

Shih-Chieh Kao, Ph.D.

Senior Research Staff	Email: kaos@ornl.gov
Program Manager, Water Power Program	Phone: (865) 576-1259
Group Leader, Water Resource Science & Engineering	Cell: (312) 560-1209
Environmental Sciences Division	Web: http://web.ornl.gov/~kaos
Oak Ridge National Laboratory	https://www.ornl.gov/waterpower
P.O. Box 2008, MS 6038, Oak Ridge, TN 37831-6038	ORCID: 0000-0002-3207-5328

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–July 2004	Full-Time Teaching Assistant, Department of Civil Engineering, National Taiwan University, Taipei, Taiwan

Honors / Certificates

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

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=newletter
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

- [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 Coastal 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>.
- [62] Mukherjee, S., A. K. Mishra, M. Ashfaq, and S.-C. Kao (2022), Relative Contribution of Anthropogenic Warming and Natural Climate Variability to Changes in Compound Drought and Heatwaves, *J. Hydrol.*, 605, 127396, <https://doi.org/10.1016/j.jhydrol.2021.127396>.
- [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>.
- [57] Heidari, H., M. Arabi, T. Warziniack, and S.-C. Kao (2021), Shifts in Hydroclimatology of U.S. Megaregions in Response to Climate Change, *Environ. Res. Commun.*, 3, 065002, <https://doi.org/10.1088/2515-7620/ac0617>.
- [56] Turner, S. W. D., K. Nelson, N. Voisin, V. Tidwell, A. Miara, A. Dyreson, S. Cohen, D. Mantena, J. Jin, P. Warnken, and S.-C. Kao (2021), A Multi-Reservoir Model for Projecting Drought Impacts on Thermoelectric Disruption Risk Across the Texas Power Grid, *Energy*, 231, 120892, <https://doi.org/10.1016/j.energy.2021.120892>.
- [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>.
- [47] Kao, S.-C., S. T. DeNeale, E. Yegorova, J. Kanney, and M. L. Carr (2020), Variability of Precipitation Areal Reduction Factors in the Conterminous United States, *J. Hydrol. X*, 9, 100064, <https://doi.org/10.1016/j.hydroa.2020.100064>.
- [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>.
- [42] Gangrade, S., S.-C. Kao, and R. A. McManamay (2020), Multi-model Hydroclimate Projections for the Alabama-Coosa-Tallapoosa River Basin in the Southeastern United States, *Nature Sci. Rep.*, 10, 2870, <https://doi.org/10.1038/s41598-020-59806-6>.
- [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>.
- [40] Forbes, W. L., J. Mao, 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, *Water Resour. Res.*, 55, 6640–6652, <https://doi.org/10.1029/2018WR024256>.
- [39] Gangrade, S., S.-C. Kao, T. T. Dullo, A. J. Kalyanapu, and B. L. Preston (2019), Ensemble-Based Flood Vulnerability Assessment for Probable Maximum Flood in a Changing Environment, *J. Hydrol.*, 576, 342–355, <https://doi.org/10.1016/j.jhydrol.2019.06.027>.
- [38] Chegwiddden, O. S., B. Nijssen, D. E. Rupp, J. R. Arnold, M. P. Clark, J. J. Hamman, S.-C. Kao, Y. Mao, N. Mizukami, P. Mote, M. Pan, E. Pytlak, and M. Xiao (2019), How do Modeling Decisions Affect the Spread among Hydrologic Climate Change Projections? Exploring a Large Ensemble of Simulations across a Diversity of Hydroclimates, *Earth's Future*, 7, 623–637, <https://doi.org/10.1029/2018EF001047>.
- [37] Beigi, E., F. T.-C. Tsai, V. P. Singh, and S.-C. Kao (2019), Bayesian Hierarchical Model Uncertainty Quantification for Future Hydroclimate Projections in Southern Hills-Gulf Region, USA, *Water*, 11(2), 268, <https://doi.org/10.3390/w11020268>.
- [36] Kao, S.-C., S. T. DeNeale, and D. B. Watson (2019), Hurricane Harvey Highlights: Need to Assess the Adequacy of Probable Maximum Precipitation Estimation Methods, *J. Hydrol. Eng.*, 24(4), 05019005, [https://doi.org/10.1061/\(ASCE\)HE.1943-5584.0001768](https://doi.org/10.1061/(ASCE)HE.1943-5584.0001768).
- [35] McManamay, R. A., M. J. Troia, C. R. DeRolph, A. O. Sheldon, A. Barnett, S.-C. Kao, and M.

