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Program Manager, Water Power Program
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Education

Ph.D., Civil Engineering, Purdue University, May 2008
- Major: Hydraulic and Hydrologic Engineering
- Dissertation: Multivariate Statistical Analysis of Indiana Hydrologic Data
- Advisor: Dr. Rao S. Govindaraju

M.S., Civil Engineering, National Taiwan University, June 2001
- Major: Hydraulic Engineering
- Thesis: A Study in Development of Regional Design Hyetographs
- Advisor: Dr. Gwo-Fong Lin

B.S., Civil Engineering, National Taiwan University, June 1999

Other:
- NAFTA Student Exchange Program, Lakehead University (Canada), June–July 2006

Appointments

Nov 2021–present	Program Manager, Water Power Program, Oak Ridge National Laboratory, Oak Ridge, TN
Oct 2020–present	Group Leader, Water Resource Science and Engineering Group, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN
Jan 2017–present	Senior Research Staff, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN
Jan 2017–Jun 2021	Joint Faculty, The Bredesen Center for Interdisciplinary Research and Graduate Education, University of Tennessee, Knoxville, TN
Dec 2013–Sep 2020	Team Leader, Hydrologic Systems Analysis Team, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN
Dec 2013–Dec 2016	Research Staff, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN
Dec 2010–Nov 2013	Research Associate, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN
Feb 2009–Nov 2010	Post-Doctoral Research Associate, Computational Sciences and Engineering Division, Oak Ridge National Laboratory, Oak Ridge, TN
May 2008–Jan 2009	Post-Doctoral Research Associate, School of Civil Engineering, Purdue University, West Lafayette, IN
Aug 2004–May 2008	Graduate Research/Teaching Assistant, School of Civil Engineering, Purdue University, West Lafayette, IN
March 2003–July2004	Full-Time Teaching Assistant, Department of Civil Engineering, National Taiwan University, Taipei, Taiwan

Honors / Awards / Certificates

Nov 2023	Innovative and Novel Computational Impact on Theory and Experiment (INCITE) Program Award – Gangrade et al. (2023), A Climate-Informed, Large-Scale, and High-Resolution Inundation Modeling Framework, https://www.ornl.gov/news/incite-program-awards-supercomputing-time-75-high-impact-projects
May 2023	Fellow, American Society of Civil Engineers (ASCE) Environmental and Water Resources Institute (EWRI)
July 2020	Best Paper Award, Platform for Advanced Scientific Computing 2020 (PASC20) Annual Conference – Sharif et al. (2020), Performance Evaluation of a Two Dimensional Flood Model on Heterogeneous High-Performance Computing Architectures, https://www.pasc-conference.org/pasc20-papers-open-access-via-acms-opentoc-and-best-paper-award/.
April 2014	Significant Event Award – "National Hydropower Asset Assessment Program (NHAAP)," Oak Ridge National Laboratory
Oct 2013	Statistical Hydrology Best Paper Award, International Commission on Statistical Hydrology, International Association of Hydrological Sciences
Jan 2010	Outstanding Reviewer Award, Journal of Hydrologic Engineering, American Society of Civil Engineers
Oct 2008	Civil Engineering Best Dissertation Award, Purdue University
Apr 2008	Gerrit H. Toebes Memorial Award, Purdue University
Oct 2007	Jacques W. Delleur Traveling Award, Purdue University
April 2006	Estus H. and Vashti L. Magoon Outstanding Teaching Assistant Award, Purdue University
Oct 2005	Passed the NCEES Fundamentals of Engineering Examinations
June 2001	Honorary member of the Phi Tau Phi Scholastic Society, Taiwan
May 2001	Certificate of Civil Engineer, Taiwan (PE equivalent)

Media Attention

June 2024	Building Energy Around Changing Climate, https://www.ornl.gov/news/building-energy-around-changing-climate
May 2024	ORNL at the Climate READi Workshop: Resilient Power Systems in the Context of Climate Change, https://www.ornl.gov/news/ornl-climate-readi-workshop-resilient-power-systems-context-climate-change
May 2023	Kao Named Fellow of American Society of Civil Engineers' Environmental & Water Resources Institute, https://www.ornl.gov/news/kao-named-fellow-american-society-civil-engineers-environmental-water-resources-institute
Feb 2023	Adding 1.4 GW of New Hydro at Existing Water Conduits, https://www.hydro.org/powerhouse/article/adding-1-4-gw-of-new-hydro-at-existing-water-conduits/?utm_medium=email&utm_source=rasa_io&utm_campaign=newsletter
Feb 2023	The Hidden Hydropower Potential in Man-Made Waterways, https://www.wsj.com/articles/hydropower-potential-man-made-waterways-11675445578
Oct 2022	Existing Water Infrastructure May Hold Key to Generating More Hydropower, https://www.ornl.gov/news/existing-water-infrastructure-may-hold-key-generating-more-hydropower
Sept 2022	New Report Ensures Hydropower Sustainability Amid Climate Change, https://www.ornl.gov/news/new-report-ensures-hydropower-sustainability-amid-climate-change
Aug 2022	ORNL's Supercomputer-Powered TRITON Tool Models Flooding,

https://www.hpcwire.com/2022/08/03/ornls-supercomputer-powered-triton-tool-models-flooding

July 2022 TRITON: A Powerful Toolkit for Modern Flood Modeling, https://www.olcf.ornl.gov/2022/07/25/new-model-harnesses-supercomputing-power-for-more-accurate-flood-simulations

Dec 2021 Oak Ridge's Supercomputers Help Scientists Conduct Unique Research, https://fedtechmagazine.com/article/2021/12/oak-ridges-supercomputers-help-scientists-conduct-unique-research

Sept 2021 Environment – Hotter urban hydrology, https://www.ornl.gov/news/environment-hotter-urban-hydrology

Jan 2021 New Daymet Data Facilitate Environmental Science, Earth System Modeling, https://www.ornl.gov/research-highlight/new-daymet-data-facilitate-environmental-science-earth-system-modeling

Jan 2021 Modeling – Mapping the flood, https://www.ornl.gov/news/modeling-mapping-flood

Feb 2010 Is February Flooding the New Normal in East Tennessee?, https://www.wbir.com/article/weather/is-february-flooding-the-new-normal-in-east-tennessee/51-3da6c242-75bd-4dd0-9b9a-700bf6244ee5

List of Publications

Peer-Reviewed Journal Articles

[81] Rahimi, L., M. Hoque, E. Ahmadisharaf, N. Alamdari, V. Misra, A. C. Maran, S.-C. Kao, and A. AghaKouchak (2024), Future Climate Projections for South Florida: Improving Accuracy of Air Temperature and Precipitation Extremes with a Hybrid Statistical Bias Correction Technique, *Earth's Future*, *accepted*.

[80] Turner, S. W. D., G. R. Ghimire, C. H. Hansen, D. Singh, and S.-C. Kao (2024), Hydropower Capacity Factors Trending Down in the United States, *Nat. Commun.*, *15*, 5445, https://www.nature.com/articles/s41467-024-49553-x.

[79] Wang, Y., J. Mao, C. M. Brelford, D. M. Ricciuto, F. Yuan, X. Shi, D. Rastogi, M. M. Mayers, S.-C. Kao, J. M. Warren, N. A. Griffiths, X. Cheng, D. J. Weston, Y. Zhou, L. Gu, and P. E. Thornton (2024), Thermal, Water, and Land Cover Factors Led to Contrasting Urban and Rural Vegetation Resilience to Extreme Hot Months, *PNAS Nexus*, *3*(4), *147*, https://doi.org/10.1093/pnasnexus/pgae147.

[78] Jager, H. I., K. Manning, J. N. Welch, F. Corsi, A. Miara, H. S. Yoon, R. A. McManamay, S.-C. Kao, P. C. Kusnierz, and S. Gangrade (2024), Indicators of Thermal Alteration in US Waters Reveal Patterns of Climate Risk at the Energy-Water Nexus, *Ecol. Indic.*, *159*, 111755, https://doi.org/10.1016/j.ecolind.2024.111755.

