, D., Al‐Smadi, M., Shahed Behrouz, M., 2024. Effectiveness of stormwater control measures in protecting stream channel stability, Hydrological Processes 38 (6), e151784.
2. Shahed Behrouz, M., Sample, D.J., Kisila, O.B., Harrison, M., Nayeb Yazdi, M., Garna, R.K., 2024. Parameterization of nutrients and sediment build-up/wash-off processes for simulating stormwater quality from specific land uses, Journal of Environmental Management 358, 12076
3. Garna, R., D.R. Fuka, R.R. White, J.W. Faulkner, A.S. Collick, Z.M. Easton. 2023. Development of a dairy model for the Soil and Water Assessment Tool (SWAT) to direct water quality management of livestock. (In Review).
4. Garna, R., Z.M. Easton, J.W. Faulkner, A.S. Collick, D.R. Fuka. 2023. Employing higher density lower reliability weather data from the Global Historical Climatology Network (GHCN) monitors to generate serially complete weather data for watershed modeling. Hydrological Processes 37(11), e15013. https://doi.org/10.1002/hyp.15013
5. Garna, R., D.R. Fuka, J.W. Faulkner, A.S. Collick, Z.M. Easton. 2023. Watershed model parameter estimation in low data environments. Journal of Hydrology Regional Studies. 45 (2023) 101306. https://doi.org/10.1016/j.ejrh.2022.101306

Oklahoma State University

1. Khodkar, K., A. Mirchi, V. Nourani; A. Kaghazchi; J.M. Sadler; A. Mansaray; K. Wagner; P.D. Alderman; S. Taghvaeian; R.T. Bailey. 2024. Stream Salinity Prediction in Data-Scarce Regions: Application of Transfer Learning and Uncertainty Quantification. *Journal of Contaminant Hydrology Sep;266:104418. doi: 10.1016/j.jconhyd.2024.104418.*
2. Murray, B., K. Wagner, R. Reuter, L. Goodman. 2024. Use of virtual fencing to implement critical conservation practices. Rangelands (Accepted).
3. Qiao, L., D. Livsey, J. Wise, K. Kadavy, S. Hunt, K. Wagner. 2024. Predicting Flood Stages in Watersheds with Different Scales Using Hourly Rainfall Dataset: A High-Volume Rainfall Features Empowered Machine Learning Approach. *Science of the Total Environment Volume 950, 2024, 175231, ISSN 0048-9697, https://doi.org/10.1016/j.scitotenv.2024.175231.*
4. Eck, C., K. Wagner. 2024. Flowing Perceptions: Exploring Secondary Students’ Perceptions of Water. *Advancements in Agricultural Development. https://doi.org/10.37433/aad.v5i1.405*
5. Phillippe, Austin J., Kevin L. Wagner, Rodney E. Will, Chris B. Zou. 2023. Escherichia coli efflux from rangeland ecosystems in the southcentral Great Plains, USA. *Journal of Environmental Quality, 00, 1-12.* [*https://doi.org/10.1002/jeq2.20527*](https://doi.org/10.1002/jeq2.20527)

NCSU

1. Sauers N, Rok A., Birgand F, Evidence of Nitrate Removal ‘hot Moments’ During Flow and Nitrate Pulses in a Denitrification ‘hot Spot’. J. ASABE. In revision.
2. Julia Harrison, Christopher Osburn, Angela Harris, Natalie G. Nelson, Tryptophan-like fluorescence in brackish waters for applications in bacterial water quality monitoring, In revision with *ACS ES&T Water*
3. Natalie Chazal, Megan Carr, A.K. Leight, Sheila Saia, Natalie G. Nelson (2024), [Short-Term Forecasting of Fecal Coliforms in Shellfish Growing Waters](https://doi.org/10.1016/j.marpolbul.2024.116053), *Marine Pollution Bulletin*, 200: 116053
4. Qicheng Tang, Owen W. Duckworth, Daniel R. Obenour, Stephanie B. Kulesza, Nathan A. Slaton, Andrew H. Whitaker, Natalie G. Nelson (2024), [Relationship between soil-test-phosphorus and agricultural surplus phosphorus](http://doi.org/10.1002/jeq2.20622), *Journal of Environmental Quality*, In press