- Anderson (2018), A Stream Classification System to Explore the Physical Habitat Diversity and Anthropogenic Impacts in Riverscapes of the Eastern United States, *PLoS ONE*, 13(6), e0198439, <https://doi.org/10.1371/journal.pone.0198439>.
- [34] Zhao, G., H. Gao, S.-C. Kao, N. Voisin, and B. S. Naz (2018), A Modeling Framework for Evaluating the Drought Resilience of a Surface Water Supply System under Non-Stationarity, *J. Hydrol.*, 563, 22–32, <https://doi.org/10.1016/j.jhydrol.2018.05.037>.
- [33] Gangrade, S., S.-C. Kao, B. S. Naz, D. Rastogi, M. Ashfaq, N. Singh, and B. L. Preston (2018), Sensitivity of Probable Maximum Flood in a Changing Environment, *Water Resour. Res.*, 54(6), 3913–3936, <https://doi.org/10.1029/2017WR021987>.
- [32] Forbes, W., J. Mao, M. Jin, S.-C. Kao, W. Fu, X. Shi, D. M. Ricciuto, P. E. Thornton, A. Ribes, Y. Wang, S. Piao, T. Zhao, C. Schwalm, F. Hoffman, J. Fisher, A. Ito, B. Poulter, Y. Fang, H. Tian, A. Jain, and D. Hayes (2018), Contribution of Environmental Forcings to US Runoff Changes for the Period 1950–2010, *Environ. Res. Lett.*, 13(5), <https://doi.org/10.1088/1748-9326/aabb41>.
- [31] Naz, B. S., S.-C. Kao, M. Ashfaq, H. Gao, D. Rastogi, and S. Gangrade (2018), Effects of Climate Change on Streamflow Extremes and Implications for Reservoir Inflow in the United States, *J. Hydrol.*, 556, 359–370, <https://doi.org/10.1016/j.jhydrol.2017.11.027>.
- [30] Rastogi, D., S.-C. Kao, M. Ashfaq, R. Mei, E. D. Kabela, S. Gangrade, B. S. Naz, B. L. Preston, N. Singh, and V. G. Anantharaj (2017), Effects of Climate Change on Probable Maximum Precipitation: A Sensitivity Study over the Alabama-Coosa-Tallapoosa River Basin, *J. Geophys. Res.-Atmos.*, 122, 4808–4828, <https://doi.org/10.1002/2016JD026001>.
- [29] Zhao, G., H. Gao, B. S. Naz, S.-C. Kao, and N. Voisin (2016), Integrating a Reservoir Regulation Scheme into a Spatially Distributed Hydrological Model, *Adv. Water Resour.*, 98, 16–31, <https://doi.org/10.1016/j.advwatres.2016.10.014>.
- [28] Pagán, B., M. Ashfaq, D. Rastogi, D. Kendall, S.-C. Kao, B. S. Naz, R. Mei, and J. S. Pal (2016), Extreme Hydrological Changes in the Southwestern U.S. Drive Reductions in Water Supply to Southern California by Mid Century, *Environ. Res. Lett.*, 11(9), 094026, <https://doi.org/10.1088/1748-9326/11/9/094026>.
- [27] Ashfaq, M., D. Rastogi, R. Mei, S.-C. Kao, S. Gangrade, B. S. Naz, and D. Touma (2016), High-Resolution Ensemble Projections of Near-Term Regional Climate Over the Continental United States, *J. Geophys. Res.-Atmos.*, 121, 9943–9963, <https://doi.org/10.1002/2016JD025285>.
- [26] Mani, A., F. T.-C. Tsai, S.-C. Kao, B. S. Naz, M. Ashfaq, and D. Rastogi (2016), Conjunctive Management of Surface and Groundwater Resources under Projected Future Climate Change Scenarios, *J. Hydrol.*, 540, 397–411, <https://doi.org/10.1016/j.jhydrol.2016.06.021>.
- [25] Naz, B. S., S.-C. Kao, M. Ashfaq, D. Rastogi, R. Mei, and L. C. Bowling (2016), Regional Hydrologic Response to Climate Change in the Conterminous United States Using High-Resolution Hydroclimate Simulations, *Global Planet. Change*, 143, 100–117, <https://doi.org/10.1016/j.gloplacha.2016.06.003>.
- [24] McManamay, R. A., C. Oigbokie, S.-C. Kao, and M. S. Bevelhimer (2016), Classification of US Hydropower Dams by their Modes of Operation, *River Res. Appl.*, 32(7), 1450–1468, <https://doi.org/10.1002/rra.3004>.
- [23] Pasha, M. F. K., D. Yeasmin, S. Saetern, M. Yang, S.-C. Kao, and B. T. Smith (2016), Uncertainty Analysis in Geospatial Merit Matrix-Based Hydropower Resource Assessment, *J. Water Res. Pl.*, 142(4), 06016001, [https://doi.org/10.1061/\(ASCE\)WR.1943-5452.0000654](https://doi.org/10.1061/(ASCE)WR.1943-5452.0000654).
- [22] Pasha, M. F. K., M. Yang, D. Yeasmin, S. Saetern, S.-C. Kao, and B. T. Smith (2016), Identifying High-Power-Density Stream-Reaches through Refined Geospatial Resolution in Hydropower Resource Assessment, *J. Water Res. Pl.*, 06016001, [https://doi.org/10.1061/\(ASCE\)WR.1943-5452.0000599](https://doi.org/10.1061/(ASCE)WR.1943-5452.0000599).
- [21] Touma, D., M. Ashfaq, M. A. Nayak, S.-C. Kao, and N. S. Diffenbaugh (2015), A Multi-Model and Multi-Index Evaluation of Drought Characteristics in the 21st Century, *J. Hydrol.*, 526, 196–207,

- <https://doi.org/10.1016/j.jhydrol.2014.12.011>.
- [20] Kao, S.-C., M. J. Sale, M. Ashfaq, R. Uría Martínez, D. P. Kaiser, Y. Wei, and N. S. Diffenbaugh (2015), Projecting Changes in Annual Hydropower Generation Using Regional Runoff Data: An Assessment of the United States Federal Hydropower Plants, *Energy*, 80, 239–250, <https://doi.org/10.1016/j.energy.2014.11.066>.
- [19] McManamay, R. A., N. Samu, S.-C. Kao, M. S. Bevelhimer, and S. C. Hetrick (2015), A Multi-Scale Spatial Approach to Address Environmental Effects of Small Hydropower Development, *Environ. Manage.*, 55(1), 217–243, <https://doi.org/10.1007/s00267-014-0371-2>.
- [18] Pasha, M. F. K., D. Yeasmin, S.-C. Kao, B. Hadjerioua, Y. Wei, and B. T. Smith (2014), Stream-Reach Identification for New Run-of-River Hydropower Development through a Merit Matrix-Based Geospatial Algorithm, *J. Water Res. Pl.*, 140(8), 04014016, [https://doi.org/10.1061/\(ASCE\)WR.1943-5452.0000429](https://doi.org/10.1061/(ASCE)WR.1943-5452.0000429).
- [17] McManamay, R. A., M. S. Bevelhimer, and S.-C. Kao (2014), Updating the US Hydrologic Classification: An Approach to Clustering and Stratifying Ecohydrologic Data, *Ecohydrology*, 7(3), 903–926, <https://doi.org/10.1002/eco.1410>.
- [16] Oubeidillah, A. A., S.-C. Kao, M. Ashfaq, B. S. Naz, and G. Tootle (2014), A Large-Scale, High-Resolution Hydrological Model Parameter Data Set for Climate Change Impact Assessment for the Conterminous US, *Hydrol. Earth Syst. Sci.*, 18, 67–84, <https://doi.org/10.5194/hess-18-67-2014>.
- [15] Ashfaq, M., S. Ghosh, S.-C. Kao, L. C. Bowling, P. Mote, D. Touma, S. A. Rauscher, and N. S. Diffenbaugh (2013), Near-Term Acceleration of Hydroclimatic Change in the Western U.S., *J. Geophys. Res.–Atmos.*, 118, 10,676–10,693, <https://doi.org/10.1002/jgrd.50816>.
- [14] Kao, S.-C., H. K. Kim, C. Liu, X. Cui, and B. L. Bhaduri (2012), Dependence-Preserving Approach to Synthesizing Household Characteristics, *Transport. Res. Record*, 2302, 192–200, <https://doi.org/10.3141/2302-21>.
- [13] Cui, X., H. K. Kim, C. Liu, S.-C. Kao, and B. L. Bhaduri (2012), Simulating the Household Plug-in Hybrid Electric Vehicle Distribution and Its Electric Distribution Network Impacts, *Transport. Res. D–TR. E.*, 17, 548–554, <https://doi.org/10.1016/j.trd.2012.05.011>.
- [12] Kao, S.-C., and N.-B. Chang (2012), Copula-Based Flood Frequency Analysis at Ungauged Basin Confluences: Nashville, Tennessee, *J. Hydrol. Eng.*, 17(7), 790–799, [https://doi.org/10.1061/\(ASCE\)HE.1943-5584.0000477](https://doi.org/10.1061/(ASCE)HE.1943-5584.0000477).
- [11] Ghosh, S., D. Das, S.-C. Kao, and A. R. Ganguly (2012), Lack of Uniform Trends but Increasing Spatial Variability in Observed Indian Rainfall Extremes, *Nature Climate Change*, 2, 86–91, <https://doi.org/10.1038/nclimate1327>.
- [10] Kao, S.-C., and A. R. Ganguly (2011), Intensity, Duration, and Frequency of Precipitation Extremes under 21st-Century Warming Scenarios, *J. Geophys. Res.–Atmos.*, 116, D16119, <https://doi.org/10.1029/2010JD015529>.
- [9] Kao, S.-C., and R. S. Govindaraju (2010), Reply to Comment by T. P. Hutchinson on “Trivariate Statistical Analysis of Extreme Rainfall Events via the Plackett Family of Copulas”, *Water Resour. Res.*, 46, W04802, <https://doi.org/10.1029/2009WR008774>.
- [8] Kao, S.-C., and R. S. Govindaraju (2010), A Copula-Based Joint Deficit Index for Droughts, *J. Hydrol.*, 380, 121–134, <https://doi.org/10.1016/j.jhydrol.2009.10.029>.
- [7] Kao, S.-C., T. P. Chan, R. Sultana, T. Konopka, T. Cooper, B. Partridge, and R. S. Govindaraju (2009), Hydrologic and Environmental Performance of a Subsurface Constructed Wetland at a Highway Rest Area: A Case Study, *Water Qual. Expo. Health*, 1, 35–48, <https://doi.org/10.1007/s12403-009-0004-9>.
- [6] Kao, S.-C., and R. S. Govindaraju (2008), Trivariate Statistical Analysis of Extreme Rainfall Events via Plackett Family of Copulas, *Water Resour. Res.*, 44, W02415, <https://doi.org/10.1029/2007WR006261>.
- [5] Kao, S.-C., and A. R. Rao (2008), At-Site Based Evaluation of Rainfall Estimates for Indiana, *J.*