[77] Shi, M., M. Keller, B. Bomfim, L. Li, C. Koven, L. M. Kueppers, R. Knox, J. Needham, S.-C. Kao, P. E. Thornton, M. M. Thornton, and L. R. Leung (2024), Hurricane Disturbance and Recovery in Puerto Rico Simulated by the Functionally Assembled Terrestrial Ecosystem Simulator (FATES), *J. Adv. Model. Earth Sy.*, *16*(1), e2023MS003679, https://doi.org/10.1029/2023MS003679.

[76] Fan, M., S. Liu, D. Lu, S. Gangrade, and S.-C. Kao (2023), Explainable Machine Learning Model for Multi-Step Forecasting of Reservoir Inflow with Uncertainty Quantification, *Environ. Modell. Softw.*, *170*, 105849, https://doi.org/10.1016/j.envsoft.2023.105849.

[75] Wang, D., F. Yuan, S.-C. Kao, M. M. Thornton, D. M. Ricciuto, P. Schwartz, and P. E. Thornton (2023), An Ultra High-Resolution E3SM Land Model Simulation Framework and Its First Application to the Seward Peninsula in Alaska, *J. Comput. Sci.*, *73*, 102145, https://doi.org/10.1016/j.jocs.2023.102145.

[74] Gangrade, S., G. R. Ghimire, S.-C. Kao, M. Morales Hernández, A. A. Tavakoly, J. L. Gutenson, K. H. Sparrow, G. K. Darkwah, A. J. Kalyanapu, and M. L. Follum (2023), Unraveling the 2021 Central Tennessee Flood Event Using a Hierarchical Multi-Model Inundation Modeling Framework, *J. Hydrol.*, *625*, 130157, https://doi.org/10.1016/j.jhydrol.2023.130157.

[73] Shao, M., N. Fernando, J. Zhu, G. Zhao, S.-C. Kao, B. Zhao, E. Roberts, and H. Gao (2023), Estimating Future Surface Water Availability through an Integrated Climate-Hydrology-Management Modeling Framework at a Basin Scale under CMIP6 Scenarios, *Water Resour. Res.*, *59*(7), e2022WR034099, https://doi.org/10.1029/2022WR034099.

[72] Zhao, B., S.-C. Kao, G. Zhao, S. Gangrade, D. Rastogi, M. Ashfaq, and H. Gao (2023), Evaluating Enhanced Reservoir Evaporation Losses from CMIP6-Based Future Projections in the Contiguous United States, *Earth's Future*, *11*(3), e2022EF002961, https://doi.org/10.1029/2022EF002961.

[71] Ghimire, G. R., C. H. Hansen, S. Gangrade, S.-C. Kao, P. E. Thornton, and D. Singh (2023), Insights from Dayflow: A Historical Streamflow Reanalysis Dataset for the Conterminous United States, *Water Resour. Res.*, *59*(2), e2022WR032312, https://doi.org/10.1029/2022WR032312.

[70] Mohammadi, S., M. T. Bensi, S.-C. Kao, S. T. DeNeale, J. Kanney, E. Yegorova, and M. L. Carr (2023), Bayesian-Motivated Probabilistic Model of Hurricane-Induced Multi-Mechanism Flood Hazards, *J. Waterw. Port Costal Ocean Eng.*, *149*(4), 04023007, https://doi.org/10.1061/JWPED5.WWENG-1921.

[69] Zhou, T., S.-C. Kao, W. Xu, S. Gangrade, and N. Voisin (2023), Impacts of Climate Change on Subannual Hydropower Generation: A Multi-Model Assessment of the United States Federal Hydropower Plants, *Environ. Res. Lett.*, *18*(3), 034009, https://doi.org/10.1088/1748-9326/acb58d.

[68] Li, X., D. Fu, J. Nielsen-Gammon, S. Gangrade, S.-C. Kao, P. Chang, M. Morales Hernández, N. Voisin, Z. Zhang, and H. Gao (2023), Impacts of Climate Change on Future Hurricane Induced Rainfall and Flooding in A Coastal Watershed: A Case Study on Hurricane Harvey, *J. Hydrol.*, *616*, 128774, https://doi.org/10.1016/j.jhydrol.2022.128774.

[67] Gangrade, S., D. Lu, S.-C. Kao, and S. L. Painter (2022), Machine Learning Assisted Reservoir Operation Model for Long-Term Water Management Simulation, *J. Am. Water Resour. As.*, *58*(6), 1592–1603, https://doi.org/10.1111/1752-1688.13060.

[66] Hansen, C. H., G. R. Ghimire, and S.-C. Kao (2022), Evaluation of Nominal Energy Storage at Existing Hydropower Reservoirs in the US, *Water Resour. Res.*, *58*(11), e2022WR032210, https://doi.org/10.1029/2022WR032210.

[65] Ashfaq, M., D. Rastogi, J. Kitson, M. A. Abid, and S.-C. Kao (2022), Evaluation of CMIP6 GCMs over the CONUS for Downscaling Studies, *J. Geophys. Res.–Atmos.*, *127*(21), e2022JD036659, https://doi.org/10.1029/2022JD036659.

[64] Rastogi, D., S.-C. Kao, and M. Ashfaq (2022), How May the Choice of Downscaling Techniques and Meteorological Reference Observations Affect Future Hydroclimate Projections?, *Earth's Future*, *10*(8), e2022EF002734, https://doi.org/10.1029/2022EF002734.

[63] Pilla, R., N. Griffiths, L. Gu, S.-C. Kao, R. McManamay, D. M. Ricciuto, X. Shi (2022), Anthropogenically Driven Climate and Landscape Change Effects on Inland Water Carbon Dynamics: What Have We Learned and Where Are We Going?, *Glob. Change Biol.*, *28*(19), 5601–5629, https://doi.org/10.1111/gcb.16324.

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[61] Li, X., C. Rankin, S. Gangrade, G. Zhao, K. Lander, N. Voisin, M. Shao, M. Morales Hernández, S.-C. Kao, and H. Gao (2021), Evaluating Precipitation, Streamflow, and Inundation Forecasting Skills During Extreme Weather Events: A Case Study for An Urban Watershed, *J. Hydrol.*, *603*,

