

**Ganesh R. Ghimire, Ph.D.****Research and Development Staff**

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**EDUCATION**

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| August 2016 – May 2021    | The University of Iowa (UIOWA), Iowa City, Iowa, U.S.<br>Ph.D., Hydraulics and Water Resources<br>Advisor: Witold F. Krajewski<br>Dissertation: Predictability of streamflow across space and time scales  |
| August 2014 – May 2016    | Southern Illinois University - Carbondale (SIUC), Illinois, U.S.<br>M.S., Water Resources Engineering<br>Thesis: Developing sediment transport and deposition prediction model of the Lower Ohio River near the Olmstead locks and dam area<br>Advisor: Bruce A. DeVantier |
| October 2004 – March 2009 | Institute of Engineering (IOE), Tribhuvan University, Lalitpur, Nepal<br>B.E., Civil Engineering (Water Resources)   |

**RESEARCH INTERESTS**

Hydrologic forecasting; HPC-enabled large-scale hydrologic and hydraulic modeling; Hydrodynamic flood modeling; Climate change impact assessment; Hydroclimate extremes; Energy; Remote sensing and data assimilation; Natural hazards; Machine learning/Deep learning; Uncertainty quantification; Food-Water-Energy-Health nexus.

**RESEARCH EXPERIENCE**

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| November 2022 – Present | R&D Staff<br>Water Resources Science and Engineering, Environmental Sciences Division, Oak Ridge National Laboratory, Tennessee.                       |
| May 2021 – October 2022 | Postdoctoral Research Associate<br>Water Resources Science and Engineering, Environmental Sciences Division, Oak Ridge National Laboratory, Tennessee. |
| August 2016 – May 2021  | Graduate Research Assistant<br>IIHR–Hydroscience & Engineering, Department of Civil and Environmental Engineering, The University of Iowa, Iowa.       |
| June 2016 – July 2016   | Transition from Masters (SIUC) to Ph.D. (UIOWA)  |
| August 2014 – May 2016  | Graduate Research Assistant<br>Department of Civil and Environmental Engineering, Southern Illinois University–Carbondale (SIUC), Illinois.            |

**TEACHING EXPERIENCE**

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| August 2014 – May 2016 | Teaching Assistant ENGR370 Fluid Mechanics<br>(Fluid mechanics lab instructor)<br>Southern Illinois University-Carbondale (SIUC), Illinois. |
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**PROFESSIONAL EXPERIENCE**

- June 2010 – July 2014                      Civil–Hydropower Design Engineer/ Deputy Design Team Leader  
Hydro–Consult Engineering Ltd., Kathmandu, Nepal.
- May 2009 – May 2010                      Civil–Hydropower Engineer  
Tundi Power Company, Lalitpur, Nepal.