- Hydrol. Eng.*, 13(3), 184–188, [https://doi.org/10.1061/\(ASCE\)1084-0699\(2008\)13:3\(184\)](https://doi.org/10.1061/(ASCE)1084-0699(2008)13:3(184)).
- [4] Kao, S.-C., and R. S. Govindaraju (2007), A Bivariate Frequency Analysis of Extreme Rainfall with Implications for Design, *J. Geophys. Res.–Atmos.*, 112, D13119, <https://doi.org/10.1029/2007JD008522>.
- [3] Kao, S.-C., and R. S. Govindaraju (2007), Probabilistic Structure of Storm Surface Runoff Considering the Dependence between Average Intensity and Storm Duration of Rainfall Events, *Water Resour. Res.*, 43, W06410, <https://doi.org/10.1029/2006WR005564>.
- [2] Rao, A. R., and S.-C. Kao (2007), Discussion of "Updated Precipitation Frequency Estimates for Kansas City: Comparison with TP-40 and HYDRO-35" by C. Bryan Young and Bruce M. McEnroe, *J. Hydrol. Eng.*, 12(6), 694–699, [https://doi.org/10.1061/\(ASCE\)1084-0699\(2007\)12:6\(694\)](https://doi.org/10.1061/(ASCE)1084-0699(2007)12:6(694)).
- [1] Lin, G.-F., L.-H. Chen, and S.-C. Kao (2005), Development of Regional Design Hyetographs, *Hydrol. Process*, 19, 937–946, <https://doi.org/10.1002/hyp.5550>.

Software / Data

- [22] Johnson, M. M., S.-C. Kao, and R. Uría Martínez (2023), *U.S. Hydropower Retired Facilities Data, 2023*, HydroSource, Oak Ridge National Laboratory, Oak Ridge, TN, https://doi.org/10.21951/Retired_FY23/1972059.
- [21] Johnson, M. M., S.-C. Kao, and R. Uría Martínez (2023), *Existing Hydropower Assets (EHA) Plant Database, 2023*, HydroSource, Oak Ridge National Laboratory, Oak Ridge, TN, https://doi.org/10.21951/EHA_FY2023/1972057.
- [20] Johnson, M. M., S.-C. Kao, and R. Uría Martínez (2023), *Existing Hydropower Assets (EHA) Unit Database, 2023*, HydroSource, Oak Ridge National Laboratory, Oak Ridge, TN, https://doi.org/10.21951/EHA_FY2023/1972280.
- [19] Kao, S.-C., P. E. Thornton, M. M. Thornton, R. Shrestha, and A. P. Walker (2023), *Sub-Daily Climate Forcings for Puerto Rico*, Oak Ridge National Laboratory, Distributed Active Archive Center Oak Ridge, TN, <https://doi.org/10.3334/ORNLDAAAC/1977>.
- [18] Kao, S.-C., L. George, C. H. Hansen, S. T. DeNeale, K. Johnson, A. K. Sampson, M. Moutenot, K. Altamirano, K. Garcia, J. Downing, M. B. Day, and K. Rugani (2023), *US Hydropower Potential at National Conduits*, HydroSource, Oak Ridge National Laboratory, Oak Ridge, TN, <https://doi.org/10.21951/CONDUIT/1993154>.
- [17] Thornton, M. M., R. Shrestha, Y. Wei, P. E. Thornton, S.-C. Kao, and B. E. Wilson (2022), *Daymet: Station-Level Inputs and Cross-Validation for North America, Version 4 R1*, Oak Ridge National Laboratory, Distributed Active Archive Center Oak Ridge, TN, <https://doi.org/10.3334/ORNLDAAAC/2132>.
- [16] Thornton, M. M., R. Shrestha, Y. Wei, P. E. Thornton, S.-C. Kao, and B. E. Wilson (2022), *Daymet: Monthly Climate Summaries on a 1-km Grid for North America, Version 4 R1*, Oak Ridge National Laboratory, Distributed Active Archive Center Oak Ridge, TN, <https://doi.org/10.3334/ORNLDAAAC/2131>.
- [15] Thornton, M. M., R. Shrestha, Y. Wei, P. E. Thornton, S.-C. Kao, and B. E. Wilson (2022), *Daymet: Annual Climate Summaries on a 1-km Grid for North America, Version 4 R1*, Oak Ridge National Laboratory, Distributed Active Archive Center Oak Ridge, TN, <https://doi.org/10.3334/ORNLDAAAC/2130>.
- [14] Thornton, M. M., R. Shrestha, Y. Wei, P. E. Thornton, S.-C. Kao, and B. E. Wilson (2022), *Daymet: Daily Surface Weather Data on a 1-km Grid for North America, Version 4 R1*, Oak Ridge National Laboratory, Distributed Active Archive Center Oak Ridge, TN, <https://doi.org/10.3334/ORNLDAAAC/2129>.
- [13] Kao, S.-C., M. Ashfaq, D. Rastogi, and S. Gangrade (2022), *CMIP6-Based Multi-Model Hydroclimate Projection over the Conterminous US*, HydroSource, Oak Ridge National Laboratory, Oak Ridge, TN, <https://doi.org/10.21951/SWA9505V3/1887469>.