127126, https://doi.org/10.1016/j.jhydrol.2021.127126.
[60] Troia, M. J., R. A. McManamay, S.-C. Kao, and P. O'Connor (2021), A Heuristic Tool to Assess Regional Impacts of Renewable Energy Infrastructure on Conservation Areas, *Biol. Conserv.*, *263*, 109334, https://doi.org/10.1016/j.biocon.2021.109334.
[59] Yin, J., F. T.-C. Tsai, and S.-C. Kao (2021), Accounting for Uncertainty in Complex Alluvial Aquifer Modeling by Bayesian Multi-Model Approach, *J. Hydrol.*, *601*, 126682, https://doi.org/10.1016/j.jhydrol.2021.126682.
[58] Thornton, P. E., R. Shrestha, M. M. Thornton, S.-C. Kao, Y. Wei, and B. E. Wilson (2021), Gridded Daily Weather Data for North America with Comprehensive Uncertainty Quantification, *Nature Sci. Data*, *8*, 190, https://doi.org/10.1038/s41597-021-00973-0.
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[55] Ghanbari, M., M. Arabi, S.-C. Kao, J. Obeysekera, and W. Sweet (2021), Climate Change and Changes in Compound Coastal-Riverine Flooding Hazard Along the U.S. Coasts, *Earth's Future*, *9*, e2021EF002055, https://doi.org/10.1029/2021EF002055.
[54] Dullo, T. T., S. Gangrade, M. Morales Hernández, M. B. Sharif, A. J. Kalyanapu, S.-C. Kao, S. K. Ghafoor, and M. Ashfaq (2021), Assessing Climate Change-Induced Flood Risk in the Conasauga River Watershed: An Application of Ensemble Hydrodynamic Inundation Modeling, *Nat. Hazards Earth Syst. Sci.*, *21*, 1739–1757, https://doi.org/10.5194/nhess-21-1739-2021.
[53] Lu, D., G. Konapala, S. L. Painter, S.-C. Kao, and S. Gangrade (2021), Streamflow Simulation in Data-Scarce Basins Using Bayesian and Physics-Informed Machine Learning Models, *J. Hydrometeorol.*, *22*(6), 1421–1438, https://doi.org/10.1175/JHM-D-20-0082.1.
[52] Morales Hernández, M., M. B. Sharif, A. J. Kalyanapu, S. K. Ghafoor, T. T. Dullo, S. Gangrade, S.-C. Kao, M. Norman, and K. J. Evans (2021), TRITON: A Multi-GPU Open Source 2D Hydrodynamic Flood Model, *Environ. Modell. Softw.*, *141*, 105034, https://doi.org/10.1016/j.envsoft.2021.105034.
[51] Dullo, T. T., S. Gangrade, M. Morales Hernández, M. B. Sharif, S.-C. Kao, A. J. Kalyanapu, S. K. Ghafoor, and K. J. Evans (2021), Simulation of Hurricane Harvey Flood Event through Coupled Hydrologic-Hydraulic Models: Challenges and Next Steps, *J. Flood Risk Manag.*, *14*, e12716, https://doi.org/10.1111/jfr3.12716.
[50] McManamay, R. A., B. KC, M. R. Allen-Dumas, S.-C. Kao, C. M. Brelsford, B. L. Ruddell, J. Sanyal, R. N. Stewart, and B. L. Bhaduri (2021), Reanalysis of Water Withdrawal for Irrigation, Electric Power, and Public Supply Sectors in the Conterminous United States, 1950 to 2016, *Water Resour. Res.*, *57*, e2020WR027751, https://doi.org/10.1029/2020WR027751.
[49] Zhao, G., H. Gao, and S.-C. Kao (2021), The Implications of Future Climate Change on the Blue Water Footprint of Hydropower in the Contiguous US, *Environ. Res. Lett.*, *16*(3), 034003, https://doi.org/10.1088/1748-9326/abd78d.
[48] Konapala, G., S.-C. Kao, and N. Addor (2020), Exploring Hydrologic Model Process Connectivity at the Continental Scale through An Information Theory Approach, *Water Resour. Res.*, *56*(10), e2020WR027340, https://doi.org/10.1029/2020WR027340.
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[46] Heidari, H., M. Arabi, T. Warziniack, and S.-C. Kao (2020), Assessing Shifts in Regional Hydroclimatic Conditions of U.S. River Basins in Response to Climate Change over the 21st

Century, *Earth's Future*, *8*(10), e2020EF001657, https://doi.org/10.1029/2020EF001657.
[45] Konapala, G., S.-C. Kao, S. L. Painter, and D. Lu (2020), Machine Learning Assisted Hybrid Models Can Improve Streamflow Simulation in Diverse Catchments across the Conterminous US, *Environ. Res. Lett.*, *15*(10), 104022, https://doi.org/10.1088/1748-9326/aba927.
[44] Shao, M., G. Zhao, S.-C. Kao, L. Cuo, C. Rankin, and H. Gao (2020), Quantifying the Effects of Urbanization on Floods in a Changing Environment to Promote Water Security — A Case Study of Two Adjacent Basins in Texas, *J. Hydrol.*, *589*, 125154, https://doi.org/10.1016/j.jhydrol.2020.125154.
[43] Morales Hernández, M., M. B. Sharif, S. Gangrade, T. T. Dullo, S.-C. Kao, A. J. Kalyanapu, S. K. Ghafoor, K. J. Evans, E. Madadi Kandjani, and B. R. Hodges (2020), High Performance Computing in Water Resources Hydrodynamics, *J. Hydroinform.*, *22*(5), 1217–1235, https://doi.org/10.2166/hydro.2020.163.
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[41] Yang, Y., M. Pan, H. E. Beck, C. K. Fisher, R. E. Beighley, S.-C. Kao, Y. Hong, and E. F. Wood (2019), In Quest of Calibration Density and Consistency in Hydrologic Modeling: Distributed Parameter Calibration against Streamflow Characteristics, *Water Resour. Res.*, *55*, 7784–7803, https://doi.org/10.1029/2018WR024178.
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1950–2010, *Environ. Res. Lett.*, *13*(5), https://doi.org/10.1088/1748-9326/aabb41.
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[160] Tavakoly, A. A., J. W. Wegiel, Y. Yoon, A. Getirana, S. V. Kumar, M. P. Geheran, E. M. Kemp, S. Lytle, N. Memarsadeghi, A. W. Sisco, H. K. Levin, S. Gangrade, S.-C. Kao, and M. Best (2023), Recent Developments and Advancements in Global Hydrology Prediction and Projection (invited), American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.
[160] Buotte, P., M. Longo, M. Shi, E. Helmer, M. M. Thornton, S.-C. Kao, S. Martinuzzi, D. C. Morton, M. Keller, C. Koven, and L. M. Kueppers (2023), Land Use and Climate Effects on Secondary Tropical Forest Trajectories, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.
[159] Diaz, D., S. Gangrade, G. R. Ghimire, S.-C. Kao, L. Fischer, M. Christian, N. S. Rao, and J. Thomas (2023), Estimating Future Risks of Hydroclimatic Extremes and their Impacts on US Hydropower Reservoirs in a Warming Climate, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.
[157] Ghimire, G. R., S.-C. Kao, and S. Gangrade (2023), Advancing Streamflow Reanalysis in the Conterminous United States: Leveraging Multiple Forcings to Enhance Peak Flow Dynamics, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.
[156] DeNeale, S. T., S.-C. Kao, C. H. Hansen, and A. Chu (2023), Development Potential for Renewable Hydropower Generation in Existing US Water Conduits, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.
[155] Wang, D., P. Schwartz, F. Yuan, S.-C. Kao, M. M. Thornton, D. M. Ricciuto, and P. E. Thornton (2023), Developing Ultrahigh Resolution E3SM Land Model on Large Supercomputers, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.
[154] Yuan, F., B. N. Sulman, J. Kumar, S.-C. Kao, and A. L. Breen (2023), Interaction of High-Resolution Forcing and New Arctic Plant Functional Types on ELM Simulated Snow Seasonality in Seward Peninsula Region of Alaska, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.
[153] Bhanja, S. N., D. Singh, S. Gangrade, and S.-C. Kao (2023), Assessing the Impacts of Climate

Change on Sedimentation and Reservoir Operations: A Tennessee River Basin Case Study, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.

[151] Rastogi, D., S.-C. Kao, and M. Ashfaq (2023), Evaluating Widespread and Persistent Temperature Extremes: Implications for the United States Electric Grid Infrastructure, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.

[150] Zhao, B., S.-C. Kao, C. Pearson, J. L. Huntington, K. Holmes, G. H. Allen, M. Shao, A. Yadav, and H. Gao (2023), Meteorological Drivers and the Trend of Extreme Daily Reservoir Evaporation in Western United States, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.

[149] Morales Hernández, M., D. Lassiter, S. Gangrade, S.-C. Kao, and J. Fernández Pato (2023), TRITON-SWMM: A Proof-of-Concept 1D/2D Hydrodynamic Model Coupling for Better Urban Flooding Simulation and Stormwater Management, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.

[148] Turner, S. W. D., G. R. Ghimire, C. H. Hansen, and S.-C. Kao (2023), Drivers of Long Term Trend in U.S. Hydropower Utilization Over the Past Four Decades, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.

[147] Gangrade, S., S.-C. Kao, G. R. Ghimire, M. Morales Hernández, and M. E. Kelleher (2023), Towards the Development of a Climate-Informed Flood Vulnerability Assessment Framework for Department of Defense (DoD) Installations, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.

[146] Zhang, L., H. J. Rubin, J. S. Fu, R.-Y. Chien, and S.-C. Kao (2023), Accurate Risk Assessment of Drought in the U.S. Through Dynamic Downscaling Methods, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.