**KEY PUBLICATIONS**

- [32] **Ghimire, G.R.**, Kao, S.C., and Gangrade, S. 2023: Enhanced Streamflow Reanalysis with Multiple Forcings for Improved Peak Flow Dynamics in the Contiguous United States. *Journal of Geophysical Research-Atmospheres* (In preparation)
- [31] Turner, S.W.D., **Ghimire, G.R.**, Hansen, C., Singh, D., and Kao, S.C. 2023: Hydropower capacity factors trending down in the United States. *Nature Energy* (Ready to submit)
- [30] **Ghimire, G.R.**, Liu, Y., Jager, H., Gangrade, S., Kao, S.C., Parish, E., and DeRolph, C. 2023: A Large-scale Assessment of Perennial Riparian Buffers as a Flood-resilient Climate Adaption Strategy for Agricultural Landscapes. *Science of the Total Environment* (Ready to submit)
- [29] Bista, S., Baniya, R., Sharma, S., **Ghimire, G.R.**, Panthi, J., Prajapati, R., Thapa, B.R., and Talchabhadel, R. 2023: Hydrologic applicability of satellite precipitation estimates for irrigation water management in the data-scarce region. *Journal of Hydrology* (In review)
- [28] Baniya R., Regmi, R.K., Talchabhadel, R., Sharma, S., Panthi, J., **Ghimire, G.R.**, Bista, S., and Thapa, B.R. 2023: Integrated modeling for assessing climate change impacts on water resources and hydropower potential in the Himalayas. *Theoretical and Applied Climatology* (In review).
- [27] Gangrade, S., **Ghimire, G.R.**, Kao, S.C., Morales-Hernández, M., Tavakoly, A.A., Gutenson, J.L., Sparrow, K.H., Darkwah, G.K., Kalyanapu, A.J., and Follum, M.L. 2023: Unraveling 2021 Central Tennessee flood event using a hierarchical multi-model inundation modeling framework. *Journal of Hydrology* <https://doi.org/10.1016/j.jhydrol.2023.130157>.
- [26] Baniya R., Talchabhadel, R., Panthi, J., **Ghimire, G.R.**, Sharma, S., Khadka, P., Shin, S., Pokhrel, Y., Bhattarai, U., Prajapati, R., Thapa, B.R., and Maskey, R.K. 2023: Nepal Himalaya offers considerable potential for pumped storage hydropower. *Sustainable Energy Technologies and Assessments* <https://doi.org/10.1016/j.seta.2023.103423>.
- [25] **Ghimire, G.R.**, Hansen, C., Gangrade, S., Kao, S.C., Thornton, P., and Singh, D. 2022: Insights from Dayflow: A historical streamflow reanalysis dataset for the Conterminous United States. *Water Resources Research* <https://doi.org/10.1029/2022WR032312>.
- [24] Sharma, S., **Ghimire, G.R.**, and Siddique, R. 2022: Machine Learning for Postprocessing Ensemble Streamflow Forecasts. *Journal of Hydroinformatics* <https://doi.org/10.2166/hydro.2022.114>.
- [23] Shrestha R., Rakhal, B., Adhikari, T.R., **Ghimire, G.R.**, Talchabhadel, R., Tamang, D., KC, R., and Sharma, S. 2022: Farmers' Perception of Climate Change and its Impacts on Agriculture. *Hydrology*, 9, 212. <https://doi.org/10.3390/hydrology9120212>
- [22] Hansen, C., **Ghimire, G.R.**, and Kao, S.C. 2022: Evaluation of nominal energy storage at existing hydropower reservoirs in the US. *Water Resources Research* <https://doi.org/10.1029/2022WR032210>
- [21] **Ghimire, G.R.**, Hansen, C., Gangrade, S., Kao, S.C., Thornton, P., and Singh, D. 2022: Dayflow: CONUS Daily Streamflow Reanalysis, Version 1. *HydroSource, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA*. DOI: [10.21951/Dayflow/1847639](https://doi.org/10.21951/Dayflow/1847639)
- [20] Hansen, C.H., **Ghimire, G.R.**, and Gangrade, S. 2021: Hydropower Energy Storage Capacity Dataset. *HydroSource, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA*. DOI: [10.21951/HESC/1822833](https://doi.org/10.21951/HESC/1822833)