- [12] Johnson, M. M., S.-C. Kao, and R. Uría Martínez (2022), *U.S. Hydropower Retired Facilities Data, 2022*, HydroSource, Oak Ridge National Laboratory, Oak Ridge, TN, https://doi.org/10.21951/Retired_FY22/1867369.
- [11] Johnson, M. M., S.-C. Kao, and R. Uría Martínez (2022), *Existing Hydropower Assets (EHA), 2022*, HydroSource, Oak Ridge National Laboratory, Oak Ridge, TN, https://doi.org/10.21951/EHA_FY2022/1865282.
- [10] Ghimire, G. R., C. H. Hansen, S. Gangrade, S.-C. Kao, P. E. Thornton, and D. Singh (2022), *Dayflow: CONUS Daily Streamflow Reanalysis, Version 1*, HydroSource, Oak Ridge National Laboratory, Oak Ridge, TN, <https://doi.org/10.21951/Dayflow/1847639>.
- [9] Brett, B., J. New, D. Rastogi, and S.-C. Kao (2022), *Future Typical Meteorological Year (fTMY) US Weather Files for Building Simulation (1.0)*, Oak Ridge National Laboratory, <https://doi.org/10.5281/zenodo.6939750>.
- [8] Thornton, M. M., R. Shrestha, P. E. Thornton, S.-C. Kao, Y. Wei, and B. E. Wilson (2021), *Daymet Version 4 Monthly Latency: Daily Surface Weather Data*, Oak Ridge National Laboratory, Distributed Active Archive Center Oak Ridge, TN, <https://doi.org/10.3334/ORNLDAAAC/1904>.
- [7] Nelson, K., S. W. D. Turner, C. Vernon, J. Rice, and S.-C. Kao (2021), *UWSCatCH: Urban Water Supply Catchment Contributions and Hydrological Statistics for Large Cities of the Conterminous United States. V.1.0*, Pacific Northwest National Laboratory, <https://zenodo.org/record/4315195#.YBsMMeg3laS>, <https://doi.org/10.5281/zenodo.4315195>.
- [6] Johnson, M. M., S.-C. Kao, N. M. Samu, and R. Uría Martínez (2021), *Existing Hydropower Assets (EHA) Plant Database, 2021*, HydroSource, Oak Ridge National Laboratory, Oak Ridge, TN, https://doi.org/10.21951/EHA_FY2021/1782791.
- [5] Thornton, M. M., R. Shrestha, Y. Wei, P. E. Thornton, S.-C. Kao, and B. E. Wilson (2020), *Daymet: Monthly Climate Summaries on a 1-km Grid for North America, Version 4*, Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, TN, <https://doi.org/10.3334/ORNLDAAAC/1855>.
- [4] Thornton, M. M., R. Shrestha, Y. Wei, P. E. Thornton, S.-C. Kao, and B. E. Wilson (2020), *Daymet: Annual Climate Summaries on a 1-km Grid for North America, Version 4*, Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, TN, <https://doi.org/10.3334/ORNLDAAAC/1852>.
- [3] Thornton, M. M., Y. Wei, P. E. Thornton, R. Shrestha, S.-C. Kao, and B. E. Wilson (2020), *Daymet: Station-Level Inputs and Cross-Validation Result for North America, Version 4*, Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, TN, <https://doi.org/10.3334/ORNLDAAAC/1850>.
- [2] Thornton, M. M., R. Shrestha, Y. Wei, P. E. Thornton, S.-C. Kao, and B. E. Wilson (2020), *Daymet: Daily Surface Weather Data on a 1-km Grid for North America, Version 4*, Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, TN, <https://doi.org/10.3334/ORNLDAAAC/1840>.
- [1] Morales Hernández, M., K. J. Evans, S. Gangrade, S.-C. Kao, M. B. Sharif, S. K. Ghafoor, A. J. Kalyanapu, T. T. Dullo (2020), *TRITON*, Computer Software, Oak Ridge National Laboratory, TN, <https://doi.org/10.11578/dc.20201001.85>.

Technical Reports

- [20] Kao, S.-C., L. George, C. H. Hansen, S. T. DeNeale, K. Johnson, A. K. Sampson, M. Moutenot, K. Altamirano, K. Garcia, J. Downing, M. B. Day, and K. Rugani (2022), *An Assessment of Hydropower Potential at National Conduits*, ORNL/TM-2022/2431, Oak Ridge National Laboratory, Oak Ridge, TN, <https://doi.org/10.2172/1890335>.
- [19] Kao, S.-C., M. Ashfaq, D. Rastogi, S. Gangrade, R. Uría Martínez, A. Fernandez, G. Konapala, N. Voisin, T. Zhou, W. Xu, H. Gao, B. Zhao, and G. Zhao (2022), *The Third Assessment of the Effects*

- of Climate Change on Federal Hydropower*, ORNL/TM-2021/2278, Oak Ridge National Laboratory, Oak Ridge, TN, <https://doi.org/10.2172/1887712>.
- [18] Mohammadi, S., M. T. Bensi, S.-C. Kao, and S. T. DeNeale (2021), *Multi-Mechanism Flood Hazard Assessment: Example Use Case Studies*, ORNL/TM-2021/2231, Oak Ridge National Laboratory, Oak Ridge, TN, <https://doi.org/10.2172/1826019>.
- [17] DeNeale, S. T., S.-C. Kao, D. Watson, and K. Quinlan (2021), *Considerations for Site-Specific Probable Maximum Precipitation Estimation at Nuclear Power Plants in the United States of America*, NUREG/KM-0015, ML12053A340, ORNL/SPR-2021/1375, U.S. Nuclear Regulatory Commission, Washington, DC, <https://www.nrc.gov/reading-rm/doc-collections/nuregs/knowledge/km0015/index.html>.
- [16] Kao, S.-C., and S. T. DeNeale (2021), *Application of Point Precipitation Frequency Estimates to Watersheds*, NUREG/CR-7271, ML21039A503, ORNL/SPR-2019/1323, U.S. Nuclear Regulatory Commission, Washington, DC, <https://www.nrc.gov/reading-rm/doc-collections/nuregs/contract/cr7271/index.html>.
- [15] Bensi, M. T., S. Mohammadi, S.-C. Kao, and S. T. DeNeale (2020), *Multi-Mechanism Flood Hazard Assessment: Critical Review of Current Practice and Approaches*, ORNL/TM-2020/1447, Oak Ridge National Laboratory, Oak Ridge, TN, <https://doi.org/10.2172/1637939>.
- [14] DeNeale, S. T., and S.-C. Kao (2018), *Technical Evaluation Report: Review of the Site-Specific Probable Maximum Precipitation Study for the Tennessee Valley Authority Nuclear Power Plants*, ORNL/TM-2018/994, Oak Ridge National Laboratory, Oak Ridge, TN.
- [13] Kao, S.-C., and K. Johnson (2018), *An Assessment of Energy Potential at Public Drinking Water Systems: Initial Report on Methodology*, ORNL/TM-2018/869, Oak Ridge National Laboratory, Oak Ridge, TN.
- [12] Stewart, K. M., B. T. Smith, A. Witt, S. T. DeNeale, M. Bevelhimer, J. L. Pries, T. A. Burrell, S.-C. Kao, M. Mobley, K. Lee, S. Curd, A. Tsakiris, C. Mooneyham, T. Papanicolaou, K. Ekici, M. Whisenant, T. Welch, and D. Rabon (2017), *Simulation and Modeling Capability for Standard Modular Hydropower Technology*, ORNL/TM-2017/175, Oak Ridge National Laboratory, Oak Ridge, TN, <https://doi.org/10.2172/1394299>.
- [11] Allen, M. R., T. J. Wilbanks, B. L. Preston, S.-C. Kao, and J. Bradbury (2017), *Assessing the Costs and Benefits of Resilience Investments: Tennessee Valley Authority Case Study*, ORNL/TM-2017/13, Oak Ridge National Laboratory, Oak Ridge, TN, <https://doi.org/10.2172/1343538>.
- [10] Kao, S.-C., S. Chinthavali, S. Lee, K. M. Stewart, M. R. Allen, B. T. Smith, and B. L. Bhaduri (2016), *Scoping Analytical Tools and Methods for Vulnerability Analysis of Linked Electricity Generation and River Basin Systems*, ORNL/TM-2016/282, Oak Ridge National Laboratory, Oak Ridge, TN.
- [9] Kao, S.-C., M. Ashfaq, B. S. Naz, R. Uría Martínez, D. Rastogi, R. Mei, Y. Jager, N. M. Samu, and M. J. Sale (2016), *The Second Assessment of the Effects of Climate Change on Federal Hydropower*, ORNL/SR-2015/357, Oak Ridge National Laboratory, Oak Ridge, TN, <https://doi.org/10.2172/1340431>.
- [8] Schubel, J., J. A. Lentz, F. Qader, A. Kishaba, D. Bader, L. Perkins, E. Yam, A. Kaneda, L. Brown, B. R. Pagán, J. S. Pal, C. Gao, J. Reichenberger, D. R. Kendall, M. Ashfaq, D. Rastogi, S.-C. Kao, B. S. Naz, and D. Otto (2015), *City of Long Beach Climate Resiliency Assessment Report*, prepared by the Aquarium of the Pacific (AOP), for the City of Long Beach, CA.
- [7] Kao, S.-C., R. A. McManamay, K. M. Stewart, N. Samu, B. Hadjerioua, S. T. DeNeale, D. Yeasmin, M. F. K. Pasha, A. A. Oubeidillah, and B. T. Smith (2014), *New Stream-Reach Development: A Comprehensive Assessment of Hydropower Energy Potential in the United States*, GPO DOE/EE-1063, Wind and Water Power Program, Department of Energy, Washington, DC, <https://doi.org/10.2172/1130425>.
- [6] Hadjerioua, B., S.-C. Kao, R. A. McManamay, M. F. K. Pasha, D. Yeasmin, A. A. Oubeidillah, N. Samu, K. M. Stewart, M. S. Bevelhimer, S. C. Hetrick, Y. Wei, and B. T. Smith (2013), *An*