[145] Tseng, C.-Y., S. W. D. Turner, C. Montgomery, S. Gangrade, M. P. Massey, K. M. Stewart, and S.-C. Kao (2023), Sensitivity of Thermal Stratification in Two Southeastern Reservoirs in Response to Changes in Long-Term Temperature and Flow Discharge, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.

[144] Taysi, H., Y.-C. E. Yang, X. Pu, M. Rahnemoonfar, S. Gangrade, and S.-C. Kao (2023), Implementation of Urban Drainage Networks into a Machine Learning-based 2D Hydrodynamic Surrogate Model, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.

[143] Pflug, J. M., S. V. Kumar, B. Livneh, E. D. Gutmann, S. Gangrade, S.-C. Kao, and S. Rahimi (2023), Testing Coherence Across Ensembles of Statistically Downscaled Montane Snow Projections, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.

[142] Fan, M., S. Gangrade, S. Liu, S.-C. Kao, and D. Lu (2023), Enhancing Multi-Step Reservoir Inflow Forecasting: A Time-Variant Machine Learning Approach with Interpretability Analysis, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.

[141] Lytle, S. E., J. L. Gutenson, A. A. Tavakoly, S. Arias Roman, and S.-C. Kao (2023), Using Downscaled National Hydrologic Projections to Assess Climate Change-Induced Scour Risk to Bridges, American Geophysical Union 2023 Fall Meeting, December 11–15, San Francisco, CA.

[140] Gangrade, S., S.-C. Kao, G. R. Ghimire, M. Morales Hernández, and M. E. Kelleher (2023), Developing a Hierarchical Modeling Framework to Assess Climate Change-Induced Flood Vulnerability at Department of Defense (DoD) Installations, DoD Energy and Environment Innovation Symposium, November 28–December 1, Arlington, VA.

[139] Gangrade, S., G. R. Ghimire, S.-C. Kao, M. Morales Hernández, M. E. Kelleher, and A. J. Kalyanapu (2023), Scalable and Efficient Hydrodynamic Inundation Modeling for the 2019 Midwestern US Flood, SimHydro 2023, November 8–10, Chatou, France.

[138] Bensi, M. T., S. Mohammadi, Z. Liu, M. L. Carr, S. T. DeNeale, J. Kanney, S.-C. Kao, N. Nadal-Caraballo, and E. Yegorova (2023), Development of a Graded Bayesian Approach to Assess Compound Coastal Hazards, International Expert Workshop on the Safety Assessment

of Nuclear Installations for Combinations of External Hazards, September 11–13, Fontenay-aux-Roses, France.

[137] Wang, D., F. Yuan, P. Schwartz, S.-C. Kao, M. M. Thornton, D. M. Ricciuto, P. E. Thornton (2023), An Efficient Data Toolkit for Ultrahigh-Resolution E3SM Land Simulation on Massively Parallel Processing Systems, the 25th International Congress on Modelling and Simulation, July 9–14, Darwin, Northern Territory, Australia.

[136] Gangrade, S., G. R. Ghimire, S.-C. Kao, M. Morales Hernández, M. E. Kelleher, and A. J. Kalyanapu (2023), Retrospective Reconstruction of the 2019 Midwestern Flood Inundation Dynamics, World Environmental & Water Resources Congress 2023, May 21–24, Henderson, NV.

[135] Bhuyian, M. N. M., G. R. Ghimire, S. Gangrade, S.-C. Kao, and D. Blackwood (2023), Evaluating Changes in Design Flow for Road-Stream Crossings in West Tennessee using CMIP6-Based Hydroclimate Projections, World Environmental & Water Resources Congress 2023, May 21–24, Henderson, NV.

[134] Lu, D., S. Gangrade, and S.-C. Kao (2023), An Uncertainty-Aware, Machine Learning-Enabled Reservoir Inflow Forecast Model, World Environmental & Water Resources Congress 2023, May 21–24, Henderson, NV.

[133] Ghimire, G. R., S. Gangrade, and S.-C. Kao (2023), CMIP6-Informed Flood Hazard and Uncertainty Assessment for Dam Safety Evaluation, World Environmental & Water Resources Congress 2023, May 21–24, Henderson, NV.

[132] Massey, M. P., J. Quebbeman, S. Carney, S.-C. Kao, and D. Rastogi (2023), Assessing Climate Change Impacts to River Management Operations in the Tennessee Valley, United States Society on Dams 2023 Annual Meeting, April 17–21, Charleston, SC.

[131] Nur, F., G. K. Darkwah, S. Gangrade, G. R. Ghimire, S.-C. Kao, and A. J. Kalyanapu (2023), Application of Triton-Lite, A Deep-Learning Surrogate Model for Flood Risk Management, 2023 Tennessee Water Resources Symposium, April 12–14, Burns, TN.

[130] Ghimire, G. R., S. Gangrade, S.-C. Kao, M. Morales Hernández, M. E. Kelleher, A. J. Kalyanapu, Y. Yoon, A. Getirana, S. V. Kumar, and J. W. Wegiel (2023), Hydrodynamic Inundation Simulation for Large Global Watersheds – A Proof of Concept, the 103rd American Meteorological Society Annual Meeting, January 8–12, Denver, CO.

[129] Kao, S.-C., M. Ashfaq, D. Rastogi, S. Gangrade, R. Uría Martínez, N. Voisin, A. Fernandez, T. Zhou, W. Xu, H. Gao, and B. Zhao (2022), Effects of Climate Change on US Federal Hydropower Generation – CMIP6-Based Assessment with Focus on Understanding the Uncertainty, American Geophysical Union 2022 Fall Meeting, December 12–16, Chicago, IL.

[128] Mohammadi, S., M. T. Bensi, S.-C. Kao, S. T. DeNeale, J. Kanney, E. Yegorova, and M. L. Carr (2022), Compound Flood Hazard Assessment Using a Bayesian Framework, American Geophysical Union 2022 Fall Meeting, December 12–16, Chicago, IL.

[127] Gangrade, S., G. R. Ghimire, S.-C. Kao, M. Morales Hernández, M. E. Kelleher, and A. J. Kalyanapu (2022), Towards the Development of a High-Resolution Historical Flood Inundation Reanalysis Dataset for the Conterminous United States, American Geophysical Union 2022 Fall Meeting, December 12–16, Chicago, IL.

[126] Hansen, C. H., S. T. DeNeale, J. Feyyisa, G. Oladosu, and S.-C. Kao (2022), Characterizing Development/Retrofit Projects Using Existing Non-Powered Infrastructure, American Geophysical Union 2022 Fall Meeting, December 12–16, Chicago, IL.

[125] Iftikhar, B., S. Gangrade, D. Lu, S.-C. Kao, S. L. Painter, and E. Coon (2022), Simulating Operation Behaviors of Cascade Reservoirs Using Physics-Based Machine Learning Models: A Case Study for Gunnison River Basin, American Geophysical Union 2022 Fall Meeting, December 12–16, Chicago, IL.

[124] Sisco, A. W., A. A Tavakoly, and S.-C. Kao (2022), Continental-Scale Changes in Discharge of the Mississippi River Basin in Response to Future Hydroclimate Projections, American Geophysical Union 2022 Fall Meeting, December 12–16, Chicago, IL.

[123] Feyyisa, J., S.-C. Kao, S. T. DeNeale, and B. M. Pracheil (2022), Low Flow Characteristics for Regulated and Unregulated Streams in North Carolina and Prediction Using Climate Signals, American Geophysical Union 2022 Fall Meeting, December 12–16, Chicago, IL.

[122] Ghimire, G. R., C. H. Hansen, S. Gangrade, and S.-C. Kao (2022), Insights from Dayflow: A Spatiotemporally Continuous Historical Streamflow Reanalysis Dataset for the Conterminous United States, American Geophysical Union 2022 Fall Meeting, December 12–16, Chicago, IL.

[121] Zhang, L., H. J. Rubin, J. S. Fu, D. Rastogi, S.-C. Kao, and M. Ashfaq (2022), Heat Wave Predictions with Dynamical and Statistical Downscaling Methods, American Geophysical Union 2022 Fall Meeting, December 12–16, Chicago, IL.