University of Kentucky

1. Agioutanti, R., **Ford, W**., Sama, M., McGill, T.  (2024). Impacts of aquatic vegetation dynamics on nitrate removal in karst agricultural streams: Insights from unmanned aircraft systems and in situ sensing. *Journal of the ASABE*, 67(2) *89-104*, doi: 10.13031/ja.15747.
2. **Ford, W.,** Williams, M.R. Mumbi, R.C. (In Review). Subsurface sediment transport in the shallow vadose zone of fine-textured soils with heterogenous preferential flows. *Hydrological Processes, Revised Resubmission.*
3. McGill, T., **Ford, W**. (2024). Extreme learning machine predicts high-frequency stream flow and nitrate concentrations in a karst agricultural watershed. *Journal of the ASABE*, 67(2) *73-87*, doi: 10.13031/ja.15747.
4. Mumbi, R., Williams, M., **Ford, W.,** Penn, C. (In Review). Dissolved phosphorus leaching reflects the dynamic interaction between hydrology and soil phosphorus kinetics.  Vadose Zone Journal, Under Review.
5. Williams, M. R**., Ford, W. I.,** & Mumbi, R. C. (2023). Preferential flow in the shallow vadose zone: Effect of rainfall intensity, soil moisture, connectivity, and agricultural management. *Hydrological Processes*, *37*(12), e15057.

University of Maryland

1. Rahman, A., M. Negahban-Azar, A. **Shirmohammadi**, and R. Karki. 2024. Evaluating the potential of recycled water use for irrigation in southern Maryland: impact on groundwater conservation and crop yield. Water Supply 24(7):2451-2472, <https://doi.org/10.2166/ws.2024.137>.
2. Shirmohammadi, A., L. Olson, E. Davidson, N. Dixit, R. Epanchin-Niell, P. Goeringer, A. Leslie, M. Negahban-Azar, N. Rawat, E. Rico, A. Ruiz-Barradas, and J. Timmons. 2024. Science and Technology Based Approach (STBA) to Minimize Climate Vulnerability and Achieve Sustainable and Resilient Food Production Systems (SRFP) in Maryland. Final Project Report submitted to the Hughese Center for Agroecology, Wye Reserch and Education Center, University of Maryland, June 15, 2024. 198p.

**Proposals Awarded ($8,615,382)**

The total award amounts for each institution are as follows:

* South Dakota State University: $401,326
* University of Tennessee: $634,343
* Iowa State University: $1,233,162
* Virginia Tech: $4,981,428
* Oklahoma State University: $964,592
* North Carolina State University (NCSU): $400,531

The overall total amount awarded to all institutions combined is $8,615,382

South Dakota State University

1. Bridging Community insights and solutions in Water Resources Management: A Pathway to Water Resources Program in South Dakota. $99, 514 Awarded 2024
2. United States Geological Survey (USGS) 104 (b). Integrated Remote Sensing and Water Quality Analysis for Spatiotemporal Assessment of Surface Water Quality in Eastern South Dakota. $15,000 Awarded 2024
3. United States Geological Survey (USGS) 104 (b). Development of a non-contact, AI-driven method for rapid assessment of surface water quality based on imagery and smells. $12,372 Awarded 2024
4. East Dakota Water Development District. Assessing the Environmental and Economic Efficacy of the SRAM Program in the Big Sioux River Watershed. $120,553 Awarded. 2024
5. 2024 South Dakota Nutrient Research and Education Council. Utilization of Laser-Induced Graphene-Based Sensor for Soil NPK Measurements and Development of Nutrients Maps - $63,412 Awarded. 2024
6. PD – USDA ARS (Agricultural Research Service) Non-Assistance Cooperative Agreement - $60,475. Awarded (Geospatial Analysis and Modeling of Agrohydrological Variability in the Water-limited Great Plains.). #58-3012-3-019/Amendment01. $30,000 (Awarded). 2023

University of Tennessee

1. RUSLE2 Maintenance. D. Yoder. USDA-NRCS through CESU agreement with Clemson University. $159,305 from 2022-2027
2. RUSLE2 Development. D. Yoder. USDA-NRCS through CESU agreement with Clemson University. $125,740 from 2022-2025
3. Fidan (Co-PI). Deep learning empowered real-time high-fidelity flood hazard forecast system. The University of Tennessee– AI TENNessee. $50,000. 07/01/2024 – 6/30/2025
4. Fidan (Lead PI). Environmental Justice in the City: Socio-Economic Dimensions of Urban Stream Health. The University of Tennessee– Institute for a Secure & Sustainable Environment. $50,000. 07/01/2024 – 6/30/2025
5. Fidan (Co-PI). Institute for Climate and Community Resilience. The University of Tennessee Track II. $249,298. 07/01/2024 – 06/30/2027