Assessment of Energy Potential from New Stream-Reach Development in the United States: Initial Report on Methodology, ORNL/TM-2012/298, Oak Ridge National Laboratory, Oak Ridge, TN.

- [5] Sale, M. J., S.-C. Kao, M. Ashfaq, D. P. Kaiser, R. Uría Martínez, C. Webb, and Y. Wei (2012), *Assessment of the Effects of Climate Change on Federal Hydropower*, ORNL/TM-2011/251, Oak Ridge National Laboratory, Oak Ridge, TN, <https://doi.org/10.2172/1220238>.
- [4] Hadjerioua, B., Y. Wei, and S.-C. Kao (2012), *An Assessment of Energy Potential at Non-Powered Dams in the United States*, GPO DOE/EE-0711, Wind and Water Power Program, Department of Energy, Washington, DC, <https://doi.org/10.2172/1039957>.
- [3] Hadjerioua, B., S.-C. Kao, M. J. Sale, Y. Wei, S. K. SanthanaVannan, H. A. Shanafield III, D. P. Kaiser, R. Devarakonda, C. Odeh, G. Palanisamy, and B. T. Smith (2010), *National Hydropower Asset Assessment Project (NHAAP) 2010 Final Annual Report*, ORNL/TM-2010/260, Oak Ridge National Laboratory, Oak Ridge, TN.
- [2] Kao, S.-C., S. Tripathi, T. J. Cooper, T. P. Chan, J. E. Alleman, and R. S. Govindaraju (2008), *The I-70 Greenfield Rest Area Wetland Projects: Final Report*, Joint Transportation Research Program Report, Purdue University, West Lafayette, IN.
- [1] Rao, A. R., and S.-C. Kao (2006), *Statistical Analysis of Indiana Rainfall Data*, Joint Transportation Research Program Report, C-36-62R, Purdue University, West Lafayette, IN.

Dissertation / Thesis

- [2] Kao, S.-C. (2008), *Multivariate Statistical Analysis of Indiana Hydrologic Data*, Ph.D. Dissertation, School of Civil Engineering, Purdue University, West Lafayette, IN.
- [1] Kao, S.-C. (2001), *A Study in Development of Regional Design Hyetographs*, Master Thesis, Department of Civil Engineering, National Taiwan University, Taipei, Taiwan.

Book Chapter

- [2] Grimaldi, S., S.-C. Kao, A. Castellarin, S.-M. Papalexiou, A. Viglione, F. Laio, H. Aksoy, and A. Gedikli (2011), *Statistical Hydrology*, *Treatise on Water Science*, 479, <https://doi.org/10.1016/B978-0-444-53199-5.00046-4>.
- [1] Kao, S.-C., and R. S. Govindaraju (2008), Probabilistic Structure of Rainfall Events over Indiana, USA, in *Hydraulics and Hydrology* (ed. V. P. Singh), Water Resources Publications, LLC, pp. 505-532.

Other Publication

- [5] *Contributor* – River Management Joint Operating Committee (2018), *Climate and Hydrology Datasets for RMJOC Long-Term Planning Studies: Second Edition (RMJOC-II), Part I: Hydroclimate Projections and Analyses*, River Management Joint Operating Committee (RMJOC): Bonneville Power Administration, US Army Corps of Engineers, and Bureau of Reclamation.
- [4] *Lead Author* – U.S. Department of Energy (2017), *Effects of Climate Change on Federal Hydropower: The Second Report to Congress*, Department of Energy, Washington, DC.
- [3] *Contributor* – U.S. Department of Energy (2016), *Hydropower Vision: A New Chapter for America's 1st Renewable Electricity Source*, Wind and Water Power Program, Department of Energy, Washington, DC.
- [2] *Lead Author* – U.S. Department of Energy (2013), *Effects of Climate Change on Federal Hydropower: Report to Congress*, DOE/GO-102016-4869, Department of Energy, Washington, DC.
- [1] Hadjerioua, B., S.-C. Kao, Y. Wei, B. T. Smith, and H. Battey (2012), Non-Powered Dams: An Uptapped Source of Renewable Electricity in the USA, *The International Journal on Hydropower and Dams*, 19(4), 45–48.