- [19] Sharma, S., Talchabhadel, R., Nepal, S., **Ghimire, G.R.**, Rakhal, B., Panthi, J., Adhikari, B.R., Pradhanang, S.M., Maskey, S., and Kumar, S. 2022: Increasing risk of cascading hazards in the central Himalayas. *Natural Hazards* <https://doi.org/10.1007/s11069-022-05462-0>
- [18] **Ghimire, G. R.**, Krajewski, W.F., Ayalew, T.B., and Goska, R. 2022: Hydrologic investigations of radar-rainfall errors propagation to rainfall-runoff model hydrographs. *Advances in Water Resources* <https://doi.org/10.1016/j.advwatres.2022.104145>
- [17] Sharma, S., Dahal, K., Nava, L., Gouli, M. R., Talchabhadel, R., Panthi, J., Roy, T., and **Ghimire, G.R.** 2022: Natural Hazards Perspectives on Integrated, Coordinated, Open, Networked (ICON) Science *Earth and Space Science* <https://doi.org/10.1029/2021EA002114> (Featured as a Research Spotlight on AGU EOS issue <https://eos.org/research-spotlights/icon-principles-underused-as-a-natural-hazards-research-tool>).
- [16] Krajewski, W.F., **Ghimire, G. R.**, Demir, I., and Mantilla, R. 2021: Real-time streamflow forecasting: AI vs. Hydrologic insights. *Journal of Hydrology X* <https://doi.org/10.1016/j.hydroa.2021.100110>
- [15] Sharma, S., **Ghimire, G.R.**, Talchabhadel, R., Panthi, J., Lee, B.S., Sun, F., Baniya, R., and Adhikari, T.R. 2021: Characterizing uncertainties surrounding fluvial flood hazard estimates using a Bayesian approach. *Hydrologic Sciences Journal* <https://doi.org/10.1080/02626667.2021.1999959>
- [14] **Ghimire, G. R.**, Jadidoleslam, N., Goska, R., and Krajewski, W.F. 2021: Insights into storm direction effect on flood response. *Journal of Hydrology* <https://doi.org/10.1016/j.jhydrol.2021.126683>
- [13] Panthi, J., Talchabhadel, R., **Ghimire, G.R.**, Sharma, S., Dahal, P., Baniya, R., Boving, T., Pradhanang, S.M., and Parajuli, B. 2021: Hydrologic regionalization under data scarcity: An implication for streamflow prediction *ASCE Journal of Hydrologic Engineering*, [https://doi.org/10.1061/\(ASCE\)HE.1943-5584.0002121](https://doi.org/10.1061/(ASCE)HE.1943-5584.0002121)
- [12] **Ghimire, G. R.**, Krajewski, W.F., and Quintero, F. 2021: Scale-dependent value of QPF for real-time streamflow forecasting. *Journal of Hydrometeorology*, <https://doi.org/10.1175/JHM-D-20-0297.1>
- [11] Rakhal, B., Sharma, S., **Ghimire, G.R.**, Adhikari, T.R., and Shrestha, R. Nepal's communities brace for multihazard risks. *EOS*, 102, <https://doi.org/10.1029/2021EO159039>
- [10] Talchabhadel, R., **Ghimire, G.R.**, Sharma, S., Dahal, P., Panthi, J., Baniya, R., Pudashine, J., Thapa, B.R., PC, S., and Parajuli, B. 2020: Weather radar in Nepal: Opportunities and challenges in a mountainous region. *Weather*, <https://doi.org/10.1002/wea.3994>
- [9] Talchabhadel, R., Panthi, J., Sharma, S., **Ghimire, G.R.**, Baniya, R., Dahal, P., Baniya, M.P., K.C. S., Jha, B., Kaini, S., Dahal, K., Gnyawali, K.R., Parajuli, B., and Kumar, S. 2021: Insights on the impacts of hydroclimatic extremes and anthropogenic activities on sediment yield of a river basin *Earth*, 2(1), 32-50, <https://doi.org/10.3390/earth2010003>
- [8] Rakhal, B., Adhikari, T.R., Sharma, S., and **Ghimire, G.R.** 2021: Assessment of channel shifting of Karnali Megafan in Nepal using remote sensing and GIS. *Annals of GIS*, <https://doi.org/10.1080/19475683.2021.1871950>
- [7] **Ghimire, G.R.**, DeVantier, B.A., and Sharma, S. 2020: Site-specific sediment deposition model for dredging planning: Case study of Olmstead locks and dam. *ASCE Journal of Waterway, Port, Coastal and Oceanic Engineering*. [https://doi.org/10.1061/\(ASCE\)WW.1943-5460.0000598](https://doi.org/10.1061/(ASCE)WW.1943-5460.0000598)
- [6] **Ghimire, G. R.**, Sharma, S., Panthi, J., Talchabhadel, R., Parajuli, B., Dahal, P., and Baniya, R. 2020: Benchmarking real-time streamflow forecasting skill in the Himalayan region. *Forecasting*, 2, 3, 230-247, <https://doi.org/10.3390/forecast2030013>
- [5] **Ghimire, G. R.**, and Krajewski, W. F. 2020: Hydrologic implications of wind farm effect on radar-rainfall observations. *Geophysical Research Letters*, 47, <https://doi.org/10.1029/2020GL089188>
- [4] **Ghimire, G. R.**, Jadidoleslam, N., Krajewski, W.F., and Tsonis, A. A. 2020: Insights on streamflow predictability across scales using horizontal visibility graph-based networks. *Frontiers in Water*, 2, 17, 1-15, <https://doi.org/10.3389/frwa.2020.00017>