Kansas State University

1. Developing and assessing innovative ephemeral gully erosion control practices. T Franti, A. Sheshukov, J. Lory, R. Cruse. (2021-2024) USDA-NRCS
2. Valuing Water Quality Improvements in Heartland Reservoirs. R.L. North, A. Ohler, L. McCann, T. Moore, A. Sheshukov. (2022-2025) EPA-STAR
3. Early Detection of Harmful Algal Blooms in Kansas Lakes and Reservoirs Using Satellite Remote Sensing. J. Panthi, T. Moore, A. Sheshukov. USGS 104b. (2024-2026)
4. Effectiveness of agricultural BMPs at the regional scale under current and future climatic trends with a KanDEP model. A. Sheshukov, B. Gelder, R. Cruse. Kansas Water Office.  (2024-2027)
5. Assessment of water quality improvement and sediment reduction outcomes from land use improvements in Red Hills watershed associated with grassland management. A. Sheshukov. The Nature Conservancy. (2024-2025)
6. Offsite BMP Program to bring urban and rural stakeholders for water-quality benefits. A. Sheshukov, T. Moore. USDA-NIFA. (2023-2024)
7. Development of an alternative stormwater compliance program for the City of Manhattan. T. Moore. City of Manhattan. (2023-2024).
8. Evaluation of reach-scale effects of streambank stabilization on the Cottonwood River, Kansas. K. Bigham, T. Layzell, and T. Moore. Kansas Water Office (2023-2024).

Iowa State University

1. Two-stage agricultural channels in Iowa’s drained landscape to improve water quality and long-term resilience. $149,036. 8/1/2024 – 7/31/2026. PI: S.W. McMillan. CoPIs: A. Arenas, P. Moore, K. Schilling, J. Swanson, A. Brown.
2. Fourmile Creek: Assessment of restoration effectiveness. $379,751. 7/1/2024 – 6/30/2028. PI: P. Moore. CoPIs: T. Isenhart, S.W. McMillan.
3. Iowa Mayors Design Workshop. Funded by Iowa State University. $70,000. 6/1/2024 – 5/31/2025. PI: E. Olson-Douglas. CoPIs: A. Dunn, S.W. McMillan, J. Robison, C. Rogers.
4. Scott County, Iowa - Working lands for resilient communities. Funded by NRCS-RCPP. Lead institution is Ducks Unlimited (total grant $8,000,000); subaward to ISU ($268,095). 5/1/2024 – 4/30/2029. PI: S.W. McMillan, CoPI: R. McGehee.
5. Sensor integration to demonstrate benefits of regenerative agriculture on soil health. Funded by NSF-IUCRC (Industry University Cooperative Research Centers). $50,000. 2/1/2024 – 1/31/2025. PI: S.W. McMillan, CoPIs: D. Anderson, C. Gomes, N. Hoover, M. Soupir.
6. Nutrient Reduction Research Program: Sources and mitigation of sediment and phosphorus in agricultural streams. Funded by State of Iowa Department of Agricultural and Land Stewardship. $316,280. 1/1/2024 – 12/31/2027. PI: S.W. McMillan, CoPI: P. Moore.

Virginia Tech

1. Bell, N., Xia, K., Sample, D. Investigation of traditional and innovative stormwater management practices to reduce contaminants of emerging concern in socioeconomically disadvantaged communities. Award: $199,973.May 2024-April 2026.
2. USDA-Cooperative Agreement. Easton, Z.M. Modeling the Lake Champlain Basin CEAP watersheds to understand and predict conservation effects on legacy phosphorus $134,223. Oct 2021-Sept 2025.
3. Collick, A.S., Z.M. Easton, and R. Bryant. UMES Stormwater Management Research Facility: Investigating nutrient and sediment reduction from poultry house stormwater drainage systems. $399,000. Sept 2020-Aug 2024
4. NSF CPS (Cyber-Physical Systems). White, R.R., E. Feuerbacher, Z.M. Easton. Collaborative Research: CPS: Medium: Greener Pastures: A pasture sanitation cyber physical system for environmental enhancement and animal monitoring. $998,232. June 2022-May 2025.
5. Virginia Dept of Environmental Quality.Easton, Z,M & K.S. Stepheson. Bioreactors to Remove Legacy Nitrogen to meet VA TMDL goals. $250,000. Dec 2023-Dec 2025.
6. USDA-NRCS CIG- On-Farm Trials. Delaware Soil and Water Conservation District, Z.M. Easton, Q. Kettering. $3,000,000. Jan 2024-Dec 2028.