Selected Conference Paper / Presentation

- [136] Gangrade, S., G. R. Ghimire, S.-C. Kao, M. Morales Hernández, M. 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. 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. 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 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., 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.
- [73] Ghafoor, S. K., K. J. Evans, A. J. Kalyanapu, S.-C. Kao, M. B. Sharif, T. T. Dullo, and S. Gangrade (2019), Simulating Hurricane Harvey Using Two Dimensional Flood Model on Titan and Summit at ORNL, The 2019 Platform for Advanced Scientific Computing (PASC19) Conference, June 12–14, Zurich, Switzerland.
- [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.
- [71] Zhao, G., H. Gao, Y. Li, and S.-C. Kao (2019), The Impacts of Droughts and Growing Demand on the Reservoir Storage in the United States, World Environmental & Water Resources Congress 2019, May 19–23, Pittsburgh, PA.
- [70] Bhuyian, M. N. M., T. T. Dullo, A. J. Kalyanapu, S. Gangrade, and S.-C. Kao (2019), Application of Geomorphic Correlations for River Bathymetry Correction in Two-Dimensional Hydrodynamic Modeling for Long-Term Flood Risk Evaluation, World Environmental & Water Resources Congress 2019, May 19–23, Pittsburgh, PA.
- [69] Gangrade, S., S.-C. Kao, T. T. Dullo, and A. J. Kalyanapu (2018), Ensemble-Based Probabilistic Flood Maps for Probable Maximum Flood, American Geophysical Union 2018 Fall Meeting, December 10–14, Washington, D.C.
- [68] DeNeale, S. T., S.-C. Kao, E. Yegorova, J. Kanney, and M. L. Carr (2018), A Comparative Evaluation of Precipitation Areal Reduction Factor Variability across the Conterminous United States, American Geophysical Union 2018 Fall Meeting, December 10–14, Washington, D.C.
- [67] Dullo, T. T., S. Gangrade, A. J. Kalyanapu, S.-C. Kao, S. K. Ghafoor, and K. J. Evans (2018),

- High-Resolution Modeling of Hurricane Harvey Flooding for Harris County, TX using a Calibrated GPU-Accelerated 2D Flood Model, American Geophysical Union 2018 Fall Meeting, December 10–14, Washington, D.C.
- [66] Shao, M., G. Zhao, C. Holmes, S.-C. Kao, and Huilin Gao (2018), Quantifying the Individual and Combined Impacts of Urbanization and Changing Climate on Hydrological Processes – A Case Study of Two Adjacent Basins in Texas, American Geophysical Union 2018 Fall Meeting, December 10–14, Washington, D.C.
- [65] Yuan, F., G. Wang, S.-C. Kao, J. Kumar, V. G. Salmon, C. M. Iversen, A. L. Breen, P. E. Thornton, and S. Wullschleger (2018), Pathways to High Resolution Simulation of Land Surface Processes in Arctic Region: A Case Study on C & N Cycles Using PFLOTRAN Coupled E3SM Land Model (ELM), American Geophysical Union 2018 Fall Meeting, December 10–14, Washington, D.C.
- [64] Yang, Y., M. Pan, H. Beck, C. K. Fisher, E. Beighley, S.-C. Kao, Y. Hong, and E. F. Wood (2018), In Quest of Calibration Density and Consistency in Hydrologic Modeling: Distributed Parameter Calibration against Streamflow Characteristics, American Geophysical Union 2018 Fall Meeting, December 10–14, Washington, D.C.
- [63] Mao, J., W. Forbes, M. Jin, S.-C. Kao, W. Fu, X. Shi, D. M. Ricciuto, P. E. Thornton, A. Ribes, Y. Wang, S. Piao, T. Zhao, C. R. Schwalm, F. Hoffman, J. B. Fisher, A. Ito, B. Poulter, Y. Fang, H. Tian, and A. Jain (2018), Contribution of Climatic and Non-Climatic Forcings to US Runoff Changes for the Period 1950-2010, the 15th Asia Oceania Geosciences Society Annual Meeting, June 3–8, Honolulu, HI.
- [62] Gangrade, S., S.-C. Kao, B. S. Naz, D. Rastogi, M. Ashfaq, N. Singh, and B. L. Preston (2018), Evaluating the Sensitivity of Probable Maximum Flood using a High-Resolution Distributed Hydrologic Model, World Environmental & Water Resources Congress 2018, June 3–7, Minneapolis, MN.
- [61] Zhao, G., H. Gao, and S.-C. Kao (2018), Impacts of Historical and Future Climate Change on the Blue Water Footprint of Hydropower in the United States, World Environmental & Water Resources Congress 2018, June 3–7, Minneapolis, MN.
- [60] Kalyanapu, A. J., T. T. Dullo, S. Gangrade, S.-C. Kao, R. Marshall, S. R. Islam, and S. K. Ghafoor (2018), Reconstruction of Hurricane Harvey Flooding for Harris County, TX Using a GPU-Accelerated 2D Flood Model for Post-Flood Hazard Analysis, 27th Tennessee Watershed Symposium: Adapting to Hydrologic Extremes, April 11–13, Montgomery Bell State Park, Burns, TN.
- [59] Mao, J., W. Forbes, W. Fu, X. Shi, D. M. Ricciuto, M. Jin, and S.-C. Kao (2018), Detection and Attribution of the Terrestrial Runoff in the Conterminous United States, the 98th American Meteorological Society Annual Meeting, January 7–11, Austin, TX.
- [58] Kao, S.-C., X. Shi, J. Kumar, D. M. Ricciuto, J. Mao, and P. E. Thornton (2017), Can Earth System Model Provide Reasonable Natural Runoff Estimates to Support Water Management Studies?, American Geophysical Union 2017 Fall Meeting, December 11–15, New Orleans, LA.
- [57] Kalyanapu, A. J., T. T. Dullo, S. Gangrade, S.-C. Kao, R. Marshall, S. R. Islam, and S. K. Ghafoor (2017), Hurricane Harvey Riverine Flooding: Part 1 – Reconstruction of Hurricane Harvey Flooding for Harris County, TX using a GPU-Accelerated 2D Flood Model for Post-Flood Hazard Analysis, American Geophysical Union 2017 Fall Meeting, December 11–15, New Orleans, LA.
- [56] Chegwiddden, O., B. Nijssen, D. Rupp, M. Clark, and S.-C. Kao (2017), How Do the Methodological Choices of Your Climate Change Study Affect Your Results? A Hydrologic Case Study Across the Pacific Northwest, American Geophysical Union 2017 Fall Meeting, December 11–15, New Orleans, LA.
- [55] Karakullukcu, R. E., F. T.-C. Tsai, D. Bhatta, K. Paudel, and S.-C. Kao (2017), Development of A Mississippi River Alluvial Aquifer Groundwater Model, American Geophysical Union 2017 Fall Meeting, December 11–15, New Orleans, LA.
- [54] Dullo, T. T., S. Gangrade, R. Marshall, S. R. Islam, S. K. Ghafoor, S.-C. Kao, and A. J. Kalyanapu