- [3] Krajewski, W. F., **Ghimire, G. R.**, and Quintero, F. 2020: Streamflow forecasting without models. *Journal of Hydrometeorology*, 21, 1689-1704, <https://doi.org/10.1175/JHM-D-19-0292.1>
- [2] **Ghimire, G. R.**, and W. F. Krajewski, 2020: Exploring persistence in streamflow forecasting. *Journal of the American Water Resources Association*, 56, 542–550, <https://doi.org/10.1111/1752-1688.12821>
- [1] **Ghimire, G.R.**, W.F. Krajewski, and R. Mantilla. 2018: A power law model for river flow velocity in Iowa basins. *Journal of the American Water Resources Association*, 1–13, <https://doi.org/10.1111/1752-1688.12665>

## RESEARCH PROJECTS

- [4] DOE's Towards Climate-Resilient Energy Planning: Enhancing Power Sector Resilience through Climate-Adjusted Future Extreme Weather Scenarios proposal, 2023: Open-source ensemble hydrodynamic flood risk assessment for climate change (co-PI: \$4.35 million - in review)
- [3] DOE's Innovative and Novel Computational Impact on Theory and Experiment (INCITE) program proposal, 2022: Open-source ensemble hydrodynamic flood risk assessment for climate change (co-PI: in review)
- [2] Awarded DOD's Environmental Security Technology Certification Program (ESTCP) program grant, 2022: A demonstration of climate-informed flood vulnerability assessment for Department of Defense installations (co-PI: \$1.5 million)
- [1] Awarded DOE Water Power Technology Office (WPTO) hydropower lab seedling program request for innovation grant, 2022: Flood hazard and uncertainty assessment tool for evaluating dam safety under climate change (PI; \$50k)

## CONFERENCE PAPER / PRESENTATIONS

- [33] DOE-WPTO Seedlings Symposium, 08/2023, Washington, DC (virtual). Flood Hazard and Uncertainty Assessment Tool for Evaluating Dam Safety under Climate Change (speaker)
- [32] World Environmental and Water Resource Congress (EWRI), 05/2023, Henderson, NV. CMIP6-informed flood hazard and uncertainty assessment for dam safety evaluation (speaker)
- [31] Innovations in Climate Resilience (ICR), 03/2023, Columbus, OH. Perennial Riparian Buffers for Bioenergy: A Flood-resilient Climate Adaptation for Agricultural Landscapes (speaker)
- [30] American Meteorological Society (AMS) annual conference, 01/2023, Denver, CO. [Hydrodynamic Inundation Simulation for Large Global Watersheds – A Proof of Concept](#)
- [29] American Geophysical Union (AGU) conference, 12/2022, Chicago, IL. [Ecosystem Services from Partially-harvested Riparian Buffers](#)
- [28] American Geophysical Union (AGU) conference, 12/2022, Chicago, IL. [Towards the development of a high-resolution historical flood inundation reanalysis dataset for the conterminous United States](#)
- [27] American Geophysical Union (AGU) conference, 12/2022, Chicago, IL. [Accounting Uncertainties is Crucial to Improving Multipurpose Reservoir Management](#)
- [26] American Geophysical Union (AGU) conference, 12/2022, Chicago, IL. [Multi-satellite Precipitation Estimates Can Improve Irrigation Water Decisions](#)
- [25] American Geophysical Union (AGU) conference, 12/2022, Chicago, IL. [Insights from Dayflow: A Spatiotemporally Continuous Historical Streamflow Reanalysis Dataset for the Conterminous United States](#) (speaker)
- [24] AGU Frontiers in Hydrology Meeting (FIHM), 06/2022, Puerto Rico. [The Water, Climate, and Energy Nexus: Charting the Role of DOE's Technology Offices](#) (panelist)
- [23] AGU Frontiers in Hydrology Meeting (FIHM), 06/2022, [Puerto Rico. Unraveling an extreme flooding event using high-performance computing: A case study for the 2021 Middle Tennessee flooding](#) (speaker)
- [22] AGU Frontiers in Hydrology Meeting (FIHM), 06/2022, Puerto Rico. [Improving Hydrologic Model Performance and Synthetic Rating Curves Using Streamflow Data Assimilation](#)
- [21] EWRI Conference, 06/2022, Atlanta, GA. The Applicability of Deep Learning Techniques in Developing a Surrogate Flood Inundation Model for Operational Needs.