Oklahoma State University

1. Title: MRI: Track 1 Acquisition of an Advanced Low-altitude Earth Observing System (ALEOS) with Hyperspectral and LiDAR Capabilities to Advance Interdisciplinary Research and Training. Funding Agency: NSF MRI. Principal Investigator: H. Gholizadeh (OSU). Co-Investigators: G. Wilson, K. Baum, J. Jacob, S. Fuhlendorf, R. Will, C. Zou, K. Wagner, B. Bachelot, E. Schnitzler, L. Zhai (OSU). Status: Funded 9/1/2023-8/31/2026 ($467,796)
2. Title: Building Water Quality and Rural Health Education Capacity through Private Well Screenings and Training. Funding Agency: USDA Rural Health and Safety Education Competitive Grants Program. Principal Investigator: Nicole Colston (OSU). Co-Investigators: K. Wagner, Abu Mansaray, J. Sadler (OSU). Status: Funded 9/1/2023-8/31/2026 ($349,956)
3. Title: FY23 104b State Water Resources Research Institute Program. Funding Agency: USGS. Principal Investigator: K. Wagner. Co-Investigators: M. Foltz, M. Krzmarzick, K. Mangalgiri, N. Materer, A. Mirchi, K. Sallam (OSU). Status: Funded 9/1/2023-8/31/2024 ($146,840)

NCSU

1. AI-driven, Web-deployed, Low-Cost Visual Sensing of Stormwater Outlet Flow. F Birgand, L Wiang. NC DOT $400,531

**Students Mentored (59 Students)**

South Dakota State University

Serving as a primary adviser

1. Manoj Lamichhane, PhD Student in Ag and Biosystems Engineering – May 2026

2. Kayode B. Adebayo, PhD Student in Ag and Biosystems Engineering – December 2026

3. Azar Movaghatian, PhD Student in Biological Sciences – May 2026

Serving as a committee member

1. Maryam Sahraei, PhD Candidate in Ag and Biosystems Engineering – May 2025

2. Umar Javed, PhD Candidate in Ag and Biosystems Engineering – May 2025

3. Faisal Almitairi, Civil and Environmental Engineering

MS Students

1. Tulsi Ram Pokhrel, MS Student in Ag and Biosystems Engineering – January 2026

Undergraduate Students

1. Kyle Maher, BS, SDSU Data Science

2. Sara Abbasi Benhangi, Department of Civil and Environmental Engineering

University of Tennessee

1. Ryan Ackett, PhD Student working with Dr. Fidan as part of their committee
2. Conlan Burbrink, PhD Student working with Dr. Fidan as part of their committee
3. Henley Sartin, Master’s Student working with Dr. Fidan as part of their committee
4. Savannah Jobkar, Master’s Student working with Dr. Fidan
5. Abby Worth, Undergraduate Student with Dr. Fidan
6. Evelyn Hedrick, Undergraduate Student with Dr. Fidan
7. Hannah Thomas, Undergraduate Student with Dr. Fidan

Kansas State University

1. Jeeban Panthi, Postdoctoral Associate, BAE
2. Laura Krueger, PhD student, BAE
3. Corben Monzon, MS Student, BAE – graduated 2024
4. Averi Baker, MS Student, BAE – graduated 2024
5. Srijana Mahat, MS Student, BAE
6. Sean Hackenberg, REU student, Computer Science
7. Kyle Kohman, REU student, Computer Science
8. Josiah Quinlan, Undergraduate student - BAE
9. Sophia Steffenmiester, Undergraduate student - Environmental science

Iowa State University

1. Noah Rudko (2024): Ross Graduate Fellow; currently Postdoctoral Fellow at University of Arkansas.
2. Danielle Winter (2023) NSF Graduate Research Fellow, Purdue Doctoral Fellow; currently Extension Specialist at Purdue University.
3. Ian Chesla (2022-) Purdue University (co-advised by Dr. Jacob Hosen)
4. Wendy Yarborley Abbey (2023-), Iowa State University, Agricultural & Biosystems Engineering
5. Joseph Bergeron (2024-), Iowa State University, Environmental Science
6. Sage Coffman (2024-), Iowa State University, Environmental Science