- (2017), A Large-Scale Simulation of Climate Change Effects on Flood Regime – A Case Study for the Alabama-Coosa-Tallapoosa River Basin, American Geophysical Union 2017 Fall Meeting, December 11–15, New Orleans, LA.
- [53] [Kao, S.-C.](#), D. Rastogi, M. Ashfaq, R. Mei, E. D. Kabelá, S. Gangrade, B. S. Naz, B. L. Preston, N. Singh, and V. G. Anantharaj (2017), Assessing the Effects of Climate Change on Probable Maximum Precipitation through Numerical Weather Simulation, World Environmental & Water Resources Congress 2017, May 21–25, Sacramento, CA.
- [52] Dullo, T., S. Gangrade, R. Marshall, S. R. Islam, S. K. Ghafoor, [S.-C. Kao](#), B. L. Preston, and A. J. Kalyanapu (2017), The Vulnerability of Critical Energy Infrastructures to Climate Change Induced Flooding: A Case Study for the Alabama-Coosa-Tallapoosa River Basin, World Environmental & Water Resources Congress 2017, May 21–25, Sacramento, CA.
- [51] [Kao, S.-C.](#), B. S. Naz, S. Gangrade, M. Ashfaq, and D. Rastogi (2016), Sensitivity of Hydrologic Extremes to Spatial Resolution of Meteorological Forcings: A Case Study of the Conterminous United States, American Geophysical Union 2016 Fall Meeting, December 12–16, San Francisco, CA.
- [50] Gangrade, S., [S.-C. Kao](#), D. Rastogi, M. Ashfaq, B. S. Naz, E. D. Kabelá, V. Anantharaj, N. Singh, B. L. Preston, and R. Mei (2016), Evaluation of Probable Maximum Precipitation and Flood under Climate Change in the 21st Century, American Geophysical Union 2016 Fall Meeting, December 12–16, San Francisco, CA.
- [49] Kalyanapu, A. J., T. T. Dullo, S. Gangrade, R. Marshall, S. R. Islam, S. K. Ghafoor, [S.-C. Kao](#), and B. L. Preston (2016), Development of an Integrated DHSVM-Flood2D-GPU modeling framework – A Case Study for the Alabama-Coosa-Tallapoosa River Basin, American Geophysical Union 2016 Fall Meeting, December 12–16, San Francisco, CA.
- [48] Pasha, M. F. K., S. Kamuni, D. Yeasmin, [S.-C. Kao](#), and B. T. Smith (2016), Development of Regression Equations to Estimate Regional Hydropower Potential, HydroVision International 2016, July 26–29, Minneapolis, MN.
- [47] Gangrade, S., [S.-C. Kao](#), B. S. Naz, M. Ashfaq, and D. Rastogi (2016), Evaluating the Uncertainties of Future Water Availability Projections through the Choice of Different Hydrologic Models, World Environmental & Water Resources Congress 2016, May 22–26, West Palm Beach, FL.
- [46] Naz, B. S., [S.-C. Kao](#), M. Ashfaq, D. Rastogi, R. Mei, and S. Gangrade (2016), Assessing Hydrological Impacts of Climate Change in the United States: Implication for Hydropower Facilities, World Environmental & Water Resources Congress 2016, May 22–26, West Palm Beach, FL.
- [45] Zhao, G., H. Gao, B. S. Naz, [S.-C. Kao](#), and N. Voisin (2016), Evaluating Water Supply Resilience under Future Droughts and Population Growth, World Environmental & Water Resources Congress 2016, May 22–26, West Palm Beach, FL.
- [44] Pagán, B., M. Ashfaq, D. Rastogi, S.-C. Kao, B. S. Naz, R. Mei, D. Kendall, and J. S. Pal. (2016), Extreme Hydrological Changes in the Western United States Drive Reductions in Water Supply by Mid Century, European Geosciences Union General Assembly 2016, April 17–22, Vienna, Austria.
- [43] Zhao, G., H. Gao, B. S. Naz, [S.-C. Kao](#), and N. Voisin (2016), Survivability of Megacities Under the Impacts of Future Drought and Population Growth, Texas Weather Conference, February 5–6, Austin, TX.
- [42] Gadiraju, K., B. Ramachandra, D. Kaiser, T. Karnowski, [S.-C. Kao](#), T. Jiang, S. Ostro, and R. Vatsavai (2016), A Machine-Learning Approach to Studying Relationships Between Extremes in Geopotential Height and Surface Temperature, the 96th American Meteorological Society Annual Meeting, January 10–14, New Orleans, LA.
- [41] [Kao, S.-C.](#), B. S. Naz, and S. Gangrade (2015), Sensitivity of Regional Hydropower Generation to the Projected Changes in Future Watershed Hydrology, American Geophysical Union 2015 Fall Meeting, December 14–18, San Francisco, CA.

- [40] Hayes, B., S.-C. Kao, J. Kanney, K. Quinlan, and S. T. DeNeale (2015), Site Specific Probable Maximum Precipitation Estimates and Professional Judgement, American Geophysical Union 2015 Fall Meeting, December 14–18, San Francisco, CA.
- [39] Gangrade, S., D. Rastogi, S.-C. Kao, M. Ashfaq, B. S. Naz, E. D. Kabela, V. Anantharaj, N. Singh, B. L. Preston, and R. Mei (2015), An Integrated Modeling Framework for Probable Maximum Precipitation and Flood, American Geophysical Union 2015 Fall Meeting, December 14–18, San Francisco, CA.
- [38] Ashfaq, M., D. Rastogi, R. Mei, S.-C. Kao, B. S. Naz, and S. Gangrade (2015), Near-Term Intensification of the Hydrological Cycle in the United States, American Geophysical Union 2015 Fall Meeting, December 14–18, San Francisco, CA.
- [37] Dullo, T., A. Kalyanapu, S. K. Ghafoor, R. Marshall, K. Tindall, V. Anantharaj, S.-C. Kao, and S. Gangrade (2015), Computational Performance of an OpenMP-Enabled, MPI-Enabled and GPU-Accelerated Two-Dimensional Flood Model, American Geophysical Union 2015 Fall Meeting, December 14–18, San Francisco, CA.
- [36] Zhao, G., H. Gao, B. S. Naz, S.-C. Kao, and N. Voisin (2015), Sensitivity of Reservoir Storage and Outflow to Climate Change in a Water-Limited River Basin, American Geophysical Union 2015 Fall Meeting, December 14–18, San Francisco, CA.
- [35] Pagán, B., M. Ashfaq, D. Rastogi, B. S. Naz, S.-C. Kao, R. Mei, D. Kendall, and J. S. Pal (2015), Increased Extreme Hydrological Events and Decreased Water Supply Availability for the Southwestern United States Projected by Mid-Century, American Geophysical Union 2015 Fall Meeting, December 14–18, San Francisco, CA.
- [34] Chalise, D. R., P. O'Connor, S. T. DeNeale, R. Uría Martínez, and S.-C. Kao (2015), LCOE Uncertainty Analysis for Hydropower Using Monte Carlo Simulations, HydroVision International 2015, July 14–17, Portland, OR.
- [33] Pasha, M. F. K., L. Rowan, D. Yeasmin, S.-C. Kao, and B. T. Smith (2015), Development of a Geospatial Diversion Model for Hydropower Resource Assessment, HydroVision International 2015, July 14–17, Portland, OR.
- [32] Gangrade, S., B. S. Naz, S.-C. Kao, M. Ashfaq, R. Mei, D. Rastogi, B. L. Preston, E. D. Kabela, N. Singh, and V. Anantharaj (2015), High Resolution Distributed Hydrological Modeling for Extreme Flood Events, World Environmental & Water Resources Congress 2015, May 17–21, Austin, TX.
- [31] Zhao, G., H. Gao, B. S. Naz, and S.-C. Kao (2015), Integrating Reservoir Flow Regulation Rules into a Spatially Distributed Hydrological Model, World Environmental & Water Resources Congress 2015, May 17–21, Austin, TX.
- [30] Dullo, T., A. Kalyanapu, S. K. Ghafoor, V. Anantharaj, R. Marshall, J. Tatarczuk, and S.-C. Kao (2015), Computational Performance of a Two-Dimensional Flood Model in Single and Multiple GPU Frameworks, European Geosciences Union General Assembly 2015, April 12–17, Vienna, Austria.
- [29] Kao, S.-C., B. S. Naz, S. Gangrade, M. Ashfaq, R. Mei, and D. Rastogi (2014), Projection of Climate Change Impacts on Watershed Storage and Hydropower Generation, American Geophysical Union 2014 Fall Meeting, December 14–19, San Francisco, CA.
- [28] Naz, B. S., S.-C. Kao, M. Ashfaq, S. Gangrade, R. Mei, and D. Rastogi (2014), Climate Change Impacts on Reservoir Inflow in the United States, American Geophysical Union 2014 Fall Meeting, December 14–19, San Francisco, CA.
- [27] Ashfaq, M., D. Rastogi, R. Mei, S.-C. Kao, B. S. Naz, and S. Gangrade (2014), Ultra High-Resolution Ensemble Projections of the Near-Term Climate Change over the U.S., American Geophysical Union 2014 Fall Meeting, December 14–19, San Francisco, CA.
- [26] Naz, B. S., S.-C. Kao, M. Ashfaq, R. Mei, D. Rastogi, and L. C. Bowling (2014), Historical and Future Hydrologic Change in the Conterminous United States, American Water Resources Association 2014 Annual Water Resources Conference, November 3–6, Vienna, VA.