[120] Ghimire, G. R., S. Gangrade, S.-C. Kao, M. Morales Hernández, A. A. Tavakoly, J. L. Gutenson, K. H. Sparrow, G. K. Darkwah, A. J. Kalyanapu, and M. L. Follum (2022), Unraveling an Extreme Flooding Event Using High-Performance Computing: A Case Study for the 2021 Middle Tennessee Flooding, Frontiers in Hydrology Meeting 2022, June 19–24, San Juan, PR.

[119] Kao, S.-C., S. T. DeNeale, M. T. Bensi, S. Mohammadi, E. Yegorova, J. Kanney, and M. L. Carr (2022), Probabilistic Assessment of Multi-Mechanism Floods in Inland Watersheds Due to Snowmelt-Influenced Extreme Streamflow Events, World Environmental & Water Resources Congress 2022, June 5–8, Atlanta, GA.

[118] Darkwah, G. K., A. J. Kalyanapu, S. Gangrade, S.-C. Kao, M. B. Sharif, S. K. Ghafoor, M. Morales Hernández, and G. R. Ghimire (2022), The Applicability of Deep Learning Techniques in Developing a Surrogate Flood Inundation Model for Operational Needs, World Environmental & Water Resources Congress 2022, June 5–8, Atlanta, GA.

[117] Gangrade, S., D. Rastogi, S.-C. Kao, and M. Ashfaq (2022), Evaluation of CMIP6 based Multi-Model Ensemble Hydroclimate Projections and their Associated Uncertainties over the Conterminous United States, World Environmental & Water Resources Congress 2022, June 5–8, Atlanta, GA.

[116] Kao, S.-C., M. Ashfaq, D. Rastogi, S. Gangrade, R. Uría Martínez, A. Fernandez, N. Voisin, T. Zhou, W. Xu, H. Gao, and B. Zhao (2022), Effects of Climate Change on U.S. Federal Hydropower Generation, 2022 Conference on Innovations in Climate Resilience, March 29–30, Columbus, OH.

[115] Shao, M., N. Fernando, J. Zhu, S.-C. Kao, G. Zhao, and Huilin Gao (2022), Evaluating Future Surface Water Availability Considering Changes in Reservoir Evaporation and Streamflow Due to Climate Change, the 102nd American Meteorological Society Annual Meeting, January 23–27, Houston, TX.

[114] Kao, S.-C., L. George, K. Johnson, A. K. Sampson, M. Moutenot, K. Altamirano, K. Garcia, C. H. Hansen, S. T. DeNeale, M. Sciubba, and C. Vezina (2021), Assessing Hydropower Potential in National Water Conduits: Challenges and Opportunities (invited), American Geophysical Union 2021 Fall Meeting, December 13–17, New Orleans, LA.

[113] Yuan, F., S.-C. Kao, T. K. Tesfa, D. Wang, P. Schwartz, M. M. Thornton, P. E. Thornton, and S. D. Wullschleger (2021), High-Resolution Forcing Driven Offline ELM Snow Processing and Comparing to Observations in Two Alaska Tundra Regions, American Geophysical Union 2021 Fall Meeting, December 13–17, New Orleans, LA.

[112] Lytle, S. E., A. A. Tavakoly, J. L. Gutenson, K. H. Sparrow, M. P. Geheran, and S.-C. Kao (2021), Investigating the Impact of Climate Change on Extreme Flood Conditions Across the Mississippi River Basin, American Geophysical Union 2021 Fall Meeting, December 13–17, New Orleans, LA.

[111] Li, X., D. Fu, P. Chang, J. W. Nielson-Gammon, S. Gangrade, M. Morales Hernández, S.-C. Kao, N. Voisin, and H. Gao (2021), Evaluating the Potential Impacts from Climate Change on Compound Flooding at a Coastal Watershed, American Geophysical Union 2021 Fall Meeting, December 13–17, New Orleans, LA.

[110] Shi, M., M. Keller, C. Koven, L. M. Kueppers, J. Needham, R. G. Knox, S.-C. Kao, P. E. Thornton, M.

M. Thornton, and L. R. Leung (2021), Studies of Hurricane Disturbance and Recovery in Puerto Rico Using ELM-FATES, American Geophysical Union 2021 Fall Meeting, December 13–17, New Orleans, LA.

[109] Gangrade, S., D. Lu, S.-C. Kao, S. L. Painter, and E. Coon (2021), Evaluation of Machine Learning Assisted Reservoir Operation Models for Long-Term Water Management Simulation, American Geophysical Union 2021 Fall Meeting, December 13–17, New Orleans, LA.

[108] Rastogi, D., S.-C. Kao, and M. Ashfaq (2021), How May the Choice of Downscaling Techniques and Meteorological Reference Observations Affect Future Hydroclimate Projections?, American Geophysical Union 2021 Fall Meeting, December 13–17, New Orleans, LA.

[107] Darkwah, G. K., A. J. Kalyanapu, S. Gangrade, S.-C. Kao, M. B. Sharif, S. K. Ghafoor, and M. Morales Hernández (2021), Development of a Deep Learning Surrogate Model in the TRITON Inundation Modeling Framework, American Geophysical Union 2021 Fall Meeting, December 13–17, New Orleans, LA.

[106] Mohammadi, S., M. T. Bensi, S.-C. Kao, S. T. DeNeale, E. Yegorova, J. Kanney, and M. L. Carr (2021), Probabilistic Flood Hazard Assessment of Multi-Mechanism Floods Using a Computationally Tractable Bayesian-Motivated Approach, American Geophysical Union 2021 Fall Meeting, December 13–17, New Orleans, LA.

[105] Mohammadi, S., M. T. Bensi, S.-C. Kao, S. T. DeNeale, J. Kanney, E. Yegorova, and M. L. Carr (2021), Multi-Mechanism Flood Hazard Assessment in Coastal Areas, Society for Risk Analysis 2021, December 5–9 (virtual meeting).

[104] Lu, D., S. Liu, D. M. Ricciuto, G. Konapala, S. L. Painter, and S.-C. Kao (2021), Physics-Informed, Interpretable Machine Learning for Improving Terrestrial Ecosystem Predictions, 11th International Conference on Ecological Informatics (ICEI 2020+1), November 9–13 (virtual meeting).

[103] Kao, S.-C., S. T. DeNeale, E. Yegorova, J. Kanney, and M. L. Carr (2021), Factors Affecting the Variability of Precipitation Areal Reduction Factors in the Conterminous United States, World Environmental & Water Resources Congress 2021, June 7–11 (virtual meeting).

[102] Hansen, C. H., and S.-C. Kao (2021), Approaches to Quantify Energy Storage at National Hydropower Reservoirs, World Environmental & Water Resources Congress 2021, June 7–11 (virtual meeting).

[101] Gangrade, S., M. Morales Hernández, A. J. Kalyanapu, T. T. Dullo, and S.-C. Kao (2021), Applications of a High-Resolution, Multi-GPU Accelerated 2D Hydrodynamic Flood Model (TRITON) for Large-Scale Floodplain Modeling, World Environmental & Water Resources Congress 2021, June 7–11 (virtual meeting).

[100] Thornton, M. M., R. Shrestha, P. E. Thornton, S.-C. Kao, Y. Wei, and B. E. Wilson (2021), Gridded Daily Weather Data for North America with Comprehensive Uncertainty Quantification – Daymet Version 4, the 7th North American Carbon Program Open Science Meeting, March (virtual meeting).

[99] Kao, S.-C., M. Morales Hernández, S. Gangrade, A. J. Kalyanapu, and T. T. Dullo (2020), Towards the Development of An Operational Hydrodynamic Flood Simulation Capability – A Multi-GPU TRITON Framework, American Geophysical Union 2020 Fall Meeting, December 1–17 (virtual meeting).

[98] Painter, S. L., G. Konapala, D. Lu, and S.-C. Kao (2020), Combining Data-Driven Machine-Learning and Process-Based Simulations for Streamflow Simulation: Preliminary Results from the ExaSheds Project, American Geophysical Union 2020 Fall Meeting, December 1–17 (virtual meeting).