- [20] European Geosciences Union (EGU) Conference, 05/2020, Vienna, Austria. [Hydrologic response to climate change: A case from a high-mountain river basin](#).
- [19] ORNL's Your Science in a Nutshell (YSiNS) competition, 05/2022.
- [18] Joint Aquatic Science Meeting (JASM), 05/2022, Grand Rapids, MI. Building bridges between big datasets to better describe US hydropower reservoirs
- [17] American Geophysical Union (AGU) conference, 12/2021, New Orleans, LA. [Evaluation of energy and water storage of conventional hydropower fleet in the U.S. under climate change](#) (speaker)
- [16] American Geophysical Union (AGU) conference, 12/2021, New Orleans, LA. [Enhancing Operational Flexibility of Integrated Nepalese Power System through Pumped-storage Hydropower](#) (speaker)
- [15] American Geophysical Union (AGU) conference, 12/2020, San Francisco, CA. [Basin rotation method to quantify the effect of rainstorm movement on flood peak response](#) (speaker)
- [14] American Geophysical Union (AGU) conference, 12/2020, San Francisco, CA. [Climate-informed decision-making for hydropower resilience in the central Himalayas](#)
- [13] AWRA 2020 Virtual Geospatial Water Technology Conference, 08/2020, Austin, TX. Predictability of streamflow from complex networks (speaker)
- [12] European Geosciences Union (EGU) Conference, 05/2020, Vienna, Austria. [Scale-Dependent Worth of QPF for Real-Time Streamflow Forecasting](#) (speaker), and [Inference On Streamflow Predictability Using Horizontal Visibility Graph Based Networks](#) (speaker)
- [11] American Geophysical Union (AGU) conference, 12/2019, San Francisco, CA. Streamflow forecasting without models
- [10] American Geophysical Union (AGU) conference, 12/2019, San Francisco, CA. [In Quest for Rainfall Estimation Adequate for Real-Time Streamflow Forecasting](#)
- [9] 12<sup>th</sup> International Precipitation Conference (IPC12), 06/2019, Irvine, CA. Hydrologic investigations of propagation of errors in rainfall to hydrographs (speaker)
- [8] American Geophysical Union (AGU) conference, 12/2018, Washington D.C. [A Framework for Evaluating the Propagation of Errors in Rainfall to Hydrographs](#) (speaker)
- [7] American Meteorological Society (AMS) Annual Meeting, 1/2018, Austin, TX. [Hydrologic Routing Model of the Iowa Flood Center Real-Time Streamflow Forecasting System](#)
- [6] American Meteorological Society (AMS) Annual Meeting, 1/2018, Austin, TX. [Evaluation Studies of Real-Time Flood Forecasting: A Review of Issues](#)
- [5] American Geophysical Union (AGU) conference, 12/2017, New Orleans, LA. [A Hydrologic Routing Model Based on Geomorphological Characteristics of the River Network](#)
- [4] American Geophysical Union (AGU) conference, 12/2017, New Orleans, LA. [Effects of Radar-Rainfall Products on Distributed Streamflow Prediction](#)
- [3] American Geophysical Union (AGU) conference, 12/2017, New Orleans, LA. [A Hydrologic Routing Model Based on Geomorphological Characteristics of the River Network](#)
- [2] World Environmental and Water Resources (EWRI) Congress, 05/2016, West Palm Beach, FL. "Sediment modeling to develop a deposition prediction model at the Olmsted locks and dam area" and "Role of low impact development in the attenuation of flood flows in urban areas".
- [1] Mid-American Environmental Engineering Conference (MAEEC), 09/2015. Columbia, MO. Developing sediment transport and deposition prediction model of Lower Ohio River near the Olmstead locks and dam area.