- [25] DeNeale, S. T., Q. F. Zhang, P. W. O'Connor, and S.-C. Kao (2014), Statistical Characteristics of US Hydropower Plant Capacity Factors, HydroVision International 2014, July 22–25, Nashville, TN.
- [24] Pasha, M. F. K., M. Yang, D. Yeasmin, F. Amin, S.-C. Kao, and B. T. Smith (2014), Sensitivity of Spatial Resolution in Hydropower Resource Assessment, HydroVision International 2014, July 22–25, Nashville, TN.
- [23] Kao, S.-C., D. Rastogi, B. S. Naz, M. Ashfaq, B. L. Preston, E. D. Kabela, Rui Mei and N. Singh (2014), Towards the Development of an Integrated Energy-Water Risk Assessment Tool for Probable Maximum Precipitation and Flood, World Environmental & Water Resources Congress 2014, June 1–5, Portland, OR.
- [22] Naz, B. S., S.-C. Kao, M. Ashfaq and R. Mei (2014), Projecting the Potential Impacts of Climate Change on Water Resources for the Conterminous United States through High Resolution Hydro-Meteorological Simulation, the 94th American Meteorological Society Annual Meeting, February 2–6, Atlanta, GA.
- [21] Ashfaq, M., S.-C. Kao, R. Mei, D. Touma, D. Rastogi, S. M. Absar and B. S. Naz (2014), Ultra High-Resolution Near-Term Hydro-Meteorological Projections and Impact Assessments over the United States and South Asia, the 94th American Meteorological Society Annual Meeting, February 2–6, Atlanta, GA.
- [20] Ostro, S., D. Huber, J. H. Casola, D. P. Kaiser, T. P. Karnowski, V. C. Paquit, S.-C. Kao, J. Francis and J. Gullede (2014), Characterizing Anomalous Mid-Tropospheric Ridges and Their Trends, the 94th American Meteorological Society Annual Meeting, February 2–6, Atlanta, GA.
- [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.
- [18] Kao, S.-C., A. A. Oubeidillah, and M. F. K. Pasha (2013), Performance Evaluation of Monthly Streamflow Time Series Synthesized through USGS WaterWatch Runoff and NHDPlus River Network, World Environmental & Water Resources Congress 2013, May 19–23, Cincinnati, OH.
- [17] Oubeidillah, A. A., S.-C. Kao, and M. Ashfaq (2012), A Hydrologic Model Calibration Exercise for Regional Climate Change Impact Assessment of the Conterminous U.S., American Geophysical Union 2012 Fall Meeting, December 3–7, San Francisco, CA.
- [16] Kao, S.-C., M. Ashfaq, M. J. Sale, A. A. Oubeidillah, and N. Diefenbaugh (2012), A Quantitative Assessment Framework for Potential Climate Change Impacts on Regional Hydropower Generation, World Environmental & Water Resources Congress 2012, May 20–24, Albuquerque, NM.
- [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.
- [14] Kao, S.-C., H. K. Kim, C. Liu, X. Cui, and B. L. Bhaduri (2012), A Dependence-Preserving Approach in Synthesizing Household Characteristics, Transpiration Research Board 91st Annual Meeting, January 22–26, Washington, D.C.
- [13] Sale, M. J., S.-C. Kao, R. Uría Martínez, and Y. Wei (2011), Estimating the Effects of Climate Change on Federal Hydropower and Power Marketing, HydroVision International 2011, July 19–22, Sacramento, CA.
- [12] Kao, S.-C., B. Hadjerioua, and Y. Wei (2011), Streamflow Variability and its Potential Impact on Energy Production, World Environmental & Water Resources Congress 2011, May 22–26, Palm Springs, CA.
- [11] Hadjerioua, B., S.-C. Kao, M. J. Sale, Y. Wei, H. A. Shanafield III, D. P. Kaiser, S. K. SanthanaVannan, R. Devarakonda, G. Palanisamy, and B. T. Smith (2011), National Hydropower Asset Assessment Project: An Integrated Water-Infrastructure Research Platform, World

- Environmental & Water Resources Congress 2011, May 22–26, Palm Springs, CA.
- [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.
- [7] Kao, S.-C., A. R. Ganguly, and K. Steinhaeuser (2009), Motivating Complex Dependence Structures in Data Mining: A Case Study with Anomaly Detection in Climate, IEEE ICDM Workshop on Knowledge Discovery from Climate Data: Prediction, Extremes, and Impacts, December 6, Miami, FL, <https://doi.org/10.1145/3394277.3401852> (peer-reviewed).
- [6] Kao, S.-C., R. S. Govindaraju, and D. Niyogi (2009), A Spatio-Temporal Drought Analysis for the Midwestern US, World Environmental & Water Resources Congress 2009, May 18–21, Kansas City, MO.
- [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.
- [2] Kao, S.-C., and R. S. Govindaraju (2006), Evaluating the Probabilistic Structure of Storm Surface Runoff over Indiana, USA, An International Perspective on Environmental and Water Resources, ASCE, December 18–20, New Delhi, India.
- [1] Lin, G.-F., and S.-C. Kao (2001), Establishment of the Regional Design Hyetographs in Taiwan, Proceedings of the 11th Hydraulics Engineering Conference, C180–C187, in July 2001, Taipei, Taiwan.

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	Aligning Climate Analysis for Power Systems (ALCAPS). Role: Co-Investigator (Principal Investigator: G. Buster, NREL).
May 2023–present	A Demonstration of Climate-Informed Flood Vulnerability Assessment for Department of Defense Installations. Role: Co-Investigator (Principal Investigator: S. Gangrade, ORNL).
Mar 2023–present	A Roadmap to Intelligent Watersheds: Evaluating Knowledge Gaps & Feasibility. Role: Co-Investigator (Principal Investigator: C. H. Hansen, ORNL).
Oct 2022–present	Puerto Rico Hydropower Resource Assessment, Oak Ridge National Laboratory. Role: Co-Investigator (Principal Investigator: S. T. DeNeale, ORNL).
Jun 2022–present	DOE-TVA Climate R&D Collaboration, Oak Ridge National Laboratory. 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 – “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.