[97] Ghanbari, M., M. Arabi, and S.-C. Kao (2020), Assessment of Compound Coastal-Riverine Flooding Risks Under Climate Change along the U.S. Coasts, American Geophysical Union 2020 Fall Meeting, December 1–17 (virtual meeting).

[96] Hansen, C. H., and S.-C. Kao (2020), Historical Streamflow Reanalysis at the National Scale

using Hierarchical Routing and Data Assimilation, American Geophysical Union 2020 Fall Meeting, December 1–17 (virtual meeting).

[95] Thornton, M. M., R. Shrestha, P. E. Thornton, S.-C. Kao, Y. Wei, and B. E. Wilson (2020), Improvements in Daymet Continental-Scale Gridded Daily Precipitation and Temperature Estimates, American Geophysical Union 2020 Fall Meeting, December 1–17 (virtual meeting).

[94] Wegiel, J. W., S. V. Kumar, Y. Yoon, A. Getirana, C. Peters-Lidard, A. A. Tavakoly, M. Wahl, J. B. Eylander, S.-C. Kao, S. Gangrade, K. J. Evans, F. H. Ruggiero, K. A. McCormack, H. K. Levin, V. Huening, M. Best, and S. Chen (2020), LIS-Hydro: Authoritative Source for OCONUS Hydro-Intelligence, American Geophysical Union 2020 Fall Meeting, December 1–17 (virtual meeting).

[93] Lytle, S. E., M. P. Geheran, E. Yeates, S.-C. Kao, A. A. Tavakoly, and J. Lewis (2020), Analyzing the Effect of Climate Change on Extreme Flood Events in the Mississippi River Basin, American Geophysical Union 2020 Fall Meeting, December 1–17 (virtual meeting).

[92] Zhao, B., G. Zhao, S.-C. Kao, Y. Li, and H. Gao (2020), Evaluating Future Hydrological Drought under A Changing Climate using A Reservoir Storage Drought Index in the United States, American Geophysical Union 2020 Fall Meeting, December 1–17 (virtual meeting).

[91] Sudershan, G., and S.-C. Kao (2020), Multi-Model Future Hydroclimate Projections using Downscaled CMIP6 over the Conterminous United States, American Geophysical Union 2020 Fall Meeting, December 1–17 (virtual meeting).

[90] Mohammadi, S., M. T. Bensi, S.-C. Kao, S. T. DeNeale, E. Yegorova, J. Kanney, and M. L. Carr (2020), Coastal Probabilistic Flood Hazard Assessment Due to Coincident Occurrence of Tropical Cyclone-Induced Surge and Precipitation, American Geophysical Union 2020 Fall Meeting, December 1–17 (virtual meeting).

[89] Li, X., C. Rankin, S. Gangrade, G. Zhao, K. Lander, N. Voisin, S.-C. Kao, M. Shao, and H. Gao (2020), Quantifying Precipitation, Streamflow, and Floodplain Forecasting Skills during Extreme Weather Events in Brays Bayou, Houston, Texas, American Geophysical Union 2020 Fall Meeting, December 1–17 (virtual meeting).

[88] Shao, M., N. Fernando, J. Zhu, G. Zhao, S.-C. Kao, and H. Gao (2020), Estimating Future Surface Water Availability with Reservoir Evaporation and Hydrological Drought Considered under CMIP6 Scenarios, American Geophysical Union 2020 Fall Meeting, December 1–17 (virtual meeting).

[87] Lu, D., G. Konapala, S. L. Painter, and S.-C. Kao (2020), Streamflow Predictions in Data-Scarce Basins using Bayesian and Physics-Informed Machine Learning Models, American Geophysical Union 2020 Fall Meeting, December 1–17 (virtual meeting).

[86] Morales Hernández, M., M. B. Sharif, S.-C. Kao, and K. J. Evans (2020), A Computationally Efficient Wet/Dry Front Tracking Technique for Large-Scale Multi-GPU Hydrodynamic Modeling, Computational Methods in Water Resources 2020, December 14–17 (virtual meeting).

[85] Thornton, M. M., R. Shrestha, P. E. Thornton, S.-C. Kao, Y. Wei, and B. E. Wilson (2020), Improvements in Daymet Continental-Scale Gridded Daily Temperature and Precipitation Estimates, 2020 Ecological Society of America Annual Meeting, August 2–7 (virtual meeting).

[84] Sharif, M. B., S. K. Ghafoor, T. H. Hines, M. Morales Hernández, K. J. Evans, S.-C. Kao, A. J. Kalyanapu, T. T. Dullo, and S. Gangrade (2020), Performance Evaluation of a Two Dimensional Flood Model on Heterogeneous High-Performance Computing Architectures, *Proceedings of the 2020 Platform for Advanced Scientific Computing Conference (PASC20)*, Article No. 8, 1–9, https://doi.org/10.1145/3394277.3401852 (peer-reviewed).

[83] Gangrade, S., S.-C. Kao, and R. A. McManamay (2019), Multi-Model, Multi-Resolution Hydroclimate Projections and Associated Uncertainties: A Case Study for the Alabama-Coosa-Tallapoosa River Basin in the Southeastern United States, American Geophysical Union 2019 Fall Meeting, December 9–13, San Francisco, CA.

[82] DeNeale, S. T., S.-C. Kao, E. Yegorova, J. Kanney, and M. L. Carr (2019), A Watershed-Based Assessment of Precipitation Areal Reduction Factors in the Ohio River Basin, American Geophysical Union 2019 Fall Meeting, December 9–13, San Francisco, CA.

[81] Konapala, G., and S.-C. Kao (2019), Understanding the Connectivity of Hydrologic Model Processes through An Information Theory Approach, American Geophysical Union 2019 Fall Meeting, December 9–13, San Francisco, CA.

[80] Dullo, T. T., S. Gangrade, M. B. Sharif, M. Morales Hernández, A. J. Kalyanapu, S. K. Ghafoor, S.-C. Kao, and K. J. Evans (2019), Modeling of Climate Change Induced Flood Risk in the Conasauga River Basin, American Geophysical Union 2019 Fall Meeting, December 9–13, San Francisco, CA.

[79] Holmes, C., S. Gangrade, G. Zhao, K. Lander, N. Voisin, S.-C. Kao, M. Shao, and H. Gao (2019), Evaluating the Effects of Forecast Lead Time on Streamflow and Inundation Predictions in Brays Bayou, Houston, Texas through Coupled Hydrologic-Hydraulics Models, American Geophysical Union 2019 Fall Meeting, December 9–13, San Francisco, CA.

[78] Mao, J., W. Forbes, D. M. Ricciuto, S.-C. Kao, X. Shi, A. A. Tavakoly, M. Jin, W. Guo, T. Zhao, Y. Wang, P. E. Thornton, and F. M. Hoffman (2019), Streamflow in the Columbia River Basin: Quantifying Changes over the Period 1951–2008 and Determining the Drivers of those Changes, American Geophysical Union 2019 Fall Meeting, December 9–13, San Francisco, CA.

[77] Fang, Z., E. T. Coon, A. Jan, S.-C. Kao, G. Konapala, and S. L. Painter (2019), Exploring Climate Change Effects on Water Flow Dynamics in a Snow-Dominated Watershed Using a Physically Based Integrated Model, American Geophysical Union 2019 Fall Meeting, December 9–13, San Francisco, CA.

[76] Heidari, H., M. Arabi, T. Warziniack, and S.-C. Kao (2019), Changes in Hydroclimatic Characteristics of River Basins in the U.S over the 21st Century, American Geophysical Union 2019 Fall Meeting, December 9–13, San Francisco, CA.

[75] Mohammadi, S., M. T. Bensi, S.-C. Kao, S. T. DeNeale, M. L. Carr, and J. Kanney (2019), A Review of Joint Probability Studies Used for Estimation of Flood Hazards Due to Combinations of Flooding Mechanisms, Society for Risk Analysis 2019, December 8–12, Arlington, VA.