Virginia Tech

1. Maliha Mushtari1 PhD Student (anticipated graduation Spring, 2026).
2. Sami Towsif Khan1, PhD Student ((graduated Spring, 2024).)
3. Hossein Ahmadi2 PhD Student (anticipated graduation Spring, 2025).
4. Michael Harrison, MS Student (Graduated Spring, 2024).
5. Savanna Blackburn, MS Student, Student (graduated Spring, 2024).
6. Sabrina Mehzabin, PhD Student (Graduation Spring, 2025).
7. Binyam Asfaw, PhD Student (Graduation, Spring, 2025).
8. Siam Maksud, PhD Student (Graduation, Spring, 2025).
9. Ella Lewis, Undergraduate (Junior).
10. Stella Bryant, Undergraduate (Junior).

1Coadvised with T. Thompson

2Coadviseds with D. Scott

Oklahoma State University.

1. Lindsey Berube, MS, Environmental Science, Oklahoma State University
2. Cole Davis, MS, Environmental Science, Oklahoma State University
3. Jack Edwards, MS, Environmental Science, Oklahoma State University
4. Austin Phillippe, PhD, Natural Resource Ecology and Management, Oklahoma State University

**NCSU**

1. **Qianyu Hang, Ph.D. student**
2. **Mohammad Nooshzadi, M.S. student**
3. **Nora Sauers, undergraduate student**
4. **Julia Harrison, PhD student**
5. **Hector Fajardo, PhD student**
6. **Christopher Oates, PhD student**
7. **Taj Hewitt, undergraduate student**
8. **Abby Studnek, undergraduate student**

**University of Kentucky**

1. **Nabil Al Aamery, Postdoctoral Fellow**
2. **Tiffany Coogle, MS Student (Anticipated Graduation Spring 2026)**
3. **Tyler Botts, MS Student (Anticipated Graduation Spring 2026)**
4. **Abby Berry, MS Student (Anticipated Graduation Spring 2025)**
5. **Quinn Rison, Undergraduate Researcher (Graduates Spring 2025)**
6. **Hunter Walters, Undergraduate Researcher (Graduated Spring 2024)**

**Thesis/Dissertation (7)**

Kansas State University

1. Monzon, C. 2024. Evaluation of streambank stabilization structures on upstream and downstream bank erosion, MS, Kansas State University.
2. Baker, A. (2024) Effects of wind on reservoir mixing and stratification: a case study from Kansas. MS, Kansas State University

Iowa State University

1. Ciupak, Meghan. 2023. Biogeochemical factors influencing dissolved greenhouse gasses within two Indiana wetlands. MS Thesis. Purdue University.
2. Winter Lay, Danielle. 2023. Optimizing design and management of restored wetlands and floodplains in agricultural watersheds. PhD Dissertation. Purdue University.
3. Rudko, Noah. 2024. The impact of agricultural conservation practices on water quality in tile-drained watersheds. PhD Dissertation. Purdue University.

Virginia Tech

1. Towif Kahn, S., 2024. Impacts of Stormwater Management Practices and Climate Change on Flow Regime and Channel Stability, Ph.D. dissertation, 167 p.