## CONFERENCE / WORKSHOP ORGANIZING

- [7] American Meteorological Society (AMS) Annual Meeting, 01/2024, Baltimore, MD (chair). Recent Advances in Modeling, Monitoring, Mapping, and Forecasting of Floods (session accepted)
- [6] American Geophysical Union (AGU) conference, 12/2023, San Francisco, CA (convener). [Hydroclimatic Disasters in Data-Scarce Regions: Interfacing Science and Policy](#) (session accepted)
- [5] American Geophysical Union (AGU) conference, 12/2023, San Francisco, CA (convener). [Recent Advances in Large-Scale High-Resolution Hydrologic and Flood Modeling and Hydroclimatic Extremes Assessment - Assigned by Committee](#) (session accepted)

- [4] American Meteorological Society (AMS) Annual Meeting, 01/2023, Denver, CO (chair). Recent Advances in Modeling, Monitoring, Mapping, and Forecasting of Floods
- [3] American Geophysical Union (AGU) conference, 12/2022, Chicago, IL (convener). [Recent Advances in Large-Scale High-Resolution Hydrologic and Flood Modeling and Hydroclimatic Extremes Assessment - Assigned by Committee](#)
- [2] American Geophysical Union (AGU) conference, 12/2022, Chicago, IL (convener). [Hydroclimatic Modeling, Analyses, and Projections in South Asia and Southeast Asia: Challenges and Opportunities](#)
- [1] American Geophysical Union (AGU) conference, 12/2021, New Orleans, LA (convener). [Hydroclimatic Modeling, Analyses, and Projections in South Asia: Challenges and Opportunities](#)

## WORKSHOPS / TRAINING

- DOE's Climate Communication Workshop, 05/2022. ORNL.
- ATS-Amanzi Hydrologic Modeling Workshop, 08/2021. ORNL.
- The Community WRF-Hydro Modelling System Training Workshop, 06/2018. CUASHI-NCAR, Boulder, CO.
- Pre-conference Workshop on quantitative precipitation estimates (QPE), CHRS-PERSIANN, extreme value analysis, and National Water Model, 06/2019. Irvine, CA.
- Machine learning with Python workshop, 11/2019, The University of Iowa, Iowa City, IA.

## HONORS / AWARDS

2021	Dan Branson fellowship (\$3,000)
2020	Ballard and Seashore Ph.D. dissertation fellowship (\$10,000)
2018/2019/2020	CGRER travel grant for AGU conference
2018	CUASHI travel grant for WRF-Hydro training workshop
2004	Undergraduate fellowship, Tribhuvan University, Nepal

## PROFESSIONAL MEMBERSHIPS

American Geophysical Union; American Water Resources Association; European Geosciences Union; Nepal Engineer's Association; ASCE; Society for Industrial and Applied Mathematics; Engineer in Training (EIT), Michigan board

## LEADERSHIP ROLES

August 2016 – April 2021      President, Nepalese Student Association, The University of Iowa

## TECHNICAL SKILLS

- Programming language: Python, MATLAB, R, FORTRAN, PostgreSQL
- Hydrologic models: VIC, RAPID, Hillslope-Link Model (HLM), WRF-Hydro, HEC-HMS
- Hydraulic/hydrodynamic models: TRITON, HEC-RAS 1D/2D, HEC-GeoRAS, CCHE2D, EPA-SWMM
- Datasets: MRMS, NLDAS-2, Stage IV, HRRR, GFS, GEOS, WPC, APHRODITE
- Data formats: HDF5, NetCDF, GRIB2, ASCII, DAT, CSV
- Statistics: Bayesian statistics, Geostatistical analysis, Nonlinear dynamics, Extreme value theory, Time series modeling, Forecast verification, Uncertainty quantification, OpenBUGS, SAS
- Research tools: High-performance computing (HPC; OLCF facilities such as Summit and Andes; US AirForce HPC11), Google Earth Engine, Unix/Linux, Git/GitHub, ArcGIS/QGIS, Latex, Data Visualization

## REVIEWER FOR JOURNALS

Water Resources Research; Journal of Hydrometeorology; Journal of Hydrology; Nature Scientific Reports; Geophysical Research Letters; Environmental Modeling and Software; Journal of the American Water Resources Association; Frontiers in Water; Earth System Science Data; Sustainable and Resilient Infrastructure