[74] Morales Hernández, M., M. B. Sharif, S. Gangrade, T. T. Dullo, S.-C. Kao, A. J. Kalyanapu, S. K. Ghafoor, and K. J. Evans (2019), High Performance Computing in Hydraulics: the New Era of Flood Forecasting, The International Workshop on Modelling Hydrodynamics for Water Resources, June 17–20, University of Zaragoza, Zaragoza, Spain.

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[72] Gangrade, S., M. Shao, S.-C. Kao, G. Zhao, and H. Gao (2019), Robustness of Reservoir Operations in a Changing Environment – A Case Study for Allatoona Dam in Alabama-Coosa-Tallapoosa (ACT) River Basin, World Environmental & Water Resources Congress 2019, May 19–23, Pittsburgh, PA.

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American Geophysical Union 2014 Fall Meeting, December 14–19, San Francisco, CA.

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[19] Kao, S.-C., B. S. Naz, M. Ashfaq, and R. Mei (2013), Refining the Resolution of Future Energy-Water Projection through High Performance Computing (invited), American Geophysical Union 2013 Fall Meeting, December 9–13, San Francisco, CA.

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[15] Kao, S.-C., and N.-B. Chang (2012), Multivariate Flood Frequency Analysis through Copulas in a Partially Gauged Watershed, World Environmental & Water Resources Congress 2012, May 20–24, Albuquerque, NM.

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Palm Springs, CA.
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[10] Kim, H. K., S.-C. Kao, C. Liu, X. Cui, and B. L. Bhaduri (2011), Reconstruction of Spatial Distribution of Travelers for Activity-Based Traffic Demand Model Using LandScan USA Data Set, the 2011 Association of American Geographers Annual Meeting, April 12–16, Seattle, WA.
[9] Kao, S.-C., and A. R. Ganguly (2010), Quantifying and Comparing the Intensification of Extreme Rainfall Frequency from NCEP and ERA40 Reanalysis Data, the 90th American Meteorological Society Annual Meeting, January 17–21, Atlanta, GA.
[8] Kao, S.-C., and A. R. Ganguly (2009), Intensification of Droughts in a Warming Environment: Trends, Uncertainties and Possible Impacts, American Geophysical Union 2009 Fall Meeting, December 14–18, San Francisco, CA.
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[5] Govindaraju, R. S., and S.-C. Kao (2008), Multivariate Precipitation Analyses Using Copulas, American Geophysical Union 2008 Joint Assembly, May 27–30, Fort Lauderdale, FL.
[4] Kao, S.-C., and R. S. Govindaraju (2007), Constructing Design Rainfall Hyetographs Using Trivariate Plackett Family of Copulas, American Geophysical Union 2007 Fall Meeting, December 10–14, San Francisco, CA.
[3] Kao, S.-C., and R. S. Govindaraju (2007), Statistical Analysis of Extreme Rainfall Events over Indiana, USA, World Environmental & Water Resources Congress 2007, May 15–19, Tampa, FL.
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Research Projects

Oct 2023–present	Effects of Climate Change on Federal Hydropower – The Fourth 9505 Assessment. Sponsor: Water Power Technologies Office, U.S. Department of Energy. Role: Principal Investigator.
Oct 2023–present	Cooperative Institute for Research Operations in Hydrology (CIROH). Sponsor: Climate Program Office, National Oceanic and Atmospheric Administration. Role: Co-Investigator (Principal Investigator: Steven J. Burian, University for Alabama).
Oct 2023–present	Aligning Climate Analysis for Power Systems (ALCAPS). Sponsor: Grid Modernization Initiative, U.S. Department of Energy. Role: Co-Investigator (Principal Investigator: G. Buster, NREL).
May 2023–present	A Demonstration of Climate-Informed Flood Vulnerability Assessment for Department of Defense Installations. Sponsor: Environmental Security Technology Certification Program (ESTCP), U.S. Department of Defense. Role:

	Co-Investigator (Principal Investigator: S. Gangrade, ORNL).
Mar 2023-present	A Roadmap to Intelligent Watersheds: Evaluating Knowledge Gaps & Feasibility. Sponsor: Water Power Technologies Office, U.S. Department of Energy. Role: Co-Investigator (Principal Investigator: C. H. Hansen, ORNL).
Oct 2022–present	Puerto Rico Hydropower Resource Assessment, Oak Ridge National Laboratory. Sponsor: Water Power Technologies Office, U.S. Department of Energy. Role: Co-Investigator (Principal Investigator: S. T. DeNeale, ORNL).
Jun 2022–present	DOE-TVA Climate R&D Collaboration, Oak Ridge National Laboratory. Sponsor: Water Power Technologies Office, U.S. Department of Energy. Role: Co-Investigator (Principal Investigator: S. Turner, ORNL).
July 2018–present	Air Force / Oak Ridge National Laboratory R&D Collaboration. Sponsor: Numerical Weather Modeling Program, U.S. Air Force. Role: Co-Investigator (Principal Investigator: K. J. Evans, ORNL).
Oct 2021–Sep 2023	Ecosystem Resilience to Thermal Extremes: Urbanization Impacts. Sponsor: Laboratory Directed Research and Development Program, Oak Ridge National Laboratory. Role: Advisor (Principal Investigator: J. Mao, ORNL).
Oct 2019–Sep 2023	National Conduit Hydropower Resource Assessment. Sponsor: Water Power Technologies Office, U.S. Department of Energy. Role: Principal Investigator.
Apr 2019–Sep 2023	ExaSheds: Advancing Watershed System Science using Machine Learning for Data-Intensive Extreme-Scale Simulation. Sponsor: Biological and Environmental Research Program, U.S. Department of Energy. Role: Co-Investigator (Principal Investigator: S. L. Painter, ORNL).
Oct 2017–Sep 2023	Effects of Climate Change on Federal Hydropower – The Third 9505 Assessment. Sponsor: Water Power Technologies Office, U.S. Department of Energy. Role: Principal Investigator.
Feb 2015–Sep 2022	Review of Site-Specific Probable Maximum Precipitation Analyses. Sponsor: Office of New Reactors, U.S. Nuclear Regulatory Commission. Role: Co-Investigator (Principal Investigators: D. B. Watson and S. T. DeNeale, ORNL).
Oct 2018–Sep 2021	Methods for Estimating Joint Probabilities of Coincident and Correlated Flooding Mechanisms for Nuclear power Plant Flood Hazards Assessments. Sponsor: Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission. Role: Principal Investigator.
Oct 2017–Mar 2020	Application of Point Precipitation Frequency Estimates to Watersheds. Sponsor: Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission. Role: Principal Investigator.
Jul 2017–Jul 2018	Developing New Hydropower Using Existing Non-Powered Dams. Sponsor: Small Business Vouchers Pilot Program, U.S. Department of Energy. Role: Principal Investigator.
Apr 2018–Sep 2018	Near Real-Time High-Resolution Gridded Weather Data System as New Force for Energy and Environmental Research. Sponsor: Climate Change Science Institute, Oak Ridge National Laboratory. Role: Co-Investigator (Principal Investigator: Yaxing Wei, ORNL).
Feb 2010–Sep 2018	National Hydropower Asset Assessment Program. Sponsor: Water Power Technologies Office, U.S. Department of Energy. Role: Principal Investigator.
Oct 2013–Mar 2017	Effects of Climate Change on Federal Hydropower – The Second 9505 Assessment. Sponsor: Water Power Technologies Office, U.S. Department of Energy. Role: Principal Investigator.
Mar 2016–Sep 2016	Improve the Connection Between Earth System Models and Human Water Resources Alterations. Sponsor: Climate Change Science Institute, Oak Ridge