NCSU

1. Nooshzadi, M. Low-Cost Visual Sensing of Stormwater Outflow. M.S. thesis. NC State University, Raleigh, NC.

**Presentations (43 Presentations)**

Virginia Tech

1. Thompson, T., Sample, D., Stephenson, K., Towsif Khan, S., & Macdonald, K., 2024. Cost-effective methods for reducing sediment loads in Lick Run. In *Watershed Science in Action:  A Roanoke Stormwater Symposium*.
2. Thompson, T., Sample, D., Al-Smadi, M., Towsif Khan, S., Shahed Behrouz, M., & Miller, A., 2023. Effectiveness of Stormwater Management Practices in Protecting Stream Channel Stability. In *Stepping Up Our Efforts:  Now is the Time.  29th Annual Conference of the Maryland Water Monitoring Council*. Baltimore, MD.
3. Thompson, T., Sample, D., Al-Smadi, M., Towsif Khan, S., Shahed Behrouz, M., Miller, A., & Butcher, J., 2023. Effectiveness of stormwater management practices in protecting stream channel stability. In *Pooled Monitoring Forum: Restoration Research to make Science and Regulatory Connections*. Baltimore, MD.
4. Thompson, T., Sample, D., Al-Smadi, M., Towsif Khan, S., Shahed Behrouz, M., Miller, A., & Butcher, J., 2024. Do Maryland's Stormwater Management Regulations Protect Channel Stability? Presentation (not at a conference)/Webinar for the Maryland Stream Restoration Association. 84 participants, 20 Jun 2024.
5. Thompson, T., Sample, D., Al-Smadi, M., Towsif Khan, S., Shahed Behrouz, M., & Miller, A., 2024. Effectiveness of stormwater management practices in protecting stream channel stability. Online Presentation (not at a conference) Graduate seminar for Department of Geography & Environmental Systems at University of Maryland, Baltimore County
 Presentation date: 06 Mar 2024.
6. Towsif Khan, S., Thompson, T., & Sample, D., 2024. Assessing the Efficacy of Stream Restoration and SCM Retrofitting for Channel Stability in Urbanized Catchments. I presented at the meeting of the American Ecological Engineering Society 24th Annual Conference. Blacksburg, VA.
7. Maliha, M., Al-Smadi, M., Sample, D., Thompson, T., Miller, A., & Shahed Behrouz, M., 2024. *Traditional Stormwater Management vs Environmental Site Design (ESD): Modeling impacts of stormwater management practices on surface runoff in an urban watershed*. Poster session presented at the meeting of the American Ecological Engineering Society 24th Annual Conference. Blacksburg, VA.
8. Thompson, T., Sample, D., Alsmadi, M., Towsif Khan, S., Shahed Behrouz, M., Miller, A., & Butcher, J., 2024. Effectiveness of stormwater management practices in protecting stream channel stability. University of Maryland, Baltimore County.
9. Mehzabin, S., K. Stephenson, D.R Fuka, and Z.M. Easton. 2024. Environmental and management impacts of legacy nitrogen remediation with bioreactors. American Ecological Engineering Society Annual Meeting. Blacksburg VA, May 2024.
10. Mehzabin, S., K. Stephenson, D.R Fuka, and Z.M. Easton. 2024. Environmental and Management Impacts of Legacy Nitrogen Remediation Using Bioreactors. Chesapeake Community Research Symposium, Annapolis, Maryland. June 2024.
11. Foster, M., Z.M. Easton, and N. Bell. 2024. Denitrifying bioreactors for legacy nitrate removal from springs in the Chesapeake Bay watershed. American Ecological Engineering Society Annual Meeting. Blacksburg VA, May 2024.
12. Asfaw B. W., D. Fuka, A. Collick, R. White, Z.M. Easton. (2024, July 29). Enhanced identification of spatiotemporal dynamics of critical source areas [Poster Abstract]. ASABE Annual International Meeting, Anaheim, California. https://asabemeetings.org/
13. Asfaw B. W., D. Fuka, A. Collick, R. White, Z.M. Easton. (2024, March 29). Investigating terrain properties for improved identification of soil wetness patterns [Poster Abstract]. CAIA Big Event, Blacksburg, Virginia.
14. Asfaw B. W., D. Fuka, A. Collick, Z.M. Easton. (2024, May 30). Characterizing topographic indices for model parametrization [Poster Abstract]. AEES, Blacksburg, Virginia. <https://www.ecoeng.org/2024-annual-meeting>.
15. Asfaw B. W., D. Fuka, A. Collick,  R. White, Z.M. Easton. (2024, June 11). Characterizing topographic indices for model parametrization. Chesapeake Community Research Symposium, Annapolis, Maryland. https://ccmp2024.chesapeake.org/
16. Easton, Z.M., and K.S. Stephenson. 2023. The nonpoint source challenge-is the watershed responding to management as expected. In USGS Factors Team Group Meeting. Oct. 2023
17. Easton, Z.M., B. Benham, and K.S. Stepheson. 2023. The nonpoint source challenge. Virginia Soil and Water Conservation Districts-Soil and Water Conservation Society Annual Meeting. Nov. 2023. Extension Presentation.
18. Easton, Z.M., and K.S. Stephenson. 2023. The nonpoint source challenge-is the watershed responding to management as expected. In Delmarva Land and Litter Collaborative Annual Meeting. Aug. 2023. Extension Presentation.