	National Laboratory. Role: Principal Investigator.
Oct 2014–Sep 2016	National Extreme Events Data and Research Center (NEED) – Transforming the National Capability for Resilience to Extreme Weather and Climate Events. Sponsor: Laboratory Directed Research and Development Program, Oak Ridge National Laboratory. Role: Co-Investigator (Principal Investigator: D. P. Kaiser, ORNL).
Oct 2014–Sep 2016	Fine-Resolution Modeling of Urban-Energy Systems' Water Footprint in River Networks. Sponsor: Laboratory Directed Research and Development Program, Oak Ridge National Laboratory. Role: Co-Investigator (Principal Investigator: R. A. McManamay, ORNL).
Sep 2015–Mar 2016	Scoping Analytical Tools and Methods for Vulnerability Analysis of Linked Electricity Generation and River Basin Systems. Sponsor: Office of Energy Policy and Systems Analysis, U.S. Department of Energy. Role: Principal Investigator.
Oct 2013–Sep 2015	Toward the Development of an Integrated Energy-Water Risk Assessment Tool for Probable Maximum Precipitation and Flood. Sponsor: Laboratory Directed Research and Development Program, Oak Ridge National Laboratory. Role: Principal Investigator.
Oct 2011–Sep 2013	A Hierarchical Regional Modeling Framework for Decadal-Scale Hydro-Climatic Predictions and Impact Assessments. Sponsor: Laboratory Directed Research and Development Program, Oak Ridge National Laboratory. Role: Co-Investigator (Principal Investigator: M. Ashfaq, ORNL).
Oct 2010–Sep 2012	Effects of Climate Change on Federal Hydropower – The First 9505 Assessment. Sponsor: Water Power Technologies Office, U.S. Department of Energy. Role: Principal Investigator.
Feb 2010–Jan 2011	Enhancing Climate Impact Integrated Assessment for Water through Climate Informatics. Sponsor: Laboratory Directed Research and Development Program, Oak Ridge National Laboratory. Role: Co-Investigator (Principal Investigator: W. Christopher Lenhardt, ORNL).
Feb 2009–Jan 2010	Uncertainty Assessment and Reduction for Climate Extremes and Climate Change Impacts. Sponsor: Laboratory Directed Research and Development Program, Oak Ridge National Laboratory. Role: Co-Investigator (Principal Investigator: A. R. Ganguly, ORNL).
Jan 2006–Jan 2009	The I-70 Greenfield Rest Area Wetland Projects. Sponsor: Indiana Department of Transportation. Role: Participant (Principal Investigator: R. S. Govindaraju, Purdue University).
Aug 2004–Jul 2005	Statistical Analysis of Indiana Rainfall Data. Sponsor: Indiana Department of Transportation. Role: Participant (Principal Investigator: A. R. Rao, Purdue University).

Service

Reviewer – Scientific and Engineering Journals

- *Advances in Water Resources*
- *British Journal of Environmental and Climate Change*
- *Climate Change*
- *Climate Risk Management*
- *Environmental Research Letters*
- *Geophysical Research Letters*
- *Hydrological Processes*

- *Hydrological Sciences Journal*
- *Hydrology and Earth System Sciences Discussions*
- *International Journal of Climatology*
- *Irrigation and Drainage*
- *Journal of Computing in Civil Engineering*
- *Journal of Geophysical Research*
- *Journal of Earth System Science*
- *Journal of Hydrologic Engineering*
- *Journal of Hydrology*
- *Journal of Hydrometeorology*
- *Journal of the American Water Resources Association*
- *Meteorological Applications*
- *Natural Hazards*
- *Nature Climate Change*
- *Nature Communications*
- *Nature Scientific Reports*
- *Physics and Chemistry of the Earth*
- *Scientia Agricola*
- *Stochastic Environmental Research and Risk Assessment*
- *Theoretical and Applied Climatology*
- *Water Resources Research*
- *Water Security*

Reviewer – Proposals

- *National Science Foundation*
- *U.S. Bureau of Reclamation Science and Technology Program*
- *U.S. Dept. of Agriculture Small Business Innovation Research Program*
- *U.S. Dept. of Energy Small Business Innovation Research Program*
- *U.S. Dept. of Energy Water Power Technologies Office*
- *Louisiana Board of Regents*
- *CEATI International*

Student Advising and Mentorship Activities

- Ph.D. Advisor
  - Sudershan Gangrade, University of Tennessee, The Bredesen Center for Interdisciplinary Research and Graduate Education, 2017–2019
- Ph.D. Dissertation Committee
  - Ehsan Beigi, Louisiana State University, Department of Civil and Environmental Engineering, 2013–2015
- Post-Doctoral Research Associate
  - Dr. Ganesh Ghimire, Oak Ridge National Laboratory, 2021–present
  - Dr. Goutam Konapala, Oak Ridge National Laboratory, 2018–2020
  - Dr. Bibi S. Naz, Oak Ridge National Laboratory, 2013–2016
  - Dr. Abdoul Oubeidillah, Oak Ridge National Laboratory, 2011–2012
- Student Interns
  - Ellie Chao, University of South Carolina, 2019
  - Manqing Shao, Texas A&M University, 2018
  - Tigstu Dullo, Tennessee Technological University, 2015

- Gang Zhao, Texas A&M University, 2014–2015
- Brenna Elrod, University of Tennessee, Knoxville, 2013
- Clement Oigbokie II, University of Tennessee, Knoxville, 2012–2013
- Angela Pelle, University of Tennessee, Knoxville, 2012

Technical Association and Committee Services

- Member, Modernizing Probable Maximum Precipitation Estimation Committee, National Academies of Sciences, Engineering, and Medicine, 2023–2024.
- Member, Hydroclimate Technical Committee, Environmental and Water Resources Institute, American Society of Civil Engineers, 2012–present.
- Participant, PO.DAAC Cloud Early Adopters Program, 2019–2021.

Conference/Workshop Organizing

- Convener – "Advances in Large-scale Flood Modeling, Monitoring, Forecasting, Analysis, and Management", the 104th American Meteorological Society Annual Meeting
- Convener – "GC98. Secure and Sustainable Energy Production in the Face of Intensifying Hydroclimate Extremes in a Changing Environment", American Geophysical Union 2023 Fall Meeting
- Convener – "H108. Recent Advances in Large-Scale, High-Resolution Hydrologic and Flood Modeling, and Hydroclimatic Extremes Assessment", American Geophysical Union 2023 Fall Meeting
- Convener – "Recent Advances in Modeling, Monitoring, and Forecasting of Floods", the 103rd American Meteorological Society Annual Meeting
- Convener – "H32. Recent Advances in Large-Scale High-Resolution Hydrologic and Flood Modeling and Hydroclimatic Extremes Assessment", American Geophysical Union 2022 Fall Meeting
- Convener – "H35. Challenges and Opportunities for Hydropower Generation Under Climate Change", American Geophysical Union 2021 Fall Meeting
- Convener – "H226. Recent Advances in Large-Scale, High-Resolution Hydrologic and Flood Modeling Leveraging High-Performance Computing", American Geophysical Union 2020 Fall Meeting
- Convener – "H125. Statistical Characterization and Modeling of Precipitation Variability Across Scales", American Geophysical Union 2019 Fall Meeting
- Convener – "H100. Recent Advance in Large Scale, High Resolution Hydrologic and Flood Modeling for Intensified Extreme Events in a Changing Environment" and "H116. Statistical Characterization and Probabilistic Modeling of Precipitation Variability and Extremes Across Multiple Scales", American Geophysical Union 2018 Fall Meeting
- Session Organizer – "Modeling Energy-Water Systems in a Changing Climate" in the Hydro-Climate Symposium of World Environmental and Water Resources Congress, 2015 – 2017
- Program Committee – 2010 IEEE ICDM International Workshop on Spatial and Spatiotemporal Data Mining, December 14, Sydney, Australia.
- Program Committee – 2010 IEEE ICDM Workshop on Knowledge Discovery from Climate Data: Prediction, Extremes, and Impacts, December 14, Sydney, Australia.
- Scientific Committee – 2010 IAHS-STAHY International Workshop on Advances in Statistical Hydrology, May 23-25, Taormina, Italy.
- Program Committee – 2009 IEEE ICDM Workshop on Knowledge Discovery from Climate Data: Prediction, Extremes, and Impacts, December 6, Miami, FL.