Oklahoma State University

1. Edwards, J. 2023. Evaluating the Impact of Regenerative Agricultural Practices on Soil Health and Water Quality in Altus, Oklahoma. Oklahoma Governor’s Water Conference and Research Symposium in Norman, OK on November 29-30, 2023.
2. Kaghazchi, Afsaneh. 2023. Evaluation of the hydrologic effects of grazing practices in small watersheds. Oklahoma Governor’s Water Conference and Research Symposium in Norman, OK on November 29-30.
3. Abubakarr Mansaray, Kevin Wagner, Ryan Reuter, Ali Mirchi, and Alayna Gerhardt. Ephemeral Stream Health Assessment in Virtually Fenced Grazinglands. Oklahoma Clean Lakes and Watersheds Association Conference, April 10-11, 2024.
4. Afsaneh Kaghazchi, Ali Mirchi, et al. Assessing the Effectiveness of Rotational Grazing and Riparian Buffers for Reducing Nutrient Loads in Small Watersheds. Oklahoma Clean Lakes and Watersheds Association Conference, April 10-11, 2024.
5. Goodman, L.E., K. Wagner, R. Reuter, B. Murray, A. Michi. 2024. Virtual Fencing for Improved Grazing and Pasture Management. Southern Association of Agricultural Experiment Station Directors, April 17-20, 2024.
6. Reuter, R., K. Wagner, L. Goodman, B. Murray, C. Duchardt, A. Gerhardt, F. La Manna, T. Olsen, and K. Pfaffenberger. 2024. Virtual fencing to control cattle for improved ecosystem services. 79th SWCS International Annual Conference, July 21-24, 2024, Myrtle Beach, SC.
7. Wagner, K. 2024. Managing Grazing For Improved Water Quality. U.S. Roundtable for Sustainable Beef – Water Workgroup (August 5).
8. Wagner, K. 2024. Watershed monitoring to inform watershed scale modeling at Oklahoma State University. S1089 Multi-State Hatch Project Annual Meeting (August 27).

South Dakota State University

Conference presentations (\* Grad Students)

1. Adebayo, K.\*, and Mehan, S. (2024, October 15). Climate dynamics of the Great Plains of the United States (1924-2023) [Abstract submitted]. In South Dakota Student Water Conference, Brookings, SD, United States.
2. Lamichhane, M.\*, Mehan, S., and Mankin, K. (2024, July 28 - August 1). Comparison of hybrid machine learning models with classical machine learning models to predict actual evapotranspiration in semi-arid region. In ASABE Annual International Meeting, Anaheim, CA, United States.
3. Mehan, S., Sharma, A., McDaniel, R., Arnold, J. G., Trooien, T., Sammons, N., and Amegbletor, L. (2024, July 28-31). Evaluating the performance of SWAT+ for simulating drainage water management (DWM) and model parameter transferability spatially in Eastern SD [Abstract ID: 2401216]. In ASABE Annual International Meeting, Anaheim, CA, United States.
4. Sahraei, M., Hentegs, M., McMaine, J., Trooien, T., Mehan, S., Osterloh, K., and Moradi, H. (2024, July 28-31). Management practices and field characteristics that drive nutrient loss in tile drainage in eastern South Dakota [Abstract ID: 2400904]. In ASABE Annual International Meeting, Anaheim, CA, United States
5. Adebayo, K.\*, Mehan, S. , and Mankin, K.(2024, July 28-August 1). Analyzing climate change trends in the Great Plains of the United States (1900-2022) [Conference presentation]. In ASABE Annual International Meeting, Anaheim, CA, United States.
6. Lamichhane, M.\*, Mehan, S., Mankin, K., and Maitinyazi, M. (2024, April 18). Machine learning models to predict actual evapotranspiration in semi-arid region. In 2024 Western South Dakota Hydrology Conference, Rapid City, SD, United States.
7. Adebayo, K.\*, and Mehan, S. (2024, April 18). Comprehensive analysis of drought dynamics in South Dakota using the aridity index and standardized precipitation evapotranspiration index. In 2024 Western South Dakota Hydrology Conference, Rapid City, SD, United States.
8. Lamichhane, M.\*, Mehan, S., and Mankin, K. (2024, April 11-12). Actual evapotranspiration prediction based on harmonized Landsat sentinel indices with a few weather variables using machine learning algorithms in semi-arid regions. In 2024 ASABE North Central Regional Meeting, Brookings, SD, United States.
9. Adebayo, K.\*, Mehan, S., and Mankin, K. (2024, April 11-12). A comparative analysis of change point detection methods for hydrologic data. In 2024 ASABE North Central Regional Meeting, Brookings, SD, United States.
10. Lamichhane, M.\*, Mehan, S., and Maimaitijian, M. (2024, April 4). Soil moisture prediction using multimodal remote sensing data fusion and machine learning algorithms in diverse crop fields. Poster session presented at the 55th Geography Conference, Brookings, SD, United States.
11. Mehan, S. (2024, April 3-5). Effectiveness of SWAT simulating drainage water management using edge-of-field data in OH. In Annual Meeting for the Conservation Drainage Network and NCERA-217: Drainage Design and Management Practices to Improve Water Quality, Westerville, OH, United States.
12. Muehlman, J., Prasad, L., Thompson, A., Mehan, S., Osterholz, W., King, K., Arriaga, F., and Kalcic, M. (2024, April 25-26). Improving the representation of cold season hydrology in SWAT. In WI AWRA 2024 Annual Meeting, Appleton, WI, United States.
13. Lamichhane, M.\*, and Mehan, S. (2023, October 10). Enhancing evapotranspiration (ETa) estimation through machine learning driven satellite image fusion. In 2023 South Dakota Student Water Conference, Brookings, SD, United States.
14. Lamichhane, M.\*, Mehan, S., and Maimaitijian, M. (2023, November 15). Machine learning models to predict actual evapotranspiration (ETa) based on harmonized Landsat Sentinel (HLS) and climate variables in semi-arid regions. Poster session presented at EROS Center Fall Poster Session, Sioux Falls, SD, United States
15. Mehan, S., and Amatya, D. (2023, December 11-15). Development of an open-source forest fire prediction tool using machine learning algorithms. In American Geophysical Union Fall Meeting, San Francisco, CA, United States.
16. Mehan, S., Mankin, K., Barnard, D., and Green, T. (2023, July 9-12). GeoSpatial hydrometeorological data in the contiguous U.S.: Sources, characteristics, accessibility, and applicability – A review and synthesis. In ASABE Annual International Meeting, Omaha, NE, United States.
17. Mankin, K., Wells, R., Edmunds, D., McMaster, G., Green, T., Kipka, H., Mehan, S., Fox, F., Wagner, L., and Barnard, D. (2023, July 9-12). Crop phenology modeling and calibration using UPGM for corn, sorghum, wheat, sunflower, and dry bean. In ASABE Annual International Meeting, Omaha, NE, United States.

**Popular articles (7 Popular Articles)**

South Dakota State University

Popular/Extension articles

1. Mehan, S., & Buterbaugh, R. (2024). Educating about flooding and associated activities. South Dakota State University Extension. https://extension.sdstate.edu/educating-about-flooding-and-associated-activities
2. Mehan, S., & Buterbaugh, R. (2024). Understanding Flood Hazards in the United States. South Dakota State University Extension. https://extension.sdstate.edu/understanding-flood-hazards-united-states
3. Mehan, S., & Buterbaugh, R. (2024). Flood Preparedness. South Dakota State University Extension. https://extension.sdstate.edu/flood-preparedness
4. Mehan, S., & Buterbaugh, R. (2024). Global and U.S. Perspectives on Flooding. South Dakota State University Extension https://extension.sdstate.edu/global-and-us-perspectives-flooding
5. Mehan, S., & Buterbaugh, R. (2024). Restoring and Sampling Private Wells in South Dakota. South Dakota State University Extension. https://extension.sdstate.edu/restoring-and-sampling-private-wells-south-dakota
6. Mehan, S., & Buterbaugh, R. (2024). Where do floodwaters go and what do they leave behind? South Dakota State University Extension. https://extension.sdstate.edu/where-do-floodwaters-go-and-what-do-they-leave-behind
7. Klopp, H., Bly, A., Nunes, V.L.N., Mehan. S. (2024). Carbon to Nitrogen Ratio of Healthy Soils. South Dakota State University Extension. https://extension.sdstate.edu/carbon-nitrogen-ratio-healthy